

EPS

Experimental
Psychology
Society

**EPS
ONLINE**

14-15 April 2021



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A scientific meeting will be held online between 14th – 15th April 2021.

EPS Prize Talks

18th Mid-Career Prize Lecture

Wednesday 14th April, 4:00pm

Activation and disruption of a neural network for making novel decisions.

Professor Matthew Rushworth, University of Oxford

2020 BSA / EPS Undergraduate Project Prize Talk

Thursday 15th April, 11:45am

Clearing confounds from the inverse base-rate effect: Irrationality and concurrent load.

Lenard Dome, University of Plymouth

Poster Session

The poster session for EPS Online will run between 12:30 and 1:30pm on Thursday 15th April.

The posters will be available to view on the EPS website, with links to accompanying talk-through videos on YouTube, from Monday 12th April.

To engage with presenters during the poster sessions, we welcome you to join us in our [online poster room on Gather](#) and to ask questions / comment on posters via Twitter and YouTube (indicated below on pp. 16-18 – ‘How to Engage with Poster Presenters’).

Oral Presentations

Please visit the Zoom links in the programme schedule below (for free) to view the parallel sessions.

Any queries about the online event should be sent to Sam Hurn at expsychsoc@kent.ac.uk

START OF PARALLEL SESSION A – ([Click here to join this session](#))

Mid-Career Prize Symposium.

Inference of others' minds.

Organised by Xiaohong Wan.

- 12:30** **Jérôme Sallet** (University of Oxford) Social brain networks in human and non-human primates.
- 13:00** **Steve Chang** (Yale University, United States of America) Social decision-making and social gaze interaction in the primate prefrontal-amygdala circuits.
- 13:30** **Masaki Isoda** (National Institute for Physiological Sciences, Japan) Roles for medial prefrontal cortex and dopaminergic midbrain nuclei in social reward monitoring and valuation.
- 14:00** **Break**
- 14:15** **Patricia Lockwood** (University of Birmingham, University of Oxford) Prosocial learning and motivation: lifespan changes