LONDON MEETING

3-5 January 2024
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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 3rd – 5th January 2024.

The local organiser is Joanne Taylor.

**22nd EPS Mid-Career Award Lecture**

*Wednesday 3rd January, 5.45pm*

The enduring importance of the ‘Fine Cuts’ approach to psychology.

Geoffrey Bird, University of Oxford

**Poster Sessions**

There will be three poster sessions, to be held on Wednesday 3rd January between 7pm and 8pm in Room 305 with an accompanying wine reception. The second poster session will be held on Thursday 4th January between 5.45pm and 6.45pm in Room 305 with an accompanying wine reception. The third poster session will be held on Friday 5th January between 9.30am and 10.30am in Room 305 with accompanying pastries.

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 4th January from 7.15pm at the Tas Bloomsbury restaurant.

For more details on how to book a place at the conference dinner, please see page 85.
START OF PARALLEL SESSIONS

Session A - Lower Ground Floor Lecture Theatre

12:30  Lee Parkin* and Aneeza Pervez* (University of Nottingham) (Sponsor: Mark Haselgrove) The Great Chocolate Chase: The effects of priming on a virtual public goods game.


13:00  Mahsa Barzy, Jessica Moore, Lindsey Cameron and Heather Ferguson (University of Kent) Associations between perspective-taking and prosociality in early adolescents and young adulthood.

13:15  Alicia Mixter*, Bryony Payne, Geoffrey Bird and Caroline Catmur (King’s College London, University of Oxford, University of Birmingham) (Sponsor: Caroline Catmur) Prior experience of others’ minds underpins the ability to infer mental states.

13:30  Tea / Coffee
START OF PARALLEL SESSIONS

Session B - Ground Floor Lecture Theatre

12:30  Mengxin Wang*, David Brainard* and Hannah Smithson (University of Oxford, University of Pennsylvania, United States of America) (Sponsor: Hannah Smithson) Simulations of Vernier thresholds unravel the role of fixational eye movements in visual sampling.

12:45  Shaun Dordoy*, Spencer Talbot*, Rory Baxter* and Alastair Smith (School of Psychology, University of Plymouth, Brain Research Imaging Centre, University of Plymouth, School of Nursing and Midwifery, University of Plymouth) (Sponsor: Alastair Smith) Probability cueing in large-scale search: The role of environmental information in statistical learning.

13:00  Merryn Constable*, Mante Kvederaviciute*, James Strachan* and Jason Rajsic* (Northumbria University, University Hamburg-Eppendorf, Germany) (Sponsor: Andrew Bayliss) On the basketball court: How territorial context impacts information processing and responses.

13:15  Emily Mason*, Piotr Barc*, Seraj Brugi*, George Malcolm* and Stephanie Rossit (University of East Anglia) (Sponsor: Stephanie Rossit) Grab My Attention: An eye-tracking study investigating attentional bias towards graspable objects during visual search.

13:30  Tea / Coffee
START OF PARALLEL SESSIONS

Session A - Lower Ground Floor Lecture Theatre

EPS Mid-Career Award Symposium
Clinical social cognition: From measurement to mindspace.
Organised by Caroline Catmur.

14:00 Essi Viding (University College London) Antisocial social cognition: Challenges for research progress.

14:30 Francesca Happé (King’s College London) ‘A bit autistic’: Do autism and ‘high autistic traits’ share socio-cognitive underpinnings?

15:00 Hélio Clemente Cuve (University of Bristol) The role of alexithymia in affective-autonomic responding in autism: Insights from multivariate approaches.

15:30 Tea / Coffee

16:00 Hannah Hobson (University of York) Alexithymia and Language: Drawing evidence from clinical and non-clinical data.

16:30 Ivan Toni (Radboud University, Netherlands) Neuro-cognitive mechanisms of joint epistemic engineering in human communication.

17:00 Elizabeth Pellicano, Melanie Heyworth and Diana Tan (University College London, London, Macquarie University, Australia, Reframing Autism, Australia) Reframing Autism, Australia) Reshaping understanding of Autistic sociality.

17:30 Break

17:45 22nd Mid-Career Award Lecture
Geoffrey Bird, University of Oxford
The enduring importance of the ‘Fine Cuts’ approach to psychology.

19.00 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**

14:00  Gabriel Strain*, Andrew Stewart, Paul Warren and Caroline Jay (University of Manchester) (Sponsor: Andrew Stewart) Changing visual features to bias the perception of correlation in scatterplots.

14:30  Thomas Ormerod and James MacGregor (University of Sussex, University of Victoria BC, Canada) Testing a computational model of insight with the nine-dot problem and Mendeleev’s periodic table.

15:00  David Watson and Timothy Andrews (University of York) Mapping the connectivity of the scene network in the human brain.

15:30  Tea / Coffee

16:00  Yuyan Xue* and John Williams (University of Cambridge) (Sponsor: John Williams) Top-down effects of brief linguistic training on visual perception of non-verbal stimuli.

16:30  Helen Breadmore* and S Helene Deacon* (University of Birmingham, Dalhousie University) (Sponsor: Jo Taylor) Timing and priming morphological processes during spelling.

17:00  Jon Carr* and Kathleen Rastle (Royal Holloway, University of London) (Sponsor: Kathleen Rastle) An experimental investigation of the cultural evolution of informative writing systems.

17:30  Break

17:45  **22nd Mid-Career Award Lecture – Lower Ground Floor Lecture Theatre**
Geoffrey Bird, University of Oxford
The enduring importance of the ‘Fine Cuts’ approach to psychology.

19.00  **Poster Session – Room 305 with accompanying wine reception.**

*EPS Poster Session - Online Posters and Talk Through Videos*
Session A - Lower Ground Floor Lecture Theatre

09:30  Jayne Spiller* and Camilla Gilmore (University of Leicester, Loughborough University) (Sponsor: Camilla Gillmore) Positive impact of sleep on recall of multiplication facts.

09:45  Guyu Shen* and Bo Yao (Lancaster University) (Sponsor: Bo Yao) The role of episodic and visual-semantic memory systems in abstract and concrete conceptual processing.

10:00  Patrick Haggard, Gianluca Pontonio* and Lucie Charles (University College London, Queen Mary, University of London) Action source attribution and the subjective experience of control.

10:15  Joshua Khoo*, Christina Sapachlari*, Roland Pfister*, Claudia Danielmeier* and Jan Derrfuss* (University of Nottingham, Trier University, Germany) (Sponsor: Lauren Marsh) Examining the error cancellation effect in children with the arrow flanker task.

10:30  Tea / Coffee

11:00  Antje Meyer and Constantijn van der Burght* (Max Planck Institute for Psycholinguistics Nijmegen, The Netherlands) Are nouns and verbs represented separately in the mental lexicon?

11:15  Aureliu Lavric, Brontë Graham, Heike Elchlepp and Stephen Monsell (University of Exeter) Do “naturalistic” language cues reduce or even eliminate language switch costs in bilingual production?


11:45  Naomi Kingston*, Nikki Dean Marshall* and Emma Morgan (University of Sheffield, University of Nottingham) (Sponsor: Emma Morgan) The Impact of bilingualism on executive functioning in autistic adults.

12:00  Annual General Meeting

13:00  Lunch
**Session B - Ground Floor Lecture Theatre**

**09:30**  
Jessica De La Mare* and Anthony Lee* (University of Stirling) (Sponsor: Lily FitzGibbon) Individual differences in online dating behaviour when presented with an abundance of choice.

**09:45**  
Steven Samuel, Robert Lurz* and Sarah Salo* (City, University of London, City University of New York, United States of America, Plymouth University) Evidence of belief infection in a change-of-location task: Belief-representation or belief-simulation?

**10:00**  
Holly Cooper* and Rachel Bennetts (Brunel University London) (Sponsor: Rachel Bennetts) Childhood trauma’s effect on emotion recognition across static, dynamic, and audio-visual expressions: an eye tracker study.

**10:15**  
Vassilis Kotsaris* and Ruben Azevedo* (University of Kent) (Sponsor: Luigi Tame) Interoceptive predictive processing during an adaptive empathy task.

**10:30**  
Tea / Coffee

**11:00**  
Anne Gaule*, Peter Martin*, Patricia Lockwood, Jo Cutler, Matthew Apps*, Ruth Roberts, Harriet Phillips*, Katie Brown*, Eamon McCrory* and Essi Viding (Division of Psychology and Language Sciences, University College London, Department of Applied Health Research, University College London, University of Birmingham) (Sponsor: Essi Viding) Reduced prosocial motivation and effort in adolescents with conduct problems and callous-unemotional traits.

**11:15**  
Ruihan Wu*, Sarah White and Antonia Hamilton (University College London) (Sponsor: Sarah White) Neural and facial mechanisms of intergroup bias and ToM in smile discrimination: A fNIRS study.

**11:30**  
Sebastian Suggate* (University of York and University of Regensburg) (Sponsor: Geoff Cole) Beyond Self-Report: Measuring visual, auditory and tactile mental imagery using a mental comparisons task.

**11:45**  
Angela Nyhout*, Emily Veall* and Patricia Ganea* (University of Kent, University of Toronto, Canada) (Sponsor: Heather Ferguson) The co-construction of counterfactual worlds in parent-child conversations.

**12:00**  
Annual General Meeting

**13:00**  
Lunch
Session A - Lower Ground Floor Lecture Theatre

14:00  Jo Taylor, Jiayin Li, Louise Wong, Catarina Rodrigues, Rachael Hulme, Holly Joseph and Fiona Kyle (University College London, University of Reading, Herriot Watt University) Anchoring does not boost the benefit of contextual diversity for word learning.

14:30  Nikki Dean Marshall*, Jane Morgan, David Playfoot and Anna Di Betta (University of Nottingham, Sheffield Hallam University, University of Swansea) (Sponsor: David Playfoot) Interlingual Homographs as semantic primes in sentence contexts: does prime duration matter?


15:30  Tea / Coffee

16:00  Anastasiya Lopukhina*, Walter van Heuven, Rebecca Crowley and Kathleen Rastle (Royal Holloway, University of London, University of Nottingham) (Sponsor: Kathleen Rastle) Where do children look when watching videos with same-language subtitles?

16:30  Jinyu Shi*, Yifan Yang, Kate Nation and Elizabeth Wonnacott (University of Oxford) (Sponsor: Kate Nation) Learning from the input: a corpus-based investigation of Chinese classifiers in children’s books and child-directed speech.

17:00  Emilie de Montpellier de Vedrin*, Rik Henson and Deborah Talmi (University of Cambridge) (Sponsor: Deborah Talmi) Effect of emotion on hippocampal-dependent associative binding.

17:45  Poster Session 2 – Room 305 with accompanying wine reception.

EPS Poster Session - Online Posters and Talk Through Videos

Conference Dinner
Thursday 4th January, pm

**Session B - Ground Floor Lecture Theatre**

14:00  **Ishita Chowdhury*, Antonia Hamilton and Sarah White** (University of Surrey, University College London) (Sponsor: Sarah White) Lying to the like-minded: is it easier to spot deception in someone of the same neurotype?

14:30  **Bryony Payne*, Geoffrey Bird and Caroline Catmur** (King’s College London, University of Oxford, University of Birmingham) (Sponsor: Caroline Catmur) Understanding in-group and out-group minds: Feedback on mental state inferences improves accuracy and awareness.

15:00  **Hitoshi Nishimura*, Jennifer Rodd and Joanne Taylor** (University College London) Are Japanese and English speaker’s sensitive to sound symbolism and orthographic effects when processing the meaning of Japanese mimetic words?

15:30  Tea / Coffee

16:00  **Daniel Yon, George Blackburne* and Chris Frith** (School of Psychological Sciences, Birkbeck, University of London, Institute of Advanced Study, Paris, Department of Experimental Psychology, University College London, Institute of Philosophy, University of London, Wellcome Centre for Human Neuroimaging, University College London) Communicated priors tune the perception of control.

16:30  **Emma Ward* and Clare Press** (Birkbeck, University of London, University College London) (Sponsor: Clare Press) Surprise impairs perception of surprising and incidental events.

17:00  **Holger Wiese, Tsvetomila Popova, Mike Burton and Andrew Young** (Durham University, University of York, Bond University, Australia) How neural representations of newly learnt faces change over time: Event-related brain potential evidence for overnight consolidation.

17:45  **Poster Session 2 – Room 305 with accompanying wine reception.**

**EPS Poster Session - Online Posters and Talk Through Videos**

Conference Dinner
START OF PARALLEL SESSIONS

Session A - Lower Ground Floor Lecture Theatre

09:30 Poster Session 3 – Room 305 with accompanying pastries.

EPS Poster Session - Online Posters and Talk Through Videos

10:30 Break

10:45 Alicia Franco-Martinez*, David Shanks and Miguel Vadillo (Autonomous University of Madrid, Spain, University College London) (Sponsor: Miguel Vadillo) Modelling visual search and awareness in the additional singleton task.

11:00 Ruben Azevedo* (University of Kent) (Sponsor: Luigi Tame) Orienting towards saliency: context dependent cardiac phase effects in the processing of salient stimuli.

11:15 Jiayin Li*, Ian Cunnings* and Fang Liu (University of Reading) (Sponsor: Fang Liu) Selective attention in a dynamic “cocktail-party” scenario: Behavioural evidence of cueing effects in ASD.

11:30 Martin Thirkettle* and Charlotte Wilson* (Sheffield Hallam University) (Sponsor: Jeremy Tree) Anger or Happiness superiority effect in multi-target face search.

11:45 Tea / Coffee
START OF PARALLEL SESSIONS

Session B - Ground Floor Lecture Theatre

09:30  Poster Session 3 – Room 305 with accompanying pastries.

EPS Poster Session - Online Posters and Talk Through Videos

10:30  Break

10:45  Richard Stephens (Keele University) Experimental evidence for the efficacy of science blogging as a tool for science communication via increased psychological flow.

11:00  Theodore Carlson Webster*, Marina Wimmer and Faye Skelton* (Edinburgh Napier University) (Sponsor: Tina Seabrooke) Confidence, partisanship, and fact checking in false memories for fake news.

11:15  Tina Seabrooke, Ariana Modirrousta-Galian*, Nelu Jayaweera* and Philip Higham (University of Southampton) Re-evaluating the efficacy of the Bad News Game: Reduced discrimination of true and fake news headlines in a British student population.

11:30  Renata Sadibolova and Devin Terhune (University of Roehampton, King's College London) An unrecognized confound in (Bayesian) optional stopping.

11:45  Tea / Coffee
Session A – Lower Ground Floor Lecture Theatre

12:00 Denise Cadete*, Elisa Ferre and Matthew Longo (Birkbeck University of London) (Sponsor: Matthew Longo) A model of constant density in the perception of hand weight.

12:30 Anna Pecchinenda (Sapienza University of Rome, Italy) The effects of loneliness on memory and attention processes for faces.

13:00 Fengyun Hou* and Nina Kazanina (University of Bristol) (Sponsor: Nina Kazanina) Minimal relations lead to superior memory.

13:30 End of Meeting
Session B - Ground Floor Lecture Theatre

12:00  Ziyi Wang*, Martin Eimer and Anna Grubert (Durham University, Birkbeck, University of London) (Sponsor: Anna Grubert) Target template activation in colour-repetition versus switch trials.

12:30  Lucy Cheke, Sabine Yeung, Panyuan Guo, Frances Adlard, Seraphina Zhang, Vidita Bhagat, Josiah Cho, Lyn Curtis, Muzaffer Kaser and Mark Haggard (Department of Psychology, University of Cambridge, University of Exeter, Department of Psychiatry, University of Cambridge, Cambridgeshire and Peterborough NHS Foundation Trust, Cambridge) Trajectory of Long COVID: Longitudinal changes in symptoms and cognitive impairment.

13:00  End of Meeting
The first poster session will be held in Room 305, 26 Bedford Way, between 7-8pm, with an accompanying wine reception.

**EPS Poster Session - Online Posters and Talk Through Videos**

1. **Katrina McDonough and Patric Bach** (University of Aberdeen) Underlying mechanisms of visual perspective-taking.


3. **Natasha Baxter* and Hannah Hobson** (University of York) (Sponsor: Hannah Hobson) The impact of face masks on autistic and non-autistic adults’ face processing abilities.

4. **Magdalena Matyjek*, Nico Bast* and Salvador Soto Faraco** (Humboldt-Universität zu Berlin, Germany, Universitat Pompeu Fabra, Spain, Goethe University Frankfurt, Germany) (Sponsor: Antonia Hamilton) Is there a social motion preference in autistic adults?

5. **Rebecca Roberts-Davis*, Geoff Bird and Caroline Catmur** (University of Oxford, Kings College London) (Sponsor: Geoff Bird) Establishing the specificity of intolerance of uncertainty in Autistic and neurotypical populations.

6. **Lily FitzGibbon** (University of Stirling) Research Plan - What can children’s eye movements during decision making tell us about children’s understanding of possibilities?


8. **Anna Metzger*, Mark Gather and Matteo Toscani** (Bournemouth University) (Sponsor: Federica Degno) Visuo-haptic saliency in object shape perception.


10. **Laura Hunt* and Markus Bindemann** (University of Kent) (Sponsor: Markus Bindemann) Ensemble coding of facial identity.

11. **Yuzhen Dong* and Kate Nation** (University of Oxford) (Sponsor: Kate Nation) When do emotion words emerge in children’s vocabulary: Evidence from developmental language corpora.

12. **Joshua Eayrs*, Haya Serena Tobing* and C. Nico Boehler** (Ghent University, Belgium, KU Leuven, Belgium) (Sponsor: Michael Banissy) Pupillometric indices of proactive allocation of cognitive control.

13. **Zijun Li* and Hannes Saal** (University of Sheffield) (Sponsor: Claudia Von Bastian) Spatial and anatomical coding: Dissecting reaction time patterns in digit selection tasks.
The second poster session will be held in Room 305, 26 Bedford Way, between 5.45pm - 6.45pm, with an accompanying wine reception.

**EPS Poster Session - Online Posters and Talk Through Videos**

1. **Brendan Williams**, Lily FitzGibbon, Daniel Brady and Anastasia Christakou (University of Reading, University of Stirling, University of Sheffield) (Sponsor: Lily FitzGibbon) Sample size matters when estimating variability of flexible, goal directed behaviour.

2. **Nicholas Simpson**, Matan Mazor, Kirsten Rittershofer, Emma Ward and Clare Press (Birkbeck, University of London, University College London) (Sponsor: Clare Press) Similar perceptual repulsion effects for lifelong and recently learned expectations.

3. **Fabien Carreras**, Chris Moulin, Andrea Tales, Claire Barnes and Celine Souchay (Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, France, Centre for Innovative Ageing, Swansea University, Department of Biomedical Engineering, Swansea University) (Sponsor: Celine Souchay) Investigating metacognition related to autobiographical memory using the feeling-of-retrieval task.

4. **Lucile Meunier-Duperray**, Audrey Mazancieux, Celine Souchay, Stephen Fleming, Christine Bastin, Christopher Moulin and Lucie Angel (Universite Grenoble Alpes, Universite Savoie Mont Blanc, France, Universite de Tours, Universite de Poitiers, France, NeuroSpin center, France, Wellcome Centre for Human Neuroimaging, Institute of Neurology, Department of Experimental Psychology, University College London and Max Planck Centre for Computational Psychiatry and Ageing Research, University College London, University of Liege, Belgium) (Sponsor: Christopher Moulin) Situating metamemory within metacognition in healthy aging.

5. **Zeynep Genc** and Angela Nyhout (University of Kent) (Sponsor: Heather Ferguson) Research Plan - Testing an expectancy-violation account of counterfactual thinking development.

6. **Robert Harlow** and Matthew Hudson (University of Plymouth) (Sponsor: Matthew Hudson) Predictive action perception in Autism and Schizophrenia.

7. **Eri Ichijo**, Caroline Catmur and Geoff Bird (University of Oxford, King's College London, University of Birmingham) (Sponsor: Geoff Bird) Effects of prediction error size and valence on pain perception.

8. **Teresa Gehrig**, James Antony, Sarah Dubrow, Renee Visser and Deborah Talmi (University of Amsterdam, University of Cambridge, Cal Poly, University of Oregon) (Sponsor: Deborah Talmi) Emotion increases temporal distance judgements.
9. Yongling Lin*, Cormac Dickson*, Nadescha Trudel*, MaryAnn Noonan*, Patricia Lockwood, Elizabeth Pellicano*, Stephen Fleming and Marco Wittmann (Department of Experimental Psychology, University College London, Beijing Normal University, China, Max Planck UCL Centre for Computational Psychiatry and Ageing Research, University College London, Wellcome Centre for Human Neuroimaging, University College London, University of York, Centre for Human Brain Health, University of Birmingham, Institute for Mental Health, University of Birmingham, Centre for Developmental Science, University of Birmingham, Department of Clinical, Educational and Health Psychology, University College London) (Sponsor: Marko Wittman) Behavioural mechanisms of self-other-distinction in people with autistic traits.

10. Ruth Medcalf-Bell*, Peter Moseley and Emma Barkus* (Northumbria University) (Sponsor: Peter Moseley) Can misperceptions be controlled? Experimental findings from an auditory signal detection task using novel task feedback and sound familiarisation.


13. Matthew Weaver* and Philip Ulrich (Canterbury Christ Church University) (Sponsor: James Cane) Using olfaction to reduce stakes in high-risk gamblers.

14. Samuel Weiss-Cowie* and Matthew Davis (University of Cambridge) (Sponsor: Matthew Davis) Training item diversity and frequency selectively encourage different adaptive speech processes.

15. Vanessa Keller*, Matthew Mak, Scott Cairney and Gareth Gaskell (University of York) (Sponsor: Gareth Gaskell) Predictability effects on word-meaning priming and incidental memory.
The third poster session will be held in Room 305, 26 Bedford Way, between 9.30am – 10.30am, with accompanying pastries.

EPS Poster Session - Online Posters and Talk Through Videos

1. **Kshipra Gurunandan**, **Andrea Greve and Richard Henson** (MRC Cognition and Brain Sciences Unit, University of Cambridge, Basque Center for Cognition, Brain and Language, Spain) (Sponsor: Richard Henson) Effect of signed vs unsigned prediction error on declarative memory.

2. **Petar Raykov**, **Dominika Varga** and **Chris Bird** (University of Cambridge, University of Sussex) (Sponsor: Richard Henson) False memories for ending of events.

3. **Hannah Bernhard**, **Anna Gaidosch**, **Rob Rouhl**, **Vivianne Van Kranen-Mastenbroek**, **Bernadette Jansma**, **Peter de Weerd**, **Mark Roberts** and **Joel Reithler** (Maastricht University, The Netherlands, Maastricht University Medical Center, The Netherlands) (Sponsor: Deborah Talmi) Transient susceptibility to interference at event boundaries impacts long-term memory of naturalistic episodes.

4. **Mahmoud Elsherif and Jonathan Catling** (University of Birmingham, University of Leicester) Are two words recalled or recognised as one? How age-of-acquisition affects memory for compound words.

5. **Fatih Serin**, **Danying Wang**, **Matthew Davis** and **Richard Henson** (MRC Cognition and Brain Sciences Unit, University of Cambridge, University of Glasgow, University of Birmingham, Department of Psychiatry, University of Cambridge) (Sponsor: Richard Henson) Does theta synchronicity of sensory information enhance associative memory? Replicating the theta-induced memory effect.


7. **Matteo Toscani**, **Tao Chen** and **Giuseppe Claudio Guarnera** (Bournemouth University, University of York) (Sponsor: Federica Degno) Evaluation of classic colour constancy algorithms on spectrally rendered ground-thought.

8. **Anna Crossland** and **Catherine Preston** (University of York) (Sponsor: Catherine Preston) Development of a scale for prenatal interoception.

9. **Lydia Munns** and **Catherine Preston** (University of York) (Sponsor: Catherine Preston) The effects of pregnancy bodily experience on mother-infant outcomes.

10. **Helen Smithson**, **Philip Ulrich** and **James Cane** (Canterbury Christ Church University) (Sponsor: James Cane) Research Plan - Using Continuous Flash Suppression to understand the influence of odours on the unconscious perception of threat.
11. Emerald Grimshaw*, Anna Matejk*, Robert Kentridge* and Dorothy Cowie (Durham University) (Sponsor: David Sanderson) Time travel in the classroom: exploring the potential of VR as a pedagogical tool in History lessons.

12. Michel Belyk* and Carolyn McGettigan (Edge Hill University, University College London) (Sponsor: Carolyn McGettigan) Vocal attraction in homosexual and heterosexual listeners.

13. Emma Cosgriff*, Sarah Gunn* and Kevin Paterson (School of Medicine, University of Leicester, School of Psychology and Vision Sciences, University of Leicester) (Sponsor: Kevin Paterson) Effects of Type 2 Diabetes on attention in middle-aged and older adults.

The Great Chocolate Chase: The effects of priming on a virtual public goods game.

Lee Parkin and Aneeza Pervez
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Prosociality encompasses various behaviours such as sharing, helping, cooperating, and donating. However, how prone are children in demonstrating such behaviours, and can they be primed to act more prosocially? We developed a virtual public goods game that was an age-appropriate task to explore young people’s understanding of both concrete shareable resources (in this case chocolate) and more abstract public goods (in this case playtime). Data was gathered from children aged 4-11 (N = 64) at the annual Summer Scientist Week (a public engagement event). Subjects believed they were playing an online game with other children at similar events around the country in which they could share either a physical or an abstract resource. The other players were in fact computer generated and used pre-determined strategies with their donations they would share with the group. Children were shown to not differentiate their donations between time or chocolate, however, when they were shown the pro-social prime, their donations of time significantly increased compared to those who were shown a neutral prime, whereas no differences were shown in the chocolate condition. Furthermore, their donations were significantly impacted by the other player’s strategies, suggesting they mirrored the other players increasingly selfish strategies.


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Visual Perspective Taking (VPT) involves understanding another's visual viewpoint. Previous research has spotlighted cultural impacts on VPT-1, with collectivistic East Asians outperforming individualistic Westerners. However, VPT-2, focused on understanding how objects appear to others, has been less explored. This research aimed to unravel the differences in VPT-2 between Chinese and British adults. In Experiment 1, using the numeral VPT-2 task, participants interpreted the numeral meaning from either their perspective or that of an avatar. Despite similar overall performances between the two cultural groups, Chinese participants, when relying solely on their perspective, encountered greater interference from others' presence. This suggests a heightened tendency towards altercentric processing in comparison to the British participants. Experiment 2, exclusively investigating altercentric cognition without any external perspective prompts, produced contradictory outcomes. Regardless of cultural background, participants' results of altercentric processing were consistent when another individual was present. A possible explanation is that the mixed design of “self”/“other” trials in Exp1 preserved altercentric attention, which is absent in Exp2. This suggests that simple presence may not suffice for altercentric cognition; a more specific cue is needed. To conclude, the task intricacies may play a pivotal role in determining cross-cultural distinctions of altercentric cognition within VPT-2.
Associations between perspective-taking and prosociality in early adolescents and young adulthood.

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Perspective-taking (PT) is known to develop alongside a range of prosocial attitudes and behaviours (e.g., helping and cooperation). In adults, PT and pro-sociality are related to socio-cognitive mechanisms, including working memory (WM) and imitation inhibition (IC). The current study examined whether the same WM and IC mechanisms underlie PT and prosocial attitudes, behaviour and understanding in adolescents (aged 11-15) and young adults (18+); N=100 in each group). Results showed globally enhanced social cognitive capabilities in young adults compared to adolescents (across most measures of PT, prosociality, WM and IC), with adolescents displaying more egocentric/less prosocial tendencies. In the adult group, individual differences in WM and IC, and PT also predicted individual differences in prosociality, but these relationships were less apparent in adolescents where these skills were still developing.

Prior experience of others’ minds underpins the ability to infer mental states.

Alicia Mixter¹, Bryony Payne¹, Geoffrey Bird²,³ and Caroline Catmur¹
¹ King’s College London
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Little is known about the sources of individual difference in mentalising - the ability to infer the mental states of oneself and others. Drawing inspiration from the face processing literature, we hypothesised that adaptation to a specific ‘mind type’ would affect subsequent inferences about targets’ mental states. Participants (n=76) completed a series of false belief-type tasks depicting novel targets varying across three levels of paranoia (low, average, high). Tasks were completed at baseline, and after paranoia and openness to experience (control) adaptation conditions, delivered in a counterbalanced order. Information about the target was delivered as detail regarding either their traits or their beliefs, and in both cases, this directly affected the mental states ascribed to them. Crucially, we also demonstrated an ‘adaptation’ effect: compared to other conditions, exposure to paranoid minds led to decreased probability ratings that targets would look for an item in a location, or hold an expectation, corresponding to a false belief. This is consistent with targets being inferred to be more paranoid and, with relevance to understanding atypical development and social cognition, implicates one’s prior experience of others’ minds as a source of individual difference in the ability to infer mental states.
Simulations of Vernier thresholds unravel the role of fixational eye movements in visual sampling.

Mengxin Wang¹, David Brainard² and Hannah Smithson¹

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To explore the role of fixational eye movements in spatial vision we simulate the performance of a computational observer with knowledge of the eye movement path in discriminating between two Vernier stimuli with opposite directions of spatial offset. We first employed a simplified one-dimensional version of the Vernier task. Eye motion is beneficial when the stimulus information available from the initial position is low, but detrimental when the information from the initial position is high. Next, we used the ISETBio (isetbio.org) tools to compute Vernier thresholds in a more complete setup that simulated the two-dimensional image, optical aberrations, and realistic photon capture by the cones. Here introducing fixational drifts does not improve performance on average, even when the eye path is available and used ideally. The lack of improvement may reflect the high-density of foveal cones relative to the optical point spread function and the fact that we did not introduce temporal filtering by the visual system. The contrast between our results and previous computational findings showing a benefit of fixational eye movements (e.g. Anderson et al., 2020) suggests a rich interaction between optics, cone sampling, fixational eye movements, post-receptoral filtering, task, and visual performance.


Probability cueing in large-scale search: The role of environmental information in statistical learning.

Shaun Dordoy¹,², Spencer Talbot¹,², Rory Baxter²,³ and Alastair Smith¹,²

¹ School of Psychology, University of Plymouth
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Efficient environmental search is an important everyday skill. A particular question of theoretical interest is whether large-scale search is informed by the spatial statistics of an environment, although the precise factors that modulate sensitivity to spatial contingencies remain unclear. We examined whether sensitivity to a statistical cue was modulated by the presence of peripheral environmental landmarks, as well as the spatial reference frame in which the target was cued. In a fully immersive virtual environment, participants were required to search for a target (a coin) positioned on the ground within an 8m² arena. The target was only visible when illuminated by light emitted from a handheld torch. A target was present on each trial, appearing within the cued quadrant on 50% of trials. Participants completed the experiment within either a visually detailed (i.e. a naturalistic setting) or sparse (i.e. four grey walls) environment. In both environmental conditions, participants were only
able to adapt their search in response to the probability cue when they had uninterrupted access to egocentric and allocentric information. These findings suggest that landmark cues do not necessarily facilitate the learning of target distribution, and we discuss the factors that remain to be accounted for in the field.

On the basketball court: How territorial context impacts information processing and responses.

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Self-relevance impacts the way humans process and respond to objects and within space. Specifically, self-relevant objects are responded to faster than those that are not (self-prioritisation). Interestingly, self-prioritisation does not emerge outside of self-relevant space (Strachan et al., 2020). In the present work, we investigate how the practical relevance of territory, moderated by task-specific expertise, impacts self-prioritisation. A sample of 24 non-experts and 24 expert basketballers were asked to make judgements to determine the best action (attack or help) for a player (own or opponent team) relative to where that player appeared on the court (own side or opponent side). The action ‘attack’ sent the player to the opposite side of the court (to score). The action ‘Help’ sent the player to the same side of the court (to help and play defence). Interestingly, experts were faster to respond to their own team when it was in other-territory, which is contrary to previous findings suggesting that self-prioritisation should occur in self-territory. We suggest that the additional context of a basketball court for expert players may lead to variations in how privileged processing manifests. Specifically, in this case, the goal (which is in other territory), appears to drive the privileged processing.

Grab My Attention: An eye-tracking study investigating attentional bias towards graspable objects during visual search.

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James Gibson (1979) proposed that we perceive objects in terms of how we interact with them (such as graspability), even when no action is required. While affordances have been shown to affect visual search in neuropsychological populations (Humphreys and Riddoch, 2001), how these effects carry over to neurologically intact populations remains largely unknown. Moreover, the few studies that investigated graspability effects in search did not control for object familiarity, and, importantly, it’s unknown if distractor effects are maintained if attention is biased towards a graspable object. In a pre-registered study, and using a novel visual search paradigm, we examined how graspability influenced search
performance for graspable and non-graspable target objects. Targets could be surrounded by distractors of similar, different, or mixed graspsability. Importantly, the graspable and non-graspable stimuli were matched on several attributes, including familiarity, ease of grasping and size. Search performance was more efficient for graspable targets surrounded by non-graspable distractors, as demonstrated by reduced location, verification, dwell times and distractor fixations. Search efficiency decreased for non-graspable targets surrounded by similar distractors, but this was not true of graspable targets. In line with affordance theories of perception, graspable objects received attentional prioritisation when surrounded by similar and dissimilar distractors.

Antisocial social cognition: Challenges for research progress.

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Conduct problems - antisocial behaviour in children and young people - incur substantial economic and interpersonal costs. There has been considerable interest in the possible social cognitive risk factors that could help explain the emergence and maintenance of conduct problems. Much of this research has been cross-sectional and deployed a number of different paradigms to investigate supposedly ‘identical’ cognitive processes. In this talk I will provide brief examples of this research and highlight its promise for understanding risk for antisocial behaviour. I will also discuss the need to embed the social cognition research into a transactional, longitudinal framework that focuses on individuals as active agents in the generation of particular social ecologies. I argue that in order to progress this line of work, we need to address a number of interrelated issues regarding measurement – including: task content, task psychometric properties, as well as inclusion of experimental measures in longitudinal, multi-method studies.

‘A bit autistic’: Do autism and ‘high autistic traits’ share socio-cognitive underpinnings?

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Measuring ‘autistic traits’ below the clinical cut-off was first initiated to measure the ‘broad autism phenotype’ in relatives of diagnosed autistic people, motivated by growing understanding of the role of inherited genes in autism. However, reflecting a general trend for dimensional versus categorical approaches to neurodevelopmental (and other) conditions, over the last decades it has become popular in autism research to measure autistic traits in the general population. Typically, high scorers on autism trait measures are thought to lie on some part of the autism spectrum, albeit subclinical. There are now huge numbers of studies reporting on correlations between self-reported autistic trait scores and scores on other self-report measures thought to be relevant to autism. This work is often justified scientifically by continuity in these behavioural scores, and the evidence of overlapping genetic effects on diagnosed autism and on subclinical individual differences in autistic traits. However, at the cognitive level it is less clear whether all socio-communicative difficulties tapped by autistic trait measures really reflect the same underlying differences in social cognition thought to characterise diagnosed autism. In this talk I will explore this question, both by reflecting on studies using objective tests of social cognition in relation to self-reported autistic traits, and by reporting on new research using a novel online test of mentalising.
The role of alexithymia in affective-autonomic responding in autism: Insights from multivariate approaches.

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Atypical socio-affective functioning in autism is often linked to hyper- and or hypo-physiological responding. However, affective-physiological profiles are notably varied across studies and measures. A prevailing question is whether atypical affective-physiological responses are primarily driven by autism or a comorbid condition called alexithymia, which affects both subjective and physiological emotional concordance. Across two experiments, we investigated the role of autism and alexithymia in physiological, behavioural, and subjective emotional responses. Leveraging multimodal and multivariate approaches to describe emotion responses across a range of physiological and behavioural measures, we differentiated between predefined groups (e.g., autism vs. controls, high vs. low alexithymia) and groups identified in a data-driven manner. Our findings delineate distinct influences of autism and alexithymia in multivariate profiles of emotional responses. Alexithymia was associated with components characterising disparity between subjective emotion reports and physiological data, while autism was predominantly associated with components capturing socio-communicative signals (e.g., facial expressions). We discuss these insights in the context of the theoretical constraints of physiological responses and multimodality of autonomic-affective signals, and emphasise the importance of individual differences in typical and atypical emotional responses. We also provide a methodological framework for studying individual differences in emotion response in both typical and atypical populations.

Alexithymia and Language: Drawing evidence from clinical and non-clinical data.

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Alexithymia is a subclinical trait, defined by the impairment of insight into one’s own emotions. Alexithymia has been argued to be a clinically relevant transdiagnostic risk factor for poor mental health and emotional functioning. Explaining variance in alexithymic traits is thus of both clinical and academic interest. One proposed route to alexithymia is via impaired language function (Hobson et al., 2019). This talk will present the alexithymia-language hypothesis, which I argue offers a conceptual framework for understanding emotional problems in language-impaired populations, such as Developmental Language Disorder. I will draw on recent meta-analytic evidence for the role of language in alexithymia summarising 29 studies that use clinical and non-clinical samples. I will also present new data from spontaneous natural language tasks in typical adults (N=42) that suggests alexithymia patterns with self-reported communication impairments and also reduced diversity of emotional language. While language differences impact emotional processing, emerging findings also support the notion that alexithymia impacts interpersonal functioning, and may in turn impact on communication abilities.
Neuro-cognitive mechanisms of joint epistemic engineering in human communication.

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Human communication is often explained in terms of sending and receiving signals, with the assumption that interlocutors share a code to insert and extract meaning from those signals. This intuition does not explain how humans resolve fundamental communicative obstacles they face in everyday dialogue, e.g. referential ambiguity of communicative signals and conceptual asymmetry between interlocutors. In this talk, I will argue that people in dialogue find ways around those obstacles by solving a different control problem than the one postulated in coding-decoding frameworks. Rather than working from the sensory data using context-free statistics of those data, people jointly control their conversational context through the production of multi-layered signals. Besides reducing uncertainty over the identity of a referent in the interlocutors’ minds (a Shannon-signal), a multi-layered signal asks interlocutors to manage a declaration of communicative intent (a Grice-signal) and to coordinate the space of possible interpretations across interlocutors (a Peirce-signal). The inferential process underlying multi-layered signals is contingent on the interaction history and provides the basis for joint epistemic engineering - the act of building a shared context that makes Shannon-signals interpretable. In the talk, I will present recent empirical findings suggesting how those fundamental communicative obstacles are solved in human brains, and how communicative control parameters largely reflect long-range dependencies within interlocutors’ interaction history, over and above rapid local changes in signal characteristics.

Reshaping understanding of Autistic sociality.

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Autistic people are often said to be challenged by “pervasive deficits in social communication and social interaction”. Within the conventional autism literature, these difficulties are said to be rooted in an impoverished ‘theory of mind’ and/or in ‘diminished social motivation’, which leads Autistic people to prefer a life of social isolation. Recent research, and especially research co-produced with Autistic people, has however profoundly questioned this approach. Recent, in-depth qualitative evidence concerning Autistic people’s experiences during the COVID-19 lockdowns, presented in this talk, further calls this idea of diminished social motivation into question. It suggests that Autistic people were, in fact, profoundly, and often negatively affected, by the denuded social contact of this period and that social connection is a vital concern for many. As such, it is now necessary to seek alternative explanations of the social difficulties that confront Autistic people. In this talk, we suggest that the concept of a ‘mind space’ can help provide the basis for one such alternative account of Autistic social cognition, one rooted not in the distinctive social ‘deficits’ but rather in the discrepancies in norms and expectations between Autistic and non-autistic people.

End of Symposium
Changing visual features to bias the perception of correlation in scatterplots.

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People systematically underestimate correlation strength in scatterplots. This historic bias is observed in a wide range of scatterplot tasks and designs, and represents a communicative disadvantage, especially for those untrained in data visualisation and statistics. Changing visual features of scatterplots can be used to alter participants’ perceptions of them. In four experiments we demonstrate that changes to point size and contrast can be used to correct for the underestimation of correlation in scatterplots. In experiment 1, we show that lower total point contrast is associated with more accurate correlation estimation. In experiments 2 and 3, we use decay functions relating point contrast and size to residual magnitude to correct for the underestimation bias. In experiment 4 we demonstrate that combining point size and contrast changes has effects on correlation estimation that are non-additive in nature.

Changing the perceptual weighting of a point by changing its size or contrast narrows the width of the perceived probability distribution of a scatterplot and can bias estimates in either direction.

Testing a computational model of insight with the nine-dot problem and Mendeleev’s periodic table.

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We report experiments that test predictions derived from PRODIGI (Progress and Discovery of Ideas in Generating Insights), a computational model of insight implemented in ACT-R. Experiment 1 tests a counter-intuitive prediction emerging with the nine-dot problem, in which fixing the starting point of participants’ attempts to a correct point on the solution path reduces solution rates. The model uses the failed attempts of solvers to discover solution ideas, and the experience of failure is limited by fixing to a correct starting point. Data collected from 180 participants with or without a fixed starting point confirmed the prediction. Experiment 2 shows how monitoring progress towards a hypothesised goal and using the products of failed attempts can lead to solutions to the Cards problem (lay the Kings, Queens, Jacks and 10s from a pack of playing cards in a grid such that no is repeated or missing from a row or column), which is an analogue of the problem faced by Mendeleev in devising the periodic table of chemical elements. The experiments demonstrate that the model can discover insightful solutions without being given any solution information from the outset, the only model of insight we are aware of that can do this.
Mapping the connectivity of the scene network in the human brain.

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The perception of places has been linked to a network of scene-selective regions in the human brain (OPA: occipital place area; PPA: parahippocampal place area; RSC: retrosplenial complex). However, the connectivity of these regions to each other and the rest of the brain remains poorly understood. Here, we measured the functional and structural connectivity of the scene network. Functional connectivity, measured at rest and during movie watching, revealed a division between posterior and anterior scene regions that have been implicated in perceptual versus mnemonic aspects of scene perception. For example, OPA and posterior PPA showed greater connectivity with visual and dorsal attention networks, which may play a role in the visual representation of scenes. In contrast, anterior PPA and RSC showed preferential connectivity with default-mode and frontoparietal control networks and the hippocampus, which may reflect our memory for places. We also measured the structural connectivity of the scene network using diffusion tractography. This indicated both similarities and differences with the functional connectivity, highlighting distinctions between posterior and anterior but also ventral and dorsal scene regions. These findings provide a map of the connectivity of the scene network, informing possible roles for scene-selective regions in brain function and human behaviour.

Top-down effects of brief linguistic training on visual perception of non-verbal stimuli.

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Can brief training on novel grammatical morphemes influence visual processing of non-linguistic stimuli? If so, how deep is this effect? Here, an experimental group learned two novel morphemes highlighting the familiar concept of transitivity in sentences; a control group was exposed to the same input but with the novel morphemes used interchangeably. Subsequently, both groups performed two visual oddball tasks with non-linguistic motion events. In the first (attentional) oddball task, relative to the control group, the experimental group showed decreased attention (P300) to infrequent changes in the morpheme-irrelevant (shape) but not the morpheme-relevant dimension (motion transitivity); in the second (pre-attentive) oddball task they showed enhanced pre-attentive responses (N1/visual mismatch negativity) to infrequent changes in motion transitivity but not shape. Our findings show that increasing attention to pre-existing concepts in sentences through brief training on novel grammatical morphemes can influence both attentional and pre-attentive visual processing.
Timing and priming morphological processes during spelling.

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To explore the nature of morphological processing during spelling, two studies examined the effects of morphological structure and priming. In both studies, participants completed an auditory lexical decision task which contained root word primes (e.g., art) for half of the words subsequently spelled. Spelling items included matched pairs of multi-morphemic and mono-morphemic words (e.g., artist-article). The dependent variables were spelling accuracy and handwriting latencies before and during spelling. Study 1 was a delayed copying task (spelling with visual prompts). 20 adults and 46 children (8-12 years) were faster to begin writing multimorphemic words (e.g., artist) than monomorphemic words (e.g., article). Adults showed effects of morphological priming and effects of morphological structure on latencies during spelling production, but children did not. Study 2 was a spelling to dictation task (spelling with auditory prompts). Preliminary results from 20 adults and 72 children (9-12 years) again suggest morphological facilitation before spelling begins, with analyses of the effects during spelling ongoing (results will be presented in full). The findings indicate that multiple morphological processes influence spelling. To fully understand the role of morphology, we need to distinguish between processes used during lexical access and those used during spelling production.

An experimental investigation of the cultural evolution of informative writing systems.

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Opaque spelling systems, such as that of English, place additional demands on learning but may confer certain benefits in the context of reading. For example, the heterographic homophones (e.g., and) are hard to learn but reduce ambiguity. Might it be the case, then, that heterography - and therefore orthographic opacity - may sometimes be selected for in the evolution of writing systems? We investigate this question by experimentally simulating the evolution of orthographic systems, both with and without communicative pressure for ambiguity avoidance. Additionally, we consider two mechanisms by which informative heterography might be selected for: differentiation, in which new spellings are created to differentiate homophonous words (e.g., from to signal low-fat), and conservation, in which heterography arises as an epiphenomenon of sound change (e.g., and, which resulted historically from the /ɛː/–/eː/ merger). Our results show that, under learning pressure, orthographies may become transparent, while under communicative pressure, they may become informative, diverging from the spoken language to express meaning directly. Moreover, our findings suggest that, in the written modality where interlocutors are separated in time and space, differentiation does not represent a good model of heterography emergence.
Positive impact of sleep on recall of multiplication facts.

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This study tested the hypothesis that learning complex multiplication problems (e.g. $8 \times 23 = 184$) prior to sleep would benefit recall in adult participants compared with learning the problems prior to a period of wakefulness. Method: This study used a within-participant design where all participants learnt complex multiplication problems in two conditions separated by one week. In one condition learning was before bed (sleep-learning condition) and in the other condition learning was in the morning (wake-learning condition). In each condition recall was tested approximately 10.5 hours later. Data were collected online from 77 participants. Results: In the subset of the sample with $\geq 60\%$ accuracy at the initial learning session ($n=37$), the sleep learning condition participants had better recall compared with the wake learning condition. The equated to a moderate effect size. Regardless of initial levels of learning ($n=70$) the same beneficial effect of sleep on recall was found with a small effect size. Conclusions: This study has identified a beneficial effect of learning prior to sleep on recall of complex multiplication problems compared with learning these problems during the daytime. Future research should explore whether similar effects are observed with children learning simple multiplication facts.

The role of episodic and visual-semantic memory systems in abstract and concrete conceptual processing.

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Abstract concepts are more flexible and context-dependent than concrete concepts. We hypothesize that the episodic memory system underpins abstract concept processing by facilitating the integration of contextual information, while concrete concepts rely more on visual and semantic memory systems. Pilot Study 1 ($N=20$) involved semantic judgements of abstract and concrete words in baseline, and with visual and semantic interferences [1]. Visual interference selectively impaired semantic judgements of concrete words. Semantic interference impaired semantic judgements regardless of concreteness. Pilot Study 2 ($N=20$) involved the same semantic judgement task in baseline and during the maintenance phase (between encoding and retrieval) of an episodic source memory task. We found that performances in semantic judgements were impaired for participants who performed well in the memory task or believed they were exerting less effort in the memory task, regardless of concreteness. Our preliminary findings suggest that semantic judgements of concrete concepts rely more on sensory information than abstract concepts. However, both abstract and concrete semantic judgements equally depend on the semantic and episodic memory systems. There is little indication that semantic judgements of abstract concepts rely more heavily on the episodic memory system for integrating relational information.
Action source attribution and the subjective experience of control.

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The “Expected value of control” theory implicitly assumes that people reliably experience both the input level and the consequent results of their cognitive control. These assumptions have rarely been investigated. We studied the subjective experience of how much one’s action depends on imperative stimuli - noting that overriding prepotent stimuli is characteristic of cognitive control. Participants viewed a target arrow, surrounded by task-irrelevant congruent, incongruent or neutral flankers. An unpredictable colour cue instructed them to make speeded keypresses to either follow the target, oppose, or detach from it. After each trial, participants rated to what extent their action depended on the target. Reaction times showed expected flanker effects in all conditions. When following, participants experienced less dependency on the target if flankers were incongruent, confirming this subjective correlate of cognitive control. However, when opposing the target stimulus, dependency ratings were independent of flanker congruence, though flankers still influenced reaction times. We suggest that top-down cognitive control to override target stimulus suggestions masked any subjective experience of flanker-induced response conflict. Subjective experience of cognitive control appears poorly resolved, and lacks attribution of how specific acts of control affect specific aspects of performance. Estimates of expected value of control may therefore be imprecise.


Examining the error cancellation effect in children with the arrow flanker task.

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A frequently neglected metric of human performance is response duration, measured as the interval from key press onset to offset. A recent study by Foerster et al. (2022) showed that response durations are significantly shorter for erroneous compared to correct responses. This error cancellation effect suggests that performance monitoring mechanisms are rapidly initiated even as a response is still ongoing. The present study investigated whether young children show evidence of this effect. 102 children ranging from 4 to 12 years performed a version of the arrow flanker task. The results showed that response durations were significantly shorter for erroneous responses, providing evidence for the error cancellation effect in children. In addition, the study found no effect of congruency on response duration, suggesting that the need to resolve interference does not affect response duration. In summary, this research demonstrates rapid within-trial performance adjustments in children and highlights the relevance of considering response durations alongside more conventional metrics such as reaction time and accuracy.

Are nouns and verbs represented separately in the mental lexicon?

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In connected speech, speakers select three or four words/minute from a mental lexicon of 50,000+ items. How is this possible? One proposal is that lexical selection is constrained by word category, with speakers at different times looking for items within a determiner, noun, or verb section of the lexicon. This implies that they generate syntactic representations before selecting individual words. Evidence consistent with this controversial claim comes from a study by Momma et al. (2020). They used a sentence-picture interference paradigm, where the sentence disambiguated the word category (noun or verb) of the distractor (“her singing” or “she’s singing”) and participants produced target nouns (“her whistling”) or verbs (“she’s whistling”). Semantic interference (“singing” vs. “writing”) only arose when distractor and target belonged to the same word category. Considering the important theoretical implications of this finding we replicated the study with Dutch participants, mirroring materials and design of the original study as closely as possible. We obtained a main effect of semantic relatedness but no interaction with word category. Thus, the Dutch speakers’ lexical selection was not as tightly constrained by word class as the English speakers’. As we discuss this difference may be related to morphological differences between the languages.


Do “naturalistic” language cues reduce or even eliminate language switch costs in bilingual production?

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Language switches almost universally result in a substantial performance “switch cost” in production. However, it has been proposed that the switch cost may be (largely) due to the widespread use of “artificial” language cues, and that more “naturalistic” cues strongly reduce or eliminate the switch cost by eliciting language switches exogenously, hence removing the need for top-down selection. In a two-session picture-naming study in French, German and Spanish bilinguals we compared naturalistic cues - words spoken in the target language (e.g., “English” or “hello”) and faces of friends or unknown people - with artificial cues - flags and fragments of tunes, all presented at two cue-stimulus intervals: 250 ms and 750 ms. Even at the long cue-stimulus interval, all naturalistic cues resulted in non-trivial (22-58 ms) and highly-significant switch costs, which did not substantially (and significantly) differ from the switch costs with artificial cues. Furthermore, naturalistic cues previously associated with a language (e.g., face of English-speaking friend) and cues without such prior association (e.g., face of unknown English speaker) resulted in very similar (statistically indistinguishable) switch costs. Thus, naturalistic cues do not seem to obviate the need for top-down language selection, and bilinguals can rapidly learn to use new language cues.

Who is the winner? Visual and vestibular integration for verticality perception.

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Detecting the direction of gravity, i.e., verticality, plays a crucial role in balance and spatial orientation. The brain constructs a representation of verticality by integrating vestibular and visual information. However, how mechanistically these sensory cues are integrated for vertical has been largely debated. Here we systematically investigated the dynamic integration of vestibular and visual cues, considering their respective reliability, in the perception of verticality. Participants were administered with a Verticality Detection Task (VDT) in which they perceptually discriminated between vertical lines and lines tilted 2.5 degrees clockwise or counterclockwise. The VDT was combined with roll-plane visual optokinetic cues, galvanic vestibular cues, or both visual and vestibular cues. The number of errors, sensitivity and criterion were estimated. The number of errors in detecting vertical increased linearly between vestibular condition, visual condition and the combined visual and vestibular condition. Similarly, the sensitivity results showed a significant difference between vestibular stimulation and the combination of visual and vestibular stimulations. Importantly, no differences in post-perceptual processes (criterion) emerged. Our pattern of results indicate that verticality judgments are mainly based on visual cues rather than vestibular signals. Critically, the combination of both modalities induces summation effects in verticality perception.

The Impact of bilingualism on executive functioning in autistic adults.

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Bilingualism is argued to afford cognitive advantages across a range of executive functions (EF). However, little is known about the benefits of bilingualism for EF in clinical populations, such as those with a diagnosis of autism. This is despite the suggestion that many of the traits and characteristics associated with an autism diagnosis are due to difficulties in EF. Across two studies monolingual and bilingual participants completed four EF tasks measuring inhibitory control, cognitive flexibility, sustained attention, and working memory. Study 1 recruited neurotypical participants with differing levels of autistic traits (high or low); Study 2 recruited both neurotypical participants and participants with a clinical diagnosis of autism. Study 1 revealed that participants performed comparably regardless of their reported level of autistic traits, and that bilinguals showed an advantage compared to monolinguals on the cognitive flexibility task. Critically, Study 2 replicated these results, demonstrating that not only do neurotypical adults and autistic adults perform comparably on a range of EF tasks, but that they both show a bilingual advantage for cognitive flexibility. These results are critical, as they provide key evidence that bilingualism provides a measurable advantage in cognitive functioning for both neurotypical and autistic adults.
Individual differences in online dating behaviour when presented with an abundance of choice.

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Online daters can meet many more potential partners than could be met traditionally, for example, through work or mutual friends. Choice overload is the notion that choosers face significant difficulties when faced with an abundance of choice and is present when dating online. Participants (n = 425) viewed 50 ostensible dating profiles comprised of facial images randomly paired with personal descriptions. The number of relevant profiles (those that matched participant self-disclosed preferred gender when dating; men or women) presented was manipulated. Participants then completed several questionnaires relating to mental health and other outcomes. Individual differences in the objectification of others and rejection sensitivity were shown to have an effect on matching behaviour when presented with an abundance of potential partners, but not when partner availability was perceived to be low. When presented with an abundance of choice, participants who were either highly sensitive to rejection, or more inclined to objectify others, positively evaluated more dating profiles than those who were less sensitive to rejection, or objectified others less. This effect was not found when considering individual differences in self-esteem, self-objectification, rape myth acceptance, or sociosexual orientation. Individual differences may influence online dating behaviour when presented with an abundance of choice.

Evidence of belief infection in a change-of-location task: Belief-representation or belief-simulation?

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An important component of Theory of Mind is the ability to understand the beliefs of others. This ability can be achieved by two distinct processes: by a detached belief-representation process or by an engaged belief-simulation process. Belief-representation posits a separation between one’s own first-order representations of the physical environment and one’s second-order representations of another agent’s mental states, preventing the latter from infecting one’s own first-order representations of the environment and egocentrically driven actions. Belief-simulation, on the other hand, posits a correspondence in the mental states shared by oneself and another agent and predicts a potential influence by the other agent’s beliefs on one’s own first-order representations of the environment and egocentric actions. Across two experiments, a participant and an agent watched an object buried in a continuous space (sandbox). The participant then watched the same object moved from the first location to a new location. When participants were asked to search for the object, they demonstrated a bias towards the first location when the agent falsely believed it to be there but not when the agent knew, like the participant, that the object was in the new location. The results are interpreted in favour of a belief-simulation account.
Childhood trauma’s effect on emotion recognition across static, dynamic, and audio-visual expressions: an eye tracker study.

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Childhood trauma influences emotion recognition but how it affects eye movements during processing is unclear. As research mostly used static images we are unsure if this would differ for realistic stimuli. Participants completed a recognition task of expressions varying in presentation (static, dynamic, audio-visual), emotion (basic six, neutral), and intensity (normal, strong). We examined how these factors influenced eye movements (fixations and dwell time) to different interest areas (eyes, nose, mouth). Accuracy was higher for audio-visual than static expressions, happy and neutral than other expressions, and strong intensity than normal intensity. Fixations were higher for static than audio-visual expressions, sad, fear, and disgust than neutral expressions, strong than normal intensity, and eyes than nose or mouth. Dwell time was longer for static than audio-visual expressions and eyes than nose or mouth. Childhood trauma was not significant but its effect varied across factors: more childhood trauma led to better accuracy of audio-visual than static expressions, and sad, anger, disgust, and surprise than neutral and led to higher fixations and dwell time for eyes than nose and mouth. This may suggest childhood trauma deficits are not as prevalent for audio-visual expressions and previous static findings may struggle to generalise to real-world interactions.

Interoceptive predictive processing during an adaptive empathy task.

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Empathy is a multifaceted social process where critical for an effective empathic response is the flexible adaptation to other’s needs. Here, we examined how interoceptive inference affects learning and decision-making in an adaptive empathy task measuring the Heart Evoked Potential (HEP) as an index of interoceptive prediction and attention. We employed a social reinforcement learning task where participants had to choose among two options (distraction and reappraisal) to alleviate the distress of a virtual character whose preferred emotion regulation approach was changing, at different rates, throughout the task. Using a hierarchical Bayesian learning model, we examine whether learning and decision-making parameters are correlated with HEPs on a trial-by-trial fashion to study the influence of interoceptive processing on adaptive empathic decision-making and whether this relationship is affected by individuals’ social skills and emotion regulation abilities. So far, analyses of behavioural data revealed that similar and more adaptive learning among participants with higher empathic traits and emotion regulation difficulties and less adaptive learning among those with increased communication difficulties. Relationships between HEPs and behaviour may elucidate how brain-body communication influences social interactions under different uncertainty conditions.
Reduced prosocial motivation and effort in adolescents with conduct problems and callous-unemotional traits.

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Prosocial behaviours - acts that benefit others - are of crucial importance for many species including humans. However, adolescents with Conduct Problems (CP), unlike typically developing (TD) peers, demonstrate reduced engagement in prosocial behaviours - perhaps especially those with high levels of callous-unemotional traits (CP/HCU) who are at increased risk of developing psychopathy in adulthood. Here we investigate three important facets of prosocial engagement in adolescents with CP/HCU (N = 27), CP and lower levels of CU traits (CP/LCU; N = 34) and TD peers (N = 33): prosocial choices, prosocial motivation, and actual effort exerted following prosocial choices. Using statistical and computational modelling, we found that CP/HCU and CP/LCU groups were more averse to initiating effortful prosocial acts than TD adolescents - both at a cognitive and at a behavioural level. Strikingly, even if they chose to initiate a prosocial act, the CP/HCU group exerted less effort following this prosocial choice than other groups. Findings indicate that reduced exertion of effort to benefit others may be an important factor that differentiates adolescents with CP/HCU from their peers with CP/LCU. They offer new insights into reduced prosocial behaviour in adolescents with CP, including vulnerabilities that may particularly characterise those CP/HCU.

Neural and facial mechanisms of intergroup bias and ToM in smile discrimination: A fNIRS study.

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Intergroup bias has been found to modulate genuine and posed smile discrimination in Young (2017). However, our previous replication study showed that membership can only modulate social judgements but not social abilities. Thus, the current study aimed to conduct a closer replication that directly measures smile discrimination, and investigates the neural and facial mechanisms of intergroup bias and mental state decoding in smile discrimination. Thirty-three adults viewed videos of people making genuine or posed smiles and were informed (falsely) of the group membership of the actors. The ability to differentiate genuine and posed smiles (ToM) and male and female actors (control) of in-group and out-group members and group identification were assessed, and participants’ facial expressions were recorded. Interestingly, although our results did not reveal that intergroup bias influences smile discrimination behaviourally, we found postcentral gyrus, medial frontal gyrus, inferior frontal gyrus and dorsolateral prefrontal cortex were relevant to intergroup bias. Additionally, ToM conditions were harder than gender conditions, indicated by lower accuracy and longer reaction time and the activation within the superior temporal sulcus. Facial movement was not different between conditions. These findings extend the current understanding of mental state decoding and suggest identity may aid social experience.
Beyond Self-Report: Measuring visual, auditory and tactile mental imagery using a mental comparisons task.

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Mental imagery is of fundamental importance for experimental psychology, crossing sub-disciplines of psychology (cognitive, educational, developmental), linguistics and philosophy. Finding a reliable and valid measure of individual differences in mental imagery has proven difficult, with most measures relying on self-report scales. However, to some extent, self-report scales require participants to have access to others’ mental images (i.e., “how am I to know whether my image of a ‘rose’ is clearer than yours?”). Based on the idea that mental imagery involves multimodal sensorimotor simulations, a mental comparison task (MCT) was developed and tested across two studies on adults (n=96, n=345). Analyses examined whether lexical features of the MCT stimuli (word length and frequency), sensory modality (visual, auditory, and tactile) affected response latency and accuracy, and whether the MCT related to two widely-used self-report scales, namely the Spontaneous Use of Imagery Scale (Görgen et al., 2016) and the Plymouth Sensory Imagery Questionnaire (Andrade et al., 2014). The MCT showed evidence of reliability and validity. Responses were fastest and most accurate for the visual modality, followed by the auditory and tactile. However, consistent with the idea that mental imagery may not always be conscious, the MCT showed variable links with self-report imagery.

The co-construction of counterfactual worlds in parent-child conversations.

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Counterfactual reasoning plays a central role in judgment and decision-making. Most of what we know about its development comes from studies where children are prompted to reason counterfactually. In which everyday contexts do children first hear and produce counterfactuals? In this study, we explored parent-child reminiscing as a promising context. We propose that children’s early counterfactuals are scaffolded by caregivers via a co-construction process, whereby one dyad member offers an antecedent (e.g., “If we’d remembered an umbrella...”) and the other offers a consequent (e.g., “…we wouldn’t be wet.”). Dyads (N=63 parents & 3-5-year-olds) discussed past events and were later prompted to discuss “what could have happened differently”. Spontaneous counterfactuals arose infrequently, however all dyads produced counterfactuals when prompted. Parents produced more counterfactuals when discussing negative and unexpected events compared to positive and routine events, but children’s production did not differ significantly by event type. Parents initiated more counterfactuals and were significantly more likely to offer a complete counterfactual than children. Children were significantly more likely to complete co-constructed counterfactuals. Our results indicate that counterfactuals arise infrequently in conversations about past events between parents and pre-schoolers. When they do, parents scaffold children’s production by initiating counterfactuals that children build on.
Anchoring does not boost the benefit of contextual diversity for word learning.

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Words that appear in many contexts/topics are recognised faster than those occurring in fewer contexts. However, contextual diversity benefits are less clear in word learning studies. Mak et al. (2021) proposed that new words may need anchoring before introducing diversity. In our study, 288 adults learned meanings for eight pseudowords, four in six topics (high diversity) and four in one topic (low diversity). All were first experienced five times in one topic (anchoring phase), and results were compared to Norman et al. (2022) who used a similar paradigm without an anchoring phase. At post-test, word-form recognition accuracy and response time were unaffected by contextual diversity, replicating Norman et al. A cloze task involved choosing which pseudoword completed a sentence. For sentences situated in a previously experienced context, accuracy was higher for low diversity pseudowords, whereas for sentences situated in a new context, accuracy was higher for high diversity pseudowords. Anchoring modulated performance for high diversity items by increasing accuracy in familiar contexts but reducing accuracy in new contexts. Low diversity items were unaffected by anchoring. Inconsistent with Mak et al., these results suggest that anchoring facilitates meaning use in familiar contexts, but not generalisation to new contexts, nor word-form recognition.

Interlingual Homographs as semantic primes in sentence contexts: does prime duration matter?

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Interlingual homographs (IHs) can be used to investigate the extent to which a native language can influence second language processing. The current talk will present two experiments that use both identical and similar-IHs (e.g., CARPET-CARPETA, the latter meaning folder in Spanish). In both experiments English monolinguals and Spanish-English bilinguals completed a written sentence priming and LDT in English. Experimental sentences ended in an IH followed by lexical decision targets either related to the English meaning of the IH, the Spanish meaning, or were unrelated. Experiment 1 used a prime-duration of 500ms and found that lexical decision responses were significantly slower if the target was related to the Spanish (L1) translation of an identical and similar-IH that concluded a preceding prime sentence in English (L2) for bilinguals; monolinguals were primed by English-related primes only. In Experiment 2 the prime duration was altered to 200ms, and here, both bilinguals and monolinguals showed priming effects for only the contextually appropriate targets. Under the assumption that the bilingual lexicon stores all words irrespective of language in a single lexical network, altering the IH prime duration should affect responses in the similar way. The experiments reported here set out to test that prediction.
The neural underpinnings of reading enjoyment.

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While prior neuroimaging investigations have shed light on the neural networks implicated in various aspects of reading (such as decoding and the integration of print and meaning), we know relatively little about how reading networks change when we enjoy reading. We hypothesised that reading for pleasure would be associated with increased functional activity in dorsal and ventral striatal regions associated with reward processing. We presented neurotypical adults (N= 30, 16 females) with 40 book extracts in the scanner. We used a Becker-deGroot-Marshak auction paradigm, participants could place bids to buy the books presented (£0, 0.33p, 0.66p, £1). The books had a market value, so participants needed to place high bids when books were desirable. One bid was actioned and this amount was taken from the participant payment. When adults read desirable extracts compared to non-desirable extracts observed increased activity in the ventral striatum, and in the middle frontal gyrus, a region that forms part of an attention network. This shows that enjoyable texts may be processed differently by the brain.

Where do children look when watching videos with same-language subtitles?

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Recent campaigns in the UK and USA have argued that turning on same-language television subtitles could help children learn to read. The purpose of our study was to determine the extent to which primary-school children pay attention to and read television subtitles and whether this is influenced by their reading proficiency. We tested 180 children in Years 1-6. Each participant watched two videos with subtitles and two without subtitles. Participants’ eye movements were recorded by an EyeLink Portable Duo eye-tracker. We measured children’s reading proficiency using the TOWRE-2. For the analysis, we divided the screen into the video area and the subtitle area. All participants looked at the subtitle area more often when the subtitles were present. Importantly, attention to subtitles was strongly associated with reading proficiency: superior readers were more likely to look at the subtitles than less proficient readers and spent more time attending to them. Looks to subtitles were sensitive to word length and frequency thus implying that they were being read. These results indicate that some degree of reading proficiency is necessary before children pay attention to subtitles. Poor readers tend to ignore subtitles, suggesting that same-language subtitles may be unlikely to support initial reading acquisition.
Learning from the input: a corpus-based investigation of Chinese classifiers in children’s books and child-directed speech.

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Books form a unique and important part of children’s language experience as they provide exposure to more complex words and structures than those encountered in speech. We explored this phenomenon focusing on Chinese classifiers. Classifiers are grammatically required between numerals and nouns and form part of the local linguistic context of nouns, with their correct use often linked to the semantic properties of the corresponding noun. To explore the variation in children’s language input, we examined the distribution of classifier phrases in three corpora: (1) child-directed speech, (2) children’s television shows, and (3) children’s reading books. Although all three corpora contained a comparable count of classifier phrases, classifier use was far more diverse and less clustered in book language (268 unique classifiers) compared to children’s shows (138 unique classifiers) and child-directed speech (92 unique classifiers). Across corpora, classifier phrases appeared mostly with sortal classifiers that have a more stable and specific semantic relation to their associated noun class. Book language provides access to a richer and varied classifier system, creating a more diverse language environment for nouns. Consequently, print exposure may not only enable children to build a more precise classifier lexicon, but also scaffold the acquisition of nouns.

Effect of emotion on hippocampal-dependent associative binding.

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The weather-prediction task offers a well-established methodology to identify the contribution of the hippocampus to associative binding. This is achieved by comparing the ‘feedback’ condition, where participants learn associations between patterns and outcomes through trial-and-error, and the ‘paired-associates’ condition, where they memorise patterns and outcomes. Neuroimaging and neuropsychology results suggest that the paired-associate condition relies on hippocampal mechanisms. Because conditions are well-matched, these results are less vulnerable to measurement noise. We replaced traditional abstract patterns by negative or neutral scenes to test whether emotion impairs hippocampally-based associative binding. Three pre-registered experiments used a 2 (Emotion: negative/neutral) X 2 (Learning condition: feedback/paired-associates). Ratings suggested that the emotion manipulation was successful. We obtained no evidence that emotion impairs hippocampally-based associative binding. Analysis of participants' learning strategy provided no evidence that emotion decreased deployment of hippocampally-based 'simple' strategies. Present results suggest that previous findings using paired-associate memory tests, where emotion decreased memory performance, may not be due to the effect of emotion on hippocampally-dependent associative binding. Our results add to evidence that the dual-representation account, originally developed to account for trauma memories in post-traumatic stress disorders, may not account for memory performance in laboratory settings where stimuli that are less personally traumatic.
Lying to the like-minded: is it easier to spot deception in someone of the same neurotype?

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Background: The double empathy problem (DEP) suggests that the socio-communicative difficulties faced by autistic people are not just because of their atypical cognition, but due to a breakdown in reciprocity and mutual understanding between autistic and non-autistic people. This study investigated if DEP extended to non-verbal deception, considering autistic individuals find deception detection difficult but have only ever been tested on deception from non-autistic agents. Methods: 207 adults (103 autistic) watched videos of autistic and non-autistic agents lifting boxes, sometimes faking the weight of the box. Participants rated each lift from 1 (real) to 5 (pretend). Hypothesis: Participants would be better at distinguishing between pretend- and real-lifts for neurotype-congruent agents. Results: Both groups were better at detecting deception from autistic agents than non-autistic agents. For pretend-lifts, autistic agents (vs non-autistic agents) were judged as more deceptive by all participants. For real-lifts, autistic agents were judged as more deceptive only by non-autistic participants. Conclusions: Findings do not support DEP as both groups were better at detecting deception from autistic agents. Autistic agents were considered deceptive by non-autistic participants even when they were being genuine. This has far-reaching consequences for how autistic individuals may be perceived as being deceitful in day-to-day life.

Understanding in-group and out-group minds: Feedback on mental state inferences improves accuracy and awareness.

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Understanding others, such that we can infer their mental states, is an important part of social interaction. People are less able to accurately infer the views of out-group members relative to in-group members but are unaware of their differential performance, i.e. participants report similar levels of confidence in their ability to infer the mental states of both groups (Payne, Bird, and Catmur, in prep). Here, we asked whether feedback on the accuracy of mental state inferences could improve participants’ (n=96) performance. Further, whether receiving feedback would realign their awareness of - and their previously misplaced confidence in - their own ability to understand out-group members. The feedback significantly altered performance. Accuracy of participants’ inferences increased, and similarly so for inferences made about in-group minds and out-group minds. Also, participants’ poor awareness of their reduced ability to infer the views of out-group members - as shown by their accuracy and confidence being unrelated (i.e. non-correlated) for out-groups only - was changed. Specifically, participants’ confidence and accuracy became similarly - and significantly - positively correlated for both in-group and out-group inferences. This shows that, with feedback, people are more able to understand the minds of out-group members, and become more aware of their ability to do so.
Are Japanese and English speaker’s sensitive to sound symbolism and orthographic effects when processing the meaning of Japanese mimetic words?

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Sound symbolism refers to cross-modal associations between word meanings and sounds. Japanese has many mimetic words (e.g., “fuwa-fuwa”≒soft/bouncy, “gachi-gachi”≒hard/stiff) and both Japanese and English speakers are sensitive to these correspondences (Wong et al., 2022). Japanese also has multiple interchangeable scripts, including the syllabic scripts Hiragana and Katakana. Hiragana has more rounded symbols whereas Katakana symbols are more angular (Komatsu et al., 2014). We aimed to replicate Japanese and English speakers’ sensitivity to sound-symbolism in Japanese mimetic words and explore interactions with orthography. Participants were presented with spoken (half soft, half hard) and written (half Hiragana, half Katakana) forms of novel Japanese mimetic words and rated “How hard/soft do you think the material is that the word is describing?” from 0 to 10. Both Japanese and English speakers rated soft mimetic words as softer and hard mimetic words as harder, though this effect was stronger for Japanese speakers. Both groups also rated items written in Katakana as harder and those written in Hiragana as softer, though orthographic effects were stronger for hard than soft words. These results suggest that sensitivity to some sound and orthographic symbolisms may be universal and are relevant for real-world applications such as marketing.


Communicated priors tune the perception of control.

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Action allows us to shape the world around us. But to act effectively we need an accurate sense of control. Classic theories across cognitive science suppose that this ‘sense of agency’ is constructed from the sensorimotor signals we experience as we interact with our surroundings. But these sensorimotor signals are inherently ambiguous, and can provide us with a distorted picture of what we can and cannot influence. Here we investigate one way that agents like us might overcome this ambiguity: by combining noisy sensorimotor evidence with prior beliefs acquired through explicit communication with others. Using novel tools to measure and model control decisions, we find that
explicit beliefs about the controllability of the environment alter both the sensitivity and bias of agentic choices; making us both better at detecting and more biased to feel control when we are told to expect it. These seemingly paradoxical effects can be captured by a new computational model, where expecting to be in control renders us increasingly sensitised to both true and illusory signs of agency. In combination, these results reveal a cognitive and computational mechanism that allows public communication about what we can and cannot influence to reshape our private sense of control.

**Surprise impairs perception of surprising and incidental events.**

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When environmental regularities change, new observations should be weighted more highly than old observations, to allow model-updating in a changing world. Changes in environmental regularities influence learning rates, but it is unclear how these changes influence perception of the stimuli themselves. A recent theory suggests that surprising observations trigger a reactive noradrenaline release, increasing sensory gain. This would mean that environmental changes elicit a perceptual boost, facilitating model-updating. To test this account, we asked whether detection of surprising events themselves, and other events, improves after a surprising observation. Participants in four online experiments (N=1172) saw stimuli presented peripherally and at fixation and were tasked with detecting features of those events. Peripheral stimulus location was drawn from a truncated normal distribution, the mean of which changed once without warning during the task. We modelled surprise to ask whether the surprising distribution shift led to higher hitrates. The modelling showed instead consistently lower hitrates on trials with higher modelled surprise. This was observed for the peripheral stimuli, which were themselves surprising, and for other stimuli in the environment. This finding suggests that surprising observations do not automatically increase sensory gain, and suggests instead that attentional resources are allocated to previously-informative features.

**How neural representations of newly learnt faces change over time: Event-related brain potential evidence for overnight consolidation.**

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Previous experiments have shown that a brief encounter with a previously unfamiliar person leads to the establishment of new facial representations, which can be activated by completely novel pictures of the newly learnt face. The present study examined how stable such novel neural representations are over time, and, specifically, how they become consolidated within the first 24 hours after learning. Using event-related brain potentials (ERPs) in a between-participants design, we demonstrate that clear face familiarity effects in the occipito-temporal N250 are evident immediately
after learning. These effects then undergo change, with a nearly complete absence of familiarity-related ERP differences four hours after the initial encounter. Critically, 24 hours after learning, the original familiarity effect re-emerges. These findings suggest that the neural correlates of novel face representations are not stable over time but change during the first day after learning. The resulting pattern of change is consistent with a process of consolidation.

22nd EPS Mid-Career Award Lecture

The enduring importance of the ‘Fine Cuts’ approach to psychology.

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Nearly 30 years ago Uta Frith and Francesca Happé argued for the importance of a ‘fine cuts’ approach to understanding both typical and atypical behaviour - highlighting the importance of mechanistic, causal theories at the cognitive level, and careful measurement of psychological processes. I will argue that this message continues to be important despite advances in neuroimaging and computational modelling, and will outline some of our attempts to follow the fine cuts approach. I will talk about our work on social and emotional processes in typical and atypical minds within three broad areas – theory of mind and metacognition, face processing, and emotion processing. This work uses novel tests to illustrate, 1) a new mechanism linking individual differences in theory of mind and metacognition, 2) ways to obtain independent measurement of face perception, matching, and memory, and 3) links between awareness of one’s own emotions and the ability to understand those of others.
Modelling visual search and awareness in the additional singleton task.

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Many experiments suggest that people can learn to ignore salient but irrelevant information presented consistently at predictable locations. It has been claimed that this learning takes place unconsciously, often based on a brief measure of awareness at the end of the task. Specifically, participants are asked to report if they know the exact location where the distractor appeared most often during the experiment. Many researchers show that the suppression effect does not differ between participants who correctly and wrongly identified the hotspot. This null interaction is often invoked to claim that learning in the task must have been unconscious. But this conclusion is based on the questionable assumption that the awareness test is sufficiently reliable. Unfortunately, it is not easy to estimate the reliability of this test because it is based on a single measure. Using a real dataset from 159 participants, we modelled performance on both visual search and awareness tasks, forcing the model to represent a single common learning process. This is formally equivalent to stating that the suppression effect is conscious. Our results indicate that such a “conscious” model can also produce the null interaction, suggesting that it should not be taken as valid evidence of unconscious processing.

Orienting towards saliency: context dependent cardiac phase effects in the processing of salient stimuli.

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Studies synchronizing the presentation of stimuli to different phases of the cardiac cycle, i.e. at systole (when the heart is beating) and diastole (between heartbeats), demonstrate how afferent cardiac signals can impact the way in which we perceive the world. However, there is still considerable debate on the underlying neurocognitive mechanisms. Findings of inhibited processing of weak sensory stimuli at systole, compared to diastole, led to the suggestion of a generalised cortical inhibition during systole. Conversely, studies showing enhanced processing of threat-signalling stimuli at systole led other researchers to propose that these cardiac cycle effects reflect a mechanism through which the body selectively enhances processing of salient stimuli. Building on the latter interpretation, I suggest that cardiac afferent signals induce transient neuromodulatory states that help to prioritize salient and motivationally relevant information in a context-dependent manner. Across two studies using an auditory oddball paradigm we showed increased pupil dilation responses to target stimuli (a simple 600Hz tone) presented at systole only when a threatening context was present. Interestingly, such modulation was not observed if the threat was imminent (vs unknown onset) demonstrating the rather selective and context dependent neuromodulatory effect of this interoceptive channel.
Selective attention in a dynamic “cocktail-party” scenario: Behavioural evidence of cueing effects in ASD.

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Recognizing speech in a cocktail party scenario involves two key processes: bottom-up processing, which helps separate the unique acoustic cues of the target speaker from distracting sounds, and top-down attentional control, which filters out competing distractions. However, it is unclear how these mechanisms specifically impact individuals with autism spectrum disorder (ASD), who often struggle with speech-in-noise processing. To address this gap, we designed a real-world cocktail party scenario, where participants were asked to recognize speech from a designated “target” speaker while background noise contained a “distractor” speaker and instrumental music. We manipulated the distractor's gender and spatial location to alter acoustic similarities between the two speakers. Our primary question was whether individuals with ASD could effectively utilize these acoustic cues and selective attention control to recognize target speech in this complex listening situation. Our preliminary results from 6 ASD and 15 typically developing (TD) participants suggested that individuals with ASD could detect acoustic differences in gender and/or location between target and distractor speakers and take advantage of these cues to enhance their selective attention ability in a cocktail party scenario, although their use of these cues was less efficient compared to TD listeners due to their selective attention deficits.

Anger or Happiness superiority effect in multi-target face search.

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Studies searching for emotional faces have suggested either the presence of a “Anger Superiority Effect” or a “Happiness Superiority Effect” where one or other expression is more efficiently found. Often, these effects have been attributed to low-level aspects of the face stimuli or the construction of the search array. Using an implementation of the classic “Bells” cancellation task (Gauthier et al., 1989), where multiple targets can be presented, we sought to ascertain which, if either, of these effects was present. This paradigm allows a large search set to be used (a search array of 98 real faces, containing 21 targets) and we use a large library of faces containing 171 individuals, each presenting 6 emotions (Ebner et al., 2010) to present a heterogenous crowd display. This reduces the opportunity for low-level influences on task performance as the targets and distractors are all randomised across identity, gender, age etc. With a 60sec time limit, participants (N=30) searched for either happy faces, or angry faces, amongst a distractor set containing all identities and other emotional expressions. Significantly more happy faces were found amongst the mixed distractors than angry faces and therefore our results are consistent with a, strong, happiness superiority effect.
Experimental evidence for the efficacy of science blogging as a tool for science communication via increased psychological flow.

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Science communication comprises the sharing of scientific developments with a wide, public audience (Kappel and Holmen, 2019). Here, science blogging is framed as the task of adjusting the demands of engaging with scientific material to match the understanding of non-specialist users, resembling the challenge-skills balance that is central to flow theory (Csikszentmihalyi and LeFevre, 1989). In a between-subjects, pre-registered experiment with N=128 participants, elements of user experience were compared across two presentation formats: science blogs vs. original peer review scholarly article abstracts. Dependent variables were: message quality, reading ease, jargon, formal style, engagement, enjoyment, emotion, retention of information, trust in science, and psychological flow. Findings confirmed increased message quality, reading ease, engagement, enjoyment and flow, also reduced perception of jargon for blogs. Information retention and trust in science showed null effects. Flow mediated blog format effects on engagement and enjoyment. Data confirm tangible user benefits of science blogs over study abstracts with an explanatory role for psychological flow theory. Further planned research aims to confirm these findings by replication, extend the level of exposure to science communication materials and capture skim-reading behaviours by manipulating reading speed.

Confidence, partisanship, and fact checking in false memories for fake news.

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With the influx of fake political news, generating false memories from reading fabricated stories has become a pressing area of research. In the current studies, new methods have been used to address the difference in measuring “actual” memories versus individual thresholds of belief that a fake news story “could have happened”, especially in cases of partisan bias, using ROC curve analysis. Findings suggest that accounting for memory confidence shows no effect of partisan bias on false memories for fake news, contrasting against the notion that people falsely remember fake news as true when it aligns with their political beliefs. Additionally, the effect of fact check warnings was examined (a standard textual fact check warning, versus similar text with no warning, versus no text and no warning) on the occurrence of false memories for fake news while cortical activation patterns (fNIRS) and eye-movements (eye-tracking) were recorded. Preliminary findings indicate that fact check warnings act merely as a novel distraction as opposed to having a corrective effect. Together, findings suggest that memory confidence plays an important role in false memories for fake news and fact check warnings may act as mere distractors as opposed to correctors.
Re-evaluating the efficacy of the Bad News Game: Reduced discrimination of true and fake news headlines in a British student population.

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This paper reports a failed attempt to conceptually replicate Iyengar et al. (2023). In the original study, Iyengar et al. (2023) tested the efficacy of the Bad News game in reducing susceptibility to fake news in an Indian population. They found that participants were better able to discriminate between true and fake news headlines after playing the Bad News game than they were beforehand. In the present study, we attempted to replicate their study with a British student population, while improving the original study by counterbalancing the allocation of news headlines to the pre-test and post-test. Unlike in the original study, we found that playing Bad News reduced participants’ ability to discriminate between true and fake news headlines. This finding suggests that the Bad News game may be less effective than previously thought, which has important implications given the popularity of Bad News as an intervention to combat misinformation.


An unrecognized confound in (Bayesian) optional stopping.

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Bayesian optional stopping refers to the practice of repeatedly performing a statistical analysis on a dataset as new data are collected until a pre-specified Bayesian evidence criterion is reached. This procedure is becoming increasingly common owing in part to its efficacy in optimizing data collection. Discussions of this procedure to date have been restricted to statistical issues and have omitted consideration of any deleterious methodological implications of this procedure. Here we highlight experimenter awareness of the current evidence state during data collection (experimenter evidence unmasking) as a methodological confound in this procedure. Experimenter evidence unmasking has the potential to influence an experimenter to implicitly or explicitly modify their experimental behaviour in ways that can reduce the internal validity of a study by biasing the assessment of an experimental manipulation. We conclude by offering recommendations for circumventing this confound and for the transparent reporting of experimenter masking procedures.
A model of constant density in the perception of hand weight.

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Perception of object’s weight has been studied for over a century, however little is known about weight perception of body parts. Recently, we showed that we systematically and dramatically underestimate hand weight by 49% (Ferre et al., 2023), an effect we called weightedness, for how light we experience body parts, on Earth. To understand how perceived hand size changes felt hand weight, we induced enlarged and shrunken hands using a visual-tactile illusion and the psychophysics staircase. We found that we underestimate less our hand weight when feeling an enlarged hand, and more when feeling a shrunken hand (in preparation). This is the opposite trend of the size-weight illusion; we do not compute body part weight in the same way as objects. We, therefore, propose a model of constant density. In another study, we assessed perception of hand volume, applying a staircase procedure with wooden cubes, along with the hand weight procedure. Strikingly, hand volume is overestimated while hand weight is underestimated, yet both estimations do not correlate, disentangling weightedness from any size-weight effect. We also calculated indirect perceived hand density and found a clear underestimation of 30.8% of actual hand density, matching a sparse hand that would float in water.


The effects of loneliness on memory and attention processes for faces.

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Emotional loneliness or perceived social isolation is the subjective negative feeling deriving from appraising one’s own social relationships as unfulfilling. It stems from a mismatch from actual and desired social relationships. Although loneliness affects cognition in different ways, evidence is mixed. We report findings on the effects of perceived loneliness on attention and incidental recognition of emotional faces. In exp. 1 (N= 126 young individuals) we used a gaze cueing paradigm with neutral, threat (i.e., angry faces) or affiliation (i.e., happy faces) social signals, followed by an incidental face recognition task. In exp. 2 (N= 235) we assessed the own age memory bias by using an old/new recognition task for neutral and emotional old and young faces signalling threat or affiliation. Findings showed differences in gaze cueing effects between lonely and non-lonely individuals but the two groups differed on recognition accuracy for the faces used during the gaze cueing task F(2, 124)= 147.8, p<.001,n2p=.704. There was an Own Age Memory bias for lonely and non-lonely individuals, with a stronger Own-Age Biases being associated with less loneliness and recognition accuracy for Novel Happy faces (B=-4.3844, SE=2.074, 95%CI [-8.46, -0.29], t=2.1, p=.036). These findings are discussed in the context of current theories.
Minimal relations lead to superior memory.

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The study explores a hypothesis that between-object relations are a critical factor for memory (as evident in Miller’s (1956) chunking effects). In four experiments with English and Chinese participants, we examined whether the presence of minimal relations between objects leads to better memory performance. The stimuli were verbal and the relations were established using syntactic means, e.g. in fox’s bag the particle ‘s expresses a possessor relation. In the PHRASE condition, participants listened to sequences of four phrases (e.g. ‘fox’s bag’, ‘dragonfly’s pepper’, ‘actress’s kite’, ‘writer’s apple’) and then performed a written free recall. The control LIST condition consisted of 4 word pairs (e.g. ‘fox, bag’, ‘dragonfly, pepper’, ‘actress, kite’, ‘writer, apple’). A better memory performance for phrases vs word-pairs was found, suggesting that memory favours complex objects (created via a relation of simple ones) over lists of unrelated objects. We discuss our findings in the context of Sentence Superiority Effects (SSE, e.g. Baddeley et al., 2009) that are attributed to syntax, yet the precise mechanism by which facilitation takes place is debated (e.g. Snell and Grainger, 2017). We attribute SSE to creation of larger entities, such as events and complex objects, that more naturally fit into memory data formats.

Target template activation in colour-repetition versus -switch trials.

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Visual search is guided by target templates that are held in working memory and activated prior to search. But can they be activated strategically when target colours are repeated versus switched across trials? Our search displays (presented every 1600ms) contained two target-colour bars (AB) and four differently coloured non-targets. Following an AABB colour sequence, participants reported the orientation of the respectively coloured bar in each trial. Between search displays, we presented an RSVP stream of probes (every 200ms) in either target colour (ab). We measured N2pc components, indicative of attentional capture, in response to these probes. In colour-repeat trials, probes that matched the upcoming target colour (aA) produced reliable N2pcs from 800ms prior to search. However, in colour-switch trials, such probes only triggered N2pcs when they immediately preceded a search display. This delay in template activation in colour-switch trials can explain behavioural switch costs (slower RTs in colour-switch than -repeat trials). Especially since search-irrelevant target colour probes (bA) never triggered N2pcs, suggesting that behavioural switch costs are not caused by competition between simultaneously activated templates. Overall, our results demonstrate perfect colour selectivity and strategic control during serial two-colour search when target colours repeat versus change predictably across trials.
Trajectory of Long COVID: Longitudinal changes in symptoms and cognitive impairment.

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The post-acute sequelae of COVID-19, or Long COVID, has widespread and long-lasting multisystemic impacts on patients’ body, cognition and daily functioning, including the ability to work. This has become a far-reaching social problem. Longitudinal studies are important in investigating the expected timelines along the course of recovery. This study adopts a mixed cross-sectional/longitudinal design to examine how symptoms (cognitive and non-cognitive) and objective cognitive function evolve over time in post-COVID-19 patients (n = 187) compared to controls without infection history (n = 207). Participants completed a questionnaire about their COVID-19 experience and cognitive tasks assessing memory, language and executive function at baseline. They were followed up for approximately 9 months, during which they completed the measures again at 2-3 follow-ups depending on their group. We found varying profiles for different symptoms. While there were improvements over time in some non-cognitive symptoms in post-COVID-19 patients (e.g. gastrointestinal/autoimmune/fatigue and mood symptoms), cognitive symptoms and neurological symptoms remained unimproved across time. Objective assessments showed persistent impairments in memory function, including response accuracy and speed. Our finding suggested that people with past COVID-19 infection did not experience improvement in cognitive function over time, at least for the duration of this 9-month longitudinal study.
Underlying mechanisms of visual perspective-taking.

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Visual perspective-taking is a critical component of human social interaction, allowing us to understand how the world appears to others, to empathize, and to engage effectively in social contexts. We investigated what influences visual perspective-taking abilities, in terms of the spontaneity and intentional control of perspective-taking and why they vary among people. Participants judged, as quickly as possible, whether a letter appearing in various orientations on a table were normal or mirror-inverted. An agent sat at the table and perspective-taking was measured by how much faster letters were judged when upright to the agent compared to when rotated away. In Experiment 1, we varied agent type (human, robot, mannequin, dog, lamp) and found that people spontaneously engage in visual perspective-taking, which is activated by the subjective attribution of a “mind” to the agents. In Experiment 2 (human agent only), we instructed participants to either take or suppress the agent’s perspective and found that individuals can intentionally control when and when not to perspective-take. Our findings further highlighted variability amongst perspective-taking abilities, showing that those who possess some schizotypy traits find it difficult to take the visual perspective of others spontaneously, but do this well when specifically instructed to do so.

The Acting Self: Using fNIRS to measure an actor’s sense of self during a monologue performance.

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Background: Actors use their phenomenal and narrative self (1) to create a phenomenal and narrative self for their characters. One way to measure the sense of self is by measuring the mPFC’s activation when hearing your own name (2,3). Therefore, researchers measured an actors mPFC response to hearing their own name vs character name during acting and control conditions. Participants: 38 UK-based professional actors with 2+ years of industry experience. Design: Shimadzu LIGHTNIRS functional near-infrared system with 22 channels was used to measure PFC activity. Biosignalsplux physiology system was used to measure the actor's breathing rate. Actors performed a monologue, coloured in a mandala colouring book (control) and read from a telephone book (control). Tasks were conducted whilst seated, lasted 2 minutes and were repeated 4 times in the same listed order. During each task, the actor's first name, character name and a random name were called out from a speaker at 17-22 second intervals. The entire session lasted 24 minutes. Preliminary Findings: Own name had higher activation in the mPFC during the monologue condition, but stranger name had higher activation than own and character name in control conditions in the L_IFG, L_DLPFC and the R_FPC.
The impact of face masks on autistic and non-autistic adults’ face processing abilities.

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Atypical emotion recognition is argued to be characteristic of autism spectrum conditions (ASC), underpinned partly by atypical eye gaze, with less eye contact and more gaze direction towards the mouth. Given the widespread adoption of face masks due to the Covid-19 pandemic, exploring the effect of masks on face processing in autism, as they occlude the mouth region, is of interest. This study investigated the impact of masks on emotion and identity recognition, with a non-autistic (N = 38) and autistic sample (N = 25). Participants also completed the Toronto Alexithymia Scale, and the abridged Autism Quotient, to investigate the impact of alexithymia and autistic traits alongside masks on face processing abilities. Masks were detrimental to performance for both autistic and non-autistic groups, affecting performance on the emotion recognition task more than the identity recognition task. Autistic participants’ performance was more negatively affected by masks, for both identity and emotion recognition. The impact of facemasks was not predicted by alexithymia or autistic traits, after gender, ethnicity and age were considered. Overall, the results suggest that masks negatively affect face processing for both non-autistic and autistic groups, particularly emotion recognition, however the impact of masks is amplified for autistic people.

Is there a social motion preference in autistic adults?

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Autism is associated with attenuated social attention. In comparison to neurotypical (NT) children, autistic (AUT) children look less at social (SOC) motion scenes and more at geometrical (GEO) ones. Yet, it is unknown whether this imbalance persists in adulthood. We tested the SOC/GEO motion preference in 32 AUT and 29 NT adults in two passive-viewing tasks, measuring (1) relative looking preference to SOC/GEO paired scenes, and (2) pupillary responses to individual SOC/GEO scenes to index locus coeruleus-norepinephrine system activation (salience detection). We hypothesised increased relative looking preference and pupil sizes for SOC
in NT and for GEO in AUT. NT showed a relatively larger preference for SOC than AUT, with SOC looking preference in NT (\textit{pcorr}<.001) and no looking preference in AUT (\textit{pcorr}=.878). A linear mixed model with third-order polynomial revealed that while the pupillary responses in both groups were larger for SOC than GEO, AUT maintained the initial pupil dilation across a trial for both, but NT only for SOC (\textit{est.}=0.08, \textit{t}(6344)=-4.02, \textit{p}<.001). Our data support social motion preference in NT. However, AUT showed no preference for either motion type. This suggests that social motion preference (or lack thereof) might be a potential autism marker, even in adulthood.

Establishing the specificity of intolerance of uncertainty in Autistic and neurotypical populations.

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Intolerance of uncertainty has been implicated as a highly relevant construct to anxiety in autism (Jenkinson, Milne, and Thomas, 2020). This study aims to employ a novel paradigm to replicate findings that participants who are highly intolerant to uncertainty report more in-task distress in uncertain conditions and information seek to reduce the uncertainty of an upcoming trial (Jacoby, Abramowitz, Buck and Fabricant, 2014; Ladouceur, Talbot and Dugas, 1997). Moreover, we aim to establish whether the emotional and behavioural effects of uncertainty on these individuals is limited to uncertain conditions that are more aversive in nature. The paradigm involves participants viewing high vs. low valence images for which they can ‘purchase’ a description. Initial pilot results showed that participants reported more distress for the low valence (aversive) conditions and were more likely to purchase the image-description for aversive conditions. Future plans are to collect a full data sample of adults including a group of autistic participants to establish whether valence-specific intolerance of uncertainty is present in both groups.


Research Plan - What can children’s eye movements during decision making tell us about children’s understanding of possibilities?

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Introduction: Young children’s understanding of possible alternatives, both forward looking - multiple incompatible events could occur in the future - and backwards looking - other alternative
events could have happened in the past - has long been debated (e.g., Alderete and Xu, 2023; Beck et al., 2006; Leahy and Carey, 2020). However, by at least 5 years, children begin to be curious about foregone alternatives to their choices (FitzGibbon et al., 2019). Children’s allocation of attention during and after decision making can inform the extent to which they consider alternative possibilities. Methods: In the proposed project, I hope to combine a new paradigm, in which children choose between probabilistic gambles (gumball machines), with eye-tracking to determine to what extent preschool children’s attention to choice alternatives before and after making decisions is affected by the (a) probabilities of different outcomes and (b) children’s own agency over the decisions. Analytic approach: Region of interest analysis will be conducted to determine the time children spent looking at the two gumball machines prior to making decisions and after outcomes have been revealed. Multilevel linear models will predict looking time from the outcome probabilities of the gambles, the chosen gamble, and children’s agency over the choice.

Combining novel and familiar sensory cues in weight perception.

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Combining familiar visual (volume) and haptic cues to weight can produce more precise judgments than when using either single sensory cue alone. It remains unclear, however, if this benefit can also be gained with novel sensory cues. To test this, we investigated whether a novel visual cue (line orientation) can be combined with a familiar haptic cue to improve weight perception. We hypothesised that participants would show more precise weight discrimination with both cues. 30 participants spent 90 minutes learning a mapping between line orientations printed on jars and their corresponding weights, before completing a two-alternative forced choice weight discrimination task in which they repeatedly decided which of two jars was heavier across three sensory conditions: a haptic condition, in which participants held blank jars, a visual condition in which they looked at line-patterned jars, and a visuo-haptic condition in which they held and saw the line-patterned jars. Discrimination in the visuo-haptic condition was not significantly more precise, suggesting that novel visual cues were not combined to augment weight perception. A further study in progress investigates whether training over two weeks has combination benefits. Overall, these studies investigate the scope for perceptual plasticity and perceptual learning beyond typical human abilities.

Visuo-haptic saliency in object shape perception.

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In active exploration, we focus on salient parts of objects. While visual saliency is well-researched, haptic and multisensory saliency are less understood. We investigated how haptic and visual saliency interact in object shape perception. In our experiment we used 12 replicas of bell peppers with natural shape variations. There were 7 participants in the experiment. Their task was to compare two bell peppers presented successively. In half of trials the first object was explored haptically in the
other half it was explored visually. The second object was always explored visually. Haptic stimuli were 3D printed objects and visual stimuli were 6 different views of their 3D model. We used eye-tracking to record participants’ eye movements. We correlated heatmaps across 3 conditions: 1. the object is explored as the first object (no direct prior visual or haptic exposure), 2. the object is explored after it was seen before, 3. the object is explored after it was touched before. We found significantly smaller correlation when comparing visual exploration following haptic exploration with first or second visual exploration than when comparing purely visual explorations. Our results challenge the idea of an amodal representation of object saliency.

Physical Cognition: How the gravitational model contributes to human reasoning.

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Humans’ successful interactions with the external world rely on their ability to understand the laws of physics. Since the beginning of time, humans have evolved in a terrestrial gravity environment. The vestibular otoliths detect the direction of gravitational acceleration. Vestibular signals are integrated with visual, proprioceptive and visceral cues to create an internal model of terrestrial gravity. Here, we investigated how this model contributes to physical reasoning about the world. Healthy participants completed virtual tool-use games in which they were asked to make accurate predictions on the movement of an object in a virtual environment. Gravitational signalling was disrupted using stochastic Galvanic Vestibular Stimulation (sGVS) that was applied during the task. Sham stimulation was used to control for non-specific effects. Differences in physical reasoning were measured by performance outcomes and the strategies used to solve the task. sGVS impaired the accuracy in performance in physical reasoning only in games which involve strong gravity-related predictions. Alterations in gravitational signalling also caused a shift in strategies. Our results show a clear contribution of the gravity model to physical reasoning, thereby emphasising the role of embodiment in human cognition.

Ensemble coding of facial identity.

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Groups of visual stimuli, such as simple shapes varying by colour and size, can be combined into a single cognitive representation that captures their global statistical properties. This phenomenon is known as ensemble coding and is also observed with complex visual stimuli, such as faces. Ensemble coding of faces indicates that information from different identities can be integrated into a single average face, which is then recognised at a higher rate than its constituent identities. However, these effects are also inconsistent across studies and manipulations. In this study, ensemble encoding of facial identity was examined with an optimised paradigm that examined the combination of just two faces into an ensemble across a range of factors, such as different exposure times (Experiment 1 and 2), variation in image quality and similarity (Experiment 3 and 4), and competition between ensembles and their constituent identities (Experiment 5). Across experiments, evidence of ensemble
coding was found, consistent with the integration of different identities into a single percept. These results extend current understanding of ensemble coding, by demonstrating the persistence of this phenomenon under optimised and variable conditions.

When do emotion words emerge in children’s vocabulary: Evidence from developmental language corpora.

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Emotion words allow us to identify, describe, and regulate our emotional states. We provided a comprehensive account of emotion words in children’s book language. We take a cross-corpora developmental approach to understand how emotion words emerge in children’s reading experience, and how they are used by children in their own writing. We analysed emotion words across four large corpora: Spoken language, Picture books (both targeted at 0-5 year olds); Reading, and Writing, (read and written by > 5-13 year olds). We first compared child-directed speech and picture books used for shared reading that are targeted at preschool children, then considered children’s reading and writing through the primary and secondary school years. We showed that books contain more unique emotional words than conversations. As targeted age increases, books provided access to more nuanced and sophisticated emotion words. Children’s production of emotion words as reflected in their writing sample also increased with age, becoming more diverse and complex. We speculated that book language may play a role in emotional development by providing access to situations and characters beyond the everyday interaction.

Pupillometric indices of proactive allocation of cognitive control.

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Allocating cognitive control to a demanding task is effortful and aversive - the amount, or intensity, of control allocated to a task therefore depends upon an evaluation of the costs and potential benefits of doing so. While a considerable body of research has investigated the factors contributing to this cost/benefit evaluation, less is known about the process and time-course of actually allocating cognitive control to a task. Here, we used pupillometry to investigate the influence of reward magnitude and probability upon the allocation of control: Participants performed a Stroop task in which each trial was preceded by a cue indicating whether a monetary reward could be earned, and whether the reward would be performance-contingent or random. Pupil dilation in the pre-stimulus interval was modulated by both the magnitude and probability of reward: the largest dilation was for high-reward trials in which reward was performance-contingent. Interestingly, this effect was only observed in the final hundreds of milliseconds before stimulus onset - suggesting that control is only allocated in the moment it is needed, and not in a sustained manner. We conclude that pupil dilation can index the allocation of proactive control, providing insight into the time course of this process.
Spatial and anatomical coding: Dissecting reaction time patterns in digit selection tasks.

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Research consistently reports differential performance in choice reaction time (RT) tasks across human digits. Specifically, digits positioned in the middle were reported to be chosen slower than digits of the outer positions, leading to RTs resembling inverted-U curves. Some researchers associated this phenomenon with the spatial coding of stimuli, while others argued that it mirrored intracortical inhibition within the cortical somatotopy of the digits. The present study endeavoured to reconcile the conflicting results of previous studies by systematically examining the influence of stimulus presentation and the response set on digit selection task RT patterns. We first examined how different styles of visual stimuli contributed to the RT patterns, and the results implied that the discrepancies reported in prior research were due to different stimuli being adopted. Subsequently, we incorporated an asymmetric eight-choice task to reassociate the spatial coding of stimuli with the anatomical coding of respondent digits. Our findings underscored the intertwined roles of both coding processes as well as a stimulus-response translation process in shaping the RT patterns of digit selection tasks. Crucially, the spatial coding of stimuli plays a more dominant role compared to other factors.

Observers dynamically adapt perception in a changing environment.

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In order to facilitate informative perception, the brain leverages predictions of what it expects to observe. Extant literature has shown that expected events are usually perceived more sharply and rapidly than unexpected stimuli. However, unexpected events often signal a change in the environment, and it is not yet clear whether knowledge that the environment will change can reduce this advantage for expected events. The current study presented runs of stimuli at locations drawn from a Gaussian distribution to establish an expectation, and violated this expectation by changing the mean of the distribution periodically. Participants’ task was to detect features of those stimuli, and we adapted changepoint modelling to investigate how detection evolved as the number of changes increased. We find that detection of unexpected events was always poorer compared to expected events, though this effect was attenuated as the number of observed environmental changes increased. This confirms Bayesian accounts that expectations facilitate perception, and shows that when observers learn to expect changes in the environment, they dynamically adapt to those changes to form more precise percepts of the unexpected events. Our findings suggest one way to reconcile poor percepts of the unexpected with successful learning from surprise.
Sample size matters when estimating variability of flexible, goal directed behaviour.

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Reversal learning is commonly used to assay cognitive flexibility, with previous work demonstrating reliable behavioural, computational, and neural measures using ICC. Here we assess the reliability of reversal learning during two sessions with an online sample larger than previous reports (N=150). We quantify reliability using ICC and variance decomposition. In contrast to ICCs, where our estimates replicate previous findings, we found that within-subject variance contributed a large proportion to the overall variance of our behavioural measures, suggesting poorer reliability than previous work. Because previous studies had smaller sample sizes, we used bootstrapped sampling to quantify the change in variance proportion as a function of sample size. We show that the proportion of within-subject variance for behavioural measures increases and becomes more consistent across subjects as sample size increases. This result was also reproduced using an independent dataset. However, computational modelling parameters had less within-subject variance than behavioural measures and were more stable across sample sizes. Therefore, some computational model parameters may reflect relatively stable performance components. We suggest that insufficient sample size influences estimates of reliability in non-obvious ways, affecting for instance the estimation of variance components, meaning ICCs alone are an insufficient metric of within-subject reliability.

Similar perceptual repulsion effects for lifelong and recently learned expectations.

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Perception is typically biased towards what we expect, consistent with Bayesian accounts of veridical perception in a noisy sensory world. However, opposite, repulsive effects of expectation on perception have also been reported. For example, Phan, Harris and Kim (2022) found that perception of vertically accelerating objects is negatively biased by gravitational expectations, whereby objects are perceived as less accelerating when moving downward, compared to upward. Here we asked whether this repulsive perceptual effect was due to gravitational priors being acquired early in life and remaining relatively fixed, unlike arbitrary learned expectations in typical studies of perceptual expectation effects, which more commonly give rise to attraction effects. In a pre-registered design (N=100), we replicated the vertical gravitational repulsion effect observed by Phan et al. Critically, we additionally found a repulsive bias in the gravitationally neutral horizontal plane by inducing expectations to see objects accelerating more often in one direction and decelerating more often in the other. This bias was driven by expectations learned in a 20-minute online study, rather than by lifelong expectations of gravitational forces. We conclude that both recently learnt and stable, lifelong expectations can generate perceptual repulsion effects, and discuss potential accounts of attraction and repulsion expectation biases.
Investigating metacognition related to autobiographical memory using the feeling-of-retrieval task.

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Control processes ranging from filtering out relevant memories according to the current context, to assessing the plausibility of the event being retrieved are involved in autobiographical memory (AM) retrieval. Such processes have been mostly viewed as involuntary. That is, the extent to which people can voluntarily monitor and judge the efficacy of their AM retrieval remains unexplored. Here we integrated insights from the metacognitive and AM literatures to design an original procedure assessing monitoring related to AM retrieval. In two studies, we presented participants cue words for a short period of time (i.e., 1 or 2 seconds) and asked them to judge whether each cue would facilitate AM retrieval or not. Later, participants had to generate memories in response to both types of cues. Our results demonstrate that participants were able to predict which cue words would facilitate memory access and which would not. This ability to predict cue effects was interpreted as the ability to monitor the early stages of AM retrieval.

Situating metamemory within metacognition in healthy aging.

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One explanation of the age-related decline in episodic memory is that the memory strategies of older adults are less effective than those of younger adults. The ability to implement strategies hinges on metacognitive functions. Older adults have been shown to be less accurate than younger adults to judge their memory in episodic tasks, but just as accurate in semantic tasks (Devaluez et al., 2022). This result suggests that all domains of metacognition may not be equally impaired in aging. This study aimed to examine age-related differences of metacognition in four domains: episodic memory, semantic memory, executive functioning, and visual perception. To overcome the limitations of previous studies, data were collected in a large sample (N = 443) of participants aged from 18 to 80 and were analyzed using a hierarchical Bayesian framework. We hypothesized that older adults would be less accurate than younger adults at judging their episodic memory performance, with no age effect for the other cognitive domains. Results showed a negative effect of age on metacognitive efficiency in the episodic task, and a similar trend in the executive task. There was no age effect in the other tasks. The importance of frontal functioning and memory processes for metamemory judgements will be discussed.

Research Plan - Testing an expectancy-violation account of counterfactual thinking development.

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Several recent studies have focussed on when counterfactual thinking - reasoning about how reality could have been different - emerges, with inconsistent results suggesting that it occurs at some point between age 4 (Harris et al., 1996; Nyhout and Ganea, 2019) and adolescence (Rafetseder et al., 2013). Most research has not presented a mechanistic explanation of how children first deploy this ability in development. Here, we propose and test a mechanistic account of the early emergence of counterfactual thinking: the expectancy-violation account of counterfactual thinking. Specifically, we claim that expectancy-violation will make prior expectations readily available to the children as a counterfactual alternative. Thus, children will spontaneously consider both what actually happened and what could have happened, which will reduce the demand on executive function to inhibit reality and on keeping two different representations in mind at the same time. We will present a research plan to test this account by pitting children’s (target N = 90 children aged 3-5 years) prior expectations against reality using short vignettes. We will examine pupillary surprise responses to expectancy-inconsistent and consistent events, and we hypothesise that heightened pupil dilation will predict children’s ability to correctly answer counterfactual test questions.


Predictive action perception in Autism and Schizophrenia.

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While autism and schizophrenia are distinct conditions, they share social challenges. Furthermore, these difficulties extend along a spectrum of traits that encompass the neurotypical population as well. Predictive coding theories of perception have the potential to differentiate between them. Predictions generated at abstract and sensory levels are compared with sensory input to be either confirmed or force a re-evaluation of the prediction. Autism arises due to an over-reliance on sensory information, whereas Schizotypy arises as an over reliance on abstract predictions. In a 'take it/leave it' paradigm, whereby the perception of an action (e.g., a reach) is predictively biased nearer the object, not only along the motion trajectory, but also by the actor’s goals (e.g. declaring “I’ll take it” beforehand), we are able to disentangle the relative contributions of high level intention and low level sensory predictions on action perception. Correlational analysis revealed significant associations between autistic and schizophrenic trait scores and the extent of perceptual biases concerning the predictability of actor intentions versus movements. This research provides insights into the different cognitive mechanisms underpinning social difficulties in autism and schizophrenia and may shed light on why autistic people feel more comfortable interacting with other autistic people.
Effects of prediction error size and valence on pain perception.

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The magnitude and the valence of prediction error, the mismatch between a prior expectation and sensory evidence, are important factors in shaping one’s pain perception. It was recently demonstrated that the magnitude and valence of prediction errors affect the degree of influence of the prior expectation on perception. When the magnitude of the prediction error is large (beyond the “tipping point”), then one’s perception becomes more accurate and less affected by one’s expectation than when prediction errors are smaller, but the point at which this happens is also influenced by whether the delivered pain was more or less painful than expected (i.e., the valence of prediction error). The present study used a paradigm whereby different levels of prediction errors were elicited. The study investigated whether the impact of prediction errors was modulated by i) the magnitude of the prediction error, ii) the valence of the prediction error, and iii) individual differences in autistic and alexithymic traits. Results showed that, in line with the previous study, the magnitude and the valence of prediction error impacted pain perception. Autism modulated this effect, but it was alexithymia, not autism, that modulated how this effect changed over the course of the task.

Emotion increases temporal distance judgements.

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In the framework of retrieved context models of episodic memory, such as the Context Maintenance and Retrieval model (CMR), the mental state that represent our experience in the world is implemented in a construct termed the “temporal context”. A sudden change in a salient feature of our experience is implemented as a drifts of the temporal context. We asked how emotion influences temporal context drifts. Variants of CMR (eCMR - Talmi et al., 2019; CMR3 - Cohen and Kahana, 2021) consider that a drift in the temporal context occurs whenever contiguous experiences differ in their emotion feature. We tested 16 participants on a standard paradigm (Dubrow and Davachi, 2013) where participants observed sequences of items that all belonged to the same category (e.g. animals). Each sequence included both mildly negative items and neutral items. At test, participants were presented with item pairs and provided judgements of recency and temporal distance. Temporal order memory was at chance and was not modulated by emotion. As predicted, emotion increased temporal distance judgements, such that when pair spanned a switch in emotion, they were judged as having been presented further apart. These results provide preliminary support for CMR models of emotional memory.
Behavioural mechanisms of self-other-distinction in people with autistic traits.

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Autism is commonly characterized by changes in social interest and interactions. However, it is unclear whether these changes are underpinned by more domain-general patterns of information processing or by specific social mechanisms. Maintaining our sense of self while simultaneously interacting with others, known as self-other distinction (SOD), is crucial to navigating complex social interactions. In this study, we devised a new experimental paradigm that allows us to test whether questionnaire-assessed autistic traits in the general population are related specifically to an altered capacity for self-other-distinction (SOD) or domain-general information processing. Initial results showed that participants with higher autistic trait scores were better at distinguishing themselves from other people, indicating a more isolated sense of self. Strikingly, however, higher autistic traits did not affect how participants distinguished other people from their teammates, ruling out explanations in terms of domain-general processing. Overall, this research helps us to understand the specific cognitive processes that contribute to difficulties for autistic people when interacting with others. By dissociating the capacity for SOD from domain-general information processing, the study sheds new light on the nature of social deficits in autism.

Can misperceptions be controlled? Experimental findings from an auditory signal detection task using novel task feedback and sound familiarisation.

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Auditory signal detection tasks (ASDTs) capture an individual’s propensity towards false perceptions in ambiguous noise. These auditory misperceptions may lie outside of conscious control. This mixed design, quantitative study considers whether congruent response feedback (in which the participant is provided with information on their ongoing task performance) or sound familiarisation (in which the participant is exposed to the task noise and stimuli ahead of task trials) changes false alarm rates. 217 participants completed an online task battery including self-report measures of hallucination and three ASDT’s: i) standardised ASDT (control); ii) an ASDT with congruent feedback, and iii) an ASDT with sound familiarisation. I will present preliminary results and discuss implications for our understanding of the cognitive mechanisms that underpin auditory misperceptions.
An aesthetic preference for scenes containing object-oriented gaze.

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Humans show reliable preferences for certain configurations of stimuli within scenes. For example, we tend to prefer scenes - such as paintings or other compositions - to be organised such that the principle element is centrally located: Power of the Centre. When the object is a face looking to the left or right, we prefer scenes where that face is looking towards the centre of the composition (Inward Bias) - meaning the agent itself is off-centre. Here we investigated how these two preferences interacted with social attention. Specifically, it is typical for people to orient their gaze to salient objects. We predicted that observers would prefer scenes where a face was observed looking towards an object, and that this preference would be robust to whether the scene violated the Inward Bias and the Power of the Centre effects. Data from two experiments -where participants selected which of two sequentially presented scenes, each differing in object-face configuration - showed evidence of both the Inward Bias and the Power of the Centre. However, crucially we show that object-oriented gaze drives these effects and can result in preference for scenes that violate both the Inward Bias and Power of the Centre.

Are novel sensory cues automatically deployed during weight perception?

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People can learn new cues to an object’s weight; however, how these cues are processed remains unclear. Here, we investigate whether a novel auditory cue is automatically deployed during weight perception. We adapted a well-known phenomenon, the size-weight illusion, where an object’s weight is misjudged based on the object’s visual size, replacing the visual size cue with an arbitrary (novel) audio pitch cue. 33 participants lifted visually identically cups whose weights were mapped to an audio pitch, and verbally estimated their weights. Trials in which the audio was heard but participants did not lift the cup checked that the mapping was learnt. The task was also conducted with a visual size cue to check that participants experienced the standard illusion. Participants judged larger objects as lighter, showing the classic size-weight illusion. However, a comparable “pitch-weight” illusion was not evident. Instead, the novel auditory information biased weight perception in the opposite direction, suggesting that the novel auditory cue is not processed in the same automatic way as size. Ongoing studies are testing whether 1) a novel visual cue (line orientations) is processed similarly to a familiar visual cue to weight (volume), and whether 2) a comparable illusion emerges with more training.
Using olfaction to reduce stakes in high-risk gamblers.

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The Covid-19 pandemic led to prolonged lockdown restrictions around the world, which acted as the catalyst for online gambling disorders. As arousal is considered a key contributory factor behind risk taking within gambling, this study examined whether olfaction can manipulate arousal levels to influence resultant gambling behaviour. This study compared the influence of a relaxing scent (lavender) to stimulating scents (peppermint and isovaleric acid) on gambling behaviours in a student population (n = 45), grouped by risk taking propensity (high risk; low risk). This was examined through an augmented version of the Cambridge Gambling Task (CGT), incorporating the behavioural measures of overall proportion bet and mean bet value. Based on the overall proportion bet, results postulate that lavender lowers risk taking behaviours within gambling, but only within high risk gamblers. No significant differences were found in mean bet value. Key study limitations include potentially uneven scent stimulation levels and imperfect ecological validity of the CGT paradigm. Future research should test if alternative relaxing smells have similar effects and to develop understanding of the mechanism of effect. Although in a very early phase, the data provoke thoughts of a simple and pleasant intervention for on-line gambling problems.

Training item diversity and frequency selectively encourage different adaptive speech processes.

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Previous research suggests the relative diversity and presentation frequency of training items influences listeners’ engagement in generalized morphological learning versus item learning (Tamminen et al., 2015). We predicted that a similar pattern may emerge for perceptual learning and word learning, with higher item diversity and higher presentation count encouraging perceptual and word learning, respectively. Online participants were divided into high-diversity (n=33), medium-diversity (n=33), and low-diversity (n=35) groups. Each group encountered an identical number of training trials, but those trials either included more unique items or more presentations. Training involved written sentence stems followed by spoken presentation of a pseudo-word or highly predicted word, either in a canonical accent or an artificial accent supporting perceptual learning. Results indicate that participants in the high/medium-diversity groups adapted more strongly to the accents, increasingly rating accented words as permissible over time. Only the low-diversity group showed such a pattern for pseudo-words. The test phase produced similar results: the high/medium-diversity groups were less likely to report accented surface forms in word report, while recognition memory and meaning inference performance was highest in the low-diversity group. Given identical exposure quantity, listeners preferentially engage in perceptual or word learning depending on the diversity and presentation frequency of training items.

Predictability effects on word-meaning priming and incidental memory.

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Encountering a homonym in a sentential context that biases interpretation towards its subordinate meaning leads to that meaning subsequently being more easily accessible (word-meaning priming). Research suggests that word-meaning priming may be supported by general episodic memory processes (Gaskell et al., 2019), and may be affected by factors that have been shown to affect episodic learning (e.g., prediction error; Quent et al., 2022). In two pre-registered online experiments, we tested whether contextual predictability affects the strength of lexical-semantic updating. We exposed participants to sentences that emphasised a particular aspect of a sentence-final target word’s meaning. Importantly, the target words differed in how predictable they were based on the sentence context (e.g., “You can get in a good workout by riding an alloy bicycle” vs. “You can get in a good workout by lifting a bicycle”). Associate production and semantic relatedness judgement tasks were used to assess the strength of word-meaning priming. Contrary to our hypotheses, while relatedness judgements revealed evidence for priming in both experiments, we did not find an effect of contextual predictability in either task across the two experiments. Our findings suggest that the predictability of linguistic input might have a limited influence on lexical-semantic updating.

Effect of signed vs unsigned prediction error on declarative memory.

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De Loof et al. [1] examined the role of prediction error in one-shot learning of unknown translations of known words. In each study trial, participants were offered 1, 2 or 4 possible translations, and received financial reward for correct predictions. The translations were arbitrary, and manipulated so that participants’ predictions were correct on either 100%, 50% or 25% of the trials respectively. Associative memory for the translation was shown to be a linear function of the signed prediction error, i.e. greater when reward was more unexpected, and lesser when an expected reward was not received. In our work on prediction error in declarative memory [2], in which there was no explicit reward, we have assumed that memory is a function of unsigned prediction error (i.e. absolute “surprise”). In Experiment 1 (pre-registered here: https://osf.io/eubzf), we replicated De Loof et al.’s paradigm, but without the financial reward, and found that memory was a function of unsigned prediction error. Experiment 2 (pre-registered here: https://osf.io/8wtsn) will be a direct replication with financial reward. Should we replicate De Loof et al.’s findings, then the combined results will suggest that explicit reward determines whether the sign of prediction error is important for encoding new declarative memories.


False memories for ending of events.

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Memory distortions are often caused by our experience of what typically happens in a given situation. However, it is unclear whether memory for events is biased by the knowledge that events usually have a predictable structure (a beginning, middle, and an end). Using video clips of everyday situations, we tested how interrupting events at unexpected time points affects memory of how those events ended. In four free recall experiments (1, 2, 4, and 5), we found that interrupting clips just before a salient piece of action was completed, resulted in the false recall of details about how the clip might have ended. We refer to this as “event extension.” On the other hand, interrupting clips just after one scene had ended and a new scene started, resulted in omissions of details about the true ending of the clip (Experiments 4 and 5). We found that these effects were present, albeit attenuated, when testing memory shortly after watching the video clips compared to a week later. Overall, we conclude that when people watch videos that violate their expectations of typical event structure, they show a bias to later recall the videos as if they had ended at a predictable event boundary.
Transient susceptibility to interference at event boundaries impacts long-term memory of naturalistic episodes.

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When encoding naturalistic events, processes triggered by event boundaries seem to be relevant for subsequent memory. Specifically, novel input at event boundaries interferes with short-term retention of the preceding event. This retroactive interference may occur because new input perturbs offset-related associative binding. Because information binding thought to occur within seconds after encoding, new information should affect event memory if presented at a boundary, but not after a delay. Here, we investigated if retroactive memory interference is temporally specific and whether it also impacts long-term retention. Participants viewed short narrative movie clips in isolation or pairs, where clips were presented with a 0s or a 2s delay. In free and cued recall after 20 minutes and 24 hours, memory for movie clips that were immediately followed by a second clip was reduced compared to clips shown in isolation. Cued recall of clips followed by a second movie after 2s was comparable to movies shown in isolation. Intact offset-related processes (as indexed by successful recall of the first movie) did not negatively affect encoding of the subsequent clip. Together, these results indicate that the 2s time-window immediately after an event is relevant for successful consolidation and long-term retention of memory.

Are two words recalled or recognised as one? How age-of-acquisition affects memory for compound words.

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The current study aimed to assess whether the integrated account could explain memory tasks, using compound words, which differ from monomorphemic words regarding ease of mapping and semantic processes. Four-hundred-and-eighty participants were split into four groups of 120 participants for each of four experiments. Participants were required to recall unspaced and spaced compound words (Experiments 1 and 2, respectively) or make a recognition decision for unspaced and spaced compound words (Experiments 3 and 4, respectively). This approach allowed us to establish how semantic processing was involved in recalling and recognising the items. We found that AoA was related to all tasks such that irrespective of space, early-acquired compound words were recalled more accurately than late-acquired compound words in free recall. In recognition memory, late-acquired compound words were recognised more accurately than early-acquired compound words. However, the slope for the AoA was semantic processing influenced free recall to a greater extent than the recognition memory, with the AoA effect being larger in free recall than recognition memory. In addition, the AoA effect for the compound word was larger in spaced compound words than unspaced compound words. This demonstrates that the AoA effect in memory has multiple sources.
Does theta synchronicity of sensory information enhance associative memory? Replicating the theta-induced memory effect.

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The binding of information from different sensory sources is critical for associative memory. Previous animal research suggested that the timing of theta oscillations in the hippocampus is critical for long-term potentiation, which underlies associative and episodic memory. Studies with humans showed correlations between theta oscillations in the medial temporal lobe and episodic memory. Clouter et al. (2017) directly investigated this link by modulating the intensity of the luminance and the sound of the video clips so that they ‘flickered’ at certain frequencies and with varying synchronicity between the visual and auditory streams. Better memory was found for the synchronous theta (4Hz) flickering compared with no-flicker, asynchronous theta, or synchronous alpha and delta flickering. This effect - called the Theta-Induced Memory Effect (TIME) - is consistent with the importance of theta synchronicity for long-term potentiation.

Electroencephalography data showed that synchronicity was achieved in neuronal oscillations. Given its theoretical and practical importance, the present work attempts to replicate TIME while addressing two alternative explanations. The preliminary results of Experiment 1 could not replicate the advantage of synchronous theta over asynchronous theta and no-flicker conditions. Experiment 2 with magnetoencephalography is underway to confirm that theta synchronicity is neurally achieved.

The Vestibulocerebellum: New insights from a large-scale rs-fMRI study.

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Lobules IX and X of the cerebellar cortex are known to connect with the vestibular nuclei and considered to form the ‘vestibulocerebellum’. In humans, studies have identified a set of neocortical areas responsive to vestibular stimulation including locations within the parietal operculum, central and posterior insula, inferior parietal cortex and lateral and medial parts of the premotor cortex (zu Eulenburg et al., 2012). However, the anatomical relationships between these vestibular cortical areas and the cerebellar cortex remain unclear. The current study used 3T rs-fMRI data in humans (N=514; Cam-CAN Data Repository) to investigate these relationships. Seed-to-voxel and ROI-to-ROI analyses were conducted to explore anatomical patterns of connectivity. A conjunction analysis of all the vestibular cortical seeds revealed inhibitory influence on parts of Lobule HVIIA (Crus I and Crus II). Individual t-tests showed consistent inhibitory relationships between Lobules IX and X with 12 of the 13 vestibular cortical areas. Other parts of the cerebellar cortex including Lobule I-IV, V, VI, VIII A and VIII B showed strong positively correlated connectivity with the vestibular cortical seeds. Lobule VI showed the strongest connections. We conclude that the classically defined vestibulocerebellar areas do not appear to be influenced by cortical vestibular network.

Evaluation of classic colour constancy algorithms on spectrally rendered ground-thought.

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The small number of available spectral images imposes a significant limit to colour science. We used computer graphics to overcome the problem and spectrally render naturalistic images, to investigate performance of classic colour constancy (CC) algorithms: 1) gray-world, 2) white-patch, 3) gray-edge, 4) shades-of-gray, 5) gamut-mapping. We randomized the virtual observer's viewpoint and surface spectral reflectance in five indoor settings, resulting in a total of 4096 scenes. Instead of only comparing the illuminant estimated by the algorithms with the one inferred from a white surface embedded in each scene, we could evaluate CC algorithms based on the whole scene as rendered under a neutral illuminant. Performance of CC algorithms substantially differed between the two evaluation methods, indicating the importance of the whole-scene ground-truth. We selected a subsample of scenes and performed an online perceptual experiment to measure human CC and compare with predictions of the algorithms. Participants engaged in an asymmetric colour-matching task with a white sphere rendered at the centre of each scene. Human CC was better correlated with all algorithms’ performance when evaluated based on the whole scene. Furthermore, the arguably simplest algorithm (gray-world) best predicted human performance, suggesting that CC may be simpler than we thought.

Development of a scale for prenatal interoception.

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During pregnancy, women experience new internal signals (e.g. pregnancy specific pain), and changes to signals experienced by the general population (e.g. hunger) - collectively referred to as interoception. During pregnancy it is important for women to recognise and interpret interoceptive signals, for monitoring both fetal and maternal wellbeing. However, current interoception measures are not validated for pregnancy. We present data from a mixed methods scale development project assessing the specific interoceptive experience during pregnancy. We adapted an established scale for use with pregnant samples using factor analyses (total N= 716). Some constructs remained stable in pregnancy, while others were lost. Next, thematic analysis of online focus group data (N=80), suggested that recognition, interpretation and responses to bodily signals change during pregnancy. These findings, together with theoretical constructs and existing measures, resulted in development of a preliminary multi-dimensional scale to measure interoception in pregnancy.
The effects of pregnancy bodily experience on mother-infant outcomes.

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Background: Antenatal attachment (AA) is linked healthier pregnancy behaviours, stronger postnatal attachment, and reduced depression risk. Our bodily experience, including appearance satisfaction and interpretation of internal signals (interoceptive sensibility), intuitively connects to AA. Mixed results in the literature suggest complex relationships, necessitating a broader investigation approach. Aims and objectives: We aim to examine the effects of pregnancy bodily experience (body satisfaction and interoceptive sensibility) on multiple mother-infant outcomes, including AA. It is hypothesised that poor body satisfaction and interoceptive sensibility during pregnancy will have negative impacts on these outcomes. Methods: This project used cross-sectional data from a larger longitudinal study of 253 pregnant mothers on levels of body satisfaction, interoceptive sensibility, AA and mood. Results: Multiple regressions found low body satisfaction predicts higher levels of anxiety, depression, interoceptive sensibility and AA. A network analysis revealed relationships between body satisfaction during pregnancy and mother-infant outcomes, including depression and AA. Conclusions: Our results suggest that an interplay between feelings towards internal and external bodily cues are important for maternal wellbeing as well as AA. Enhancing our understanding of how the pregnancy bodily experience impacts maternal wellbeing may help identify those at risk from negative outcomes as well as informing potential interventions.

Research Plan - Using Continuous Flash Suppression to understand the influence of odours on the unconscious perception of threat.

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Olfaction - our sense of smell - is a dynamic sensory system exerting extensive influence over our cognitive processes and behaviours (McGann, 2017). Olfaction enables us to identify and react appropriately to olfactory signals that signify danger (Kontaris et al., 2020). This ability to perceive threats in our environment is a fundamental aspect of human survival. Extensive research has elucidated the role of visual and auditory cues in threat perception, but the olfactory modality’s unique contribution remains relatively overlooked (Li, 2014). This study will be part of a PhD thesis and aims to examine the impact of unmasked (i.e., consciously perceived) odours on threat perceptions using the breaking Continuous Flash Suppression (bCFS) paradigm. This method includes presenting visual stimuli related to threat to the participant’s non-dominant eye, with a flashing suppression stimulus concurrently being presented to the dominant eye. By repeating the method in the presence of both pleasant and unpleasant unmasked odours, the study seeks to uncover how odours modulate the unconscious processing of threatening stimuli. It is hypothesised that unpleasant odours will speed up the conscious breakthrough of threatening stimuli. An ANOVA will be used to compare the mean time-to-conscious-awareness between pleasant odour conditions, unpleasant odour conditions and a control group.
Time travel in the classroom: exploring the potential of VR as a pedagogical tool in History lessons.

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This study explores how the inclusion of a dynamic soundscape in a virtual educational experience influences learning outcomes and engagement. Participants (N = 49, 7- to 9-year-olds) had a 10-minute immersive virtual experience on the Silk Road, set 2,000 years ago, in which they interacted with the world by clicking objects with a hand-held controller. They were randomly assigned to a sound or no sound condition. Learning was measured with an MCQ quiz; engagement with an adapted Museum Experience Scale1; presence using the SUS presence scale2; and embodiment with an established child-friendly questionnaire3. There was no significant difference between the quiz scores for the sound (M = 9.04) and no sound (M = 8.52) conditions, t(47) = .830, p = .205, but the difference between the presence scores in the sound (M = 4.39) and no sound (M = 3.81) condition was approaching significance, t(47) = 1.584, p = .060. Engagement scores in both groups were high (M = 4.9/6) and were significantly positively correlated with embodiment (r = 0.637, p < .001) and presence (r = 0.539, p < .001). These preliminary analyses suggest a benefit of embodiment, but not soundscapes, for virtual learning experiences.


Vocal attraction in homosexual and heterosexual listeners.

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The human voice is a sexually dimorphic trait that distinguishes the female and male sexes. Heterosexual listeners tend to prefer opposite sex voices with acoustic features that highlight sexually dimorphic traits of the speaker, such as vocal pitch and apparent vocal size. However, research has typically been restricted to heterosexual listeners, to the exclusion of same-sex attraction. Female and male heterosexual and homosexual participants listened to recordings of voices and rated how attractive they found them. Participants were less attracted to synthetically modulated voices and strongly preferred a speaker’s habitual voice. Regardless, consistent with previous research, heterosexual participants were more sympathetic towards gendered vocal exaggeration (i.e., feminised female voices were preferred over masculinised female voices). However, as a whole participants displayed a noted bias towards masculinised voices.
Heterosexual males were a noted minority in preferring feminised voices. Experiment 2 repeated the same procedure with vocal stimuli that were modulated voluntarily by the speakers rather than manipulated synthetically, and partially replicated the masculinised voice bias. These findings may reflect a tension between the use of the voice as a fitness signal advertising secondary sexual characteristics and as a social signal for traits such as confidence which rely on similar acoustical cues.

Effects of Type 2 Diabetes on attention in middle-aged and older adults.

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The Attention Network Test (ANT) provides a combined measure of alerting, orienting and executive control (e.g., Fan et al., 2002). It has been widely used to assess individual differences in attention, including cognitive ageing effects (Veríssimo et al., 2022). With the present research, we assessed the impact of type 2 diabetes mellitus (T2DM) on attention across middle-aged and older adult age groups. T2DM is strongly associated with cognitive decline (Moheet et al., 2015), although its specific effects on attention remain unclear. Accordingly, we used the ANT (administered remotely using the Gorilla.sc online platform) to assess the attentional function of 104 participants aged 50-75 years (50 self-reporting T2DM), recruited from across the UK using Prolific. Each participant completed 96 ANT trials, responding to a central arrow with two flanker arrows on either side, preceded by one of four cues. Increased age was associated with longer reaction times, while typical effects of cue and flanker were observed. Surprisingly, neither age nor T2DM impacted on the three attentional networks significantly. Consequently, while we demonstrated the feasibility of administering the ANT remotely to a broad community sample, there was no evidence of an influence of age or T2DM on attentional networks within this population.

Irrationality in digital markets? The endowment effect in Non-fungible tokens.

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Humans are often irrational, and this translates to irrationality in economic markets. The endowment effect, in which seller’s willingness to pay is significantly lower than buyer’s willingness to accept, has been one of the most influential findings stemming from consumer and cognitive psychology as it created a fundamental shift in economic theory. Does the endowment effect extend to digital objects? Non-fungible tokens are a type of digital good that represents an asset that cannot be substituted. For example, a piece of artwork that is unique and cannot be duplicated. We sought to determine if the endowment effect can be observed for NFTs. To this end, 97 participants were shown a NFT that depicted an avatar that could be used in an online game. They were asked to either provide the price they would be willing to pay for the NFT (Buy condition) or would be willing to accept for the NFT (Sell condition). A planned directional Bayesian t-test indicated the presence of an endowment effect. Thus, irrationality in economic decision-making persisted to digital gaming avatars. This initial work highlights the need to understand how individuals value novel digital goods such as NFTs, Cryptocurrencies, and Digital currencies from a cognitive perspective.
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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 4th January 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.

To reserve your place, please complete the form through the link below. This form will be available until 5pm on Monday 4th December, or until all spaces have been filled (if this is earlier than 4th December). When the form has closed, we will send instructions on how to pay and confirm your place at the conference dinner.

Starters are all vegetarian and will be shared with the whole table, so you only need to choose a main course.

Please note that this year, dessert is not included as meals are generously portioned.

To help make your choices, please refer to the menu link on our webpage.

The standard dinner cost for EPS members is £35.50 this year. Please note that postgraduates can book at a reduced fee of £17.75, 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.
**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 76th 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 on Friday 6th January 2023

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-Third Bartlett Lecturer

23/07 Confirmation of the Joint Twenty-Third EPS Mid–Career Award Lecturers

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

23/09 Confirmation of the Thirteenth 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
The Committee submits the following nominations:

**Election of the Fifty-Third Bartlett Lecturer**
Prof Mike Burton (University of York)

**Election of the Joint Twenty-Third EPS Mid-Career Award Lecturers**
Prof Mike Le Pelley (University of New South Wales, Australia)
Prof Jennifer Rodd (University College London)

**Election of the Thirty-Second EPS Prize Lecturer**
Dr Daniel Yon (Birkbeck, University of London)

**Election of the Thirteenth Frith Prize Lecturer**
Dr Sara De Felice (University College London)

The Committee submits the following nominations for Ordinary Committee Members:

Angela De Bruin (University of York) – Data Protection Representative
Clare Sutherland (University of Aberdeen) – EDI Representative
Katie Gray (University of Reading)
Nadine Lavan (Queen Mary, University of London)
Gonzalo Urcelay (University of Nottingham)

**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.
**Annual General Meeting**

The 75th Annual General Meeting was 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. Around 30 members were in attendance.

**MINUTES**

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

Approved without change.

23/02 Matters Arising

N/A

23/03 Secretary’s Report

23/03.1 Annual Report of the Society

The Society continues to hold scientific meetings in difficult times and is now on the way to returning to fully in-person meetings again. Achievements of the Society include the awarding of numerous research grants (small grants=16, study visits=11), student bursaries (URB=9, NGRB=5) and workshops (N=2), and recognized scientific excellence through prizes, running a second year of the EPS Fellowship scheme (14 applications and 2 awarded), increasing the value of prize money awarded, launching a new EPS Pairing Scheme (39 pairings in 2022), more accurate recording of EDI among members, applications, awards etc and continued social media engagement @ExpPsychSoc.

Future proofing EPS finances – Increasing membership fees, which are very modest in relation to similar societies, to £30 for Ordinary Members and £12 for Postgraduate Members was approved without comment.

Managing demand in submissions was discussed with the below comments and ideas being suggested by members and the committee. It was decided to trial a lottery system for April 2023.

- Give a talk at one meeting, can’t talk at another in the year?
- Limiting number you can be an author on, as well as lottery, help keep quality.
- Issue isn’t only single labs.
- Three full days.
- London submitters only come to London meeting?
- Tick box to say they presented in the calendar / academic year.
- Will people sponsor and take themselves off authorship?
  - Tighter guidelines on short / normal talks.
  - Support for only two parallel sessions.
  - Support for cap of 2 for talks.
  - First or last author? All authors?
  - Not to discriminate those who submit one over those who submit two?
23/04  Treasurer’s Report

23/04.1  Treasurer’s Report

Income from QJEP royalties is decreasing, unsure how this will be in future years but expected to continue to fall. Overall position is still healthy but rising costs and grants awarded mean that spending will reduce this. Investment strategy was discussed and results from investments will be reported at the AGM in 2024.

23/05  QJEP Editor's Report

23/05.1  Editor’s Report

QJEP is going well, with a steady impact factor at a time when the calculation of impact factors has caused many to drop, 2021 Impact Factor is 2.138. There were 477 manuscript submissions and a 46% acceptance rate in 2021.

23/06  Confirmation of the Fifty-Second Bartlett Lecturer
Confirmed

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

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

23/09  Confirmation of the Twelfth Frith Prize
Confirmed

23/10  Election of Officers and Committee Members
Confirmed

23/11  Admission of Ordinary Members
Confirmed

23/12  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.

23/13  Any Other Business
No AoB.

23/14  Date, Time and Place of Next Meeting

The next AGM will be in London in January 2024, whilst the next business meeting will be held in April at EPS Plymouth.
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.
Next Meeting: Nottingham Trent University. 10th – 12th April 2024.

This meeting will include the 31st EPS Prize Lecture by Nadine Lavan (with an accompanying symposium co-organised by Kay Ritchie and Harriet Smith).

Local Organiser: Duncan Guest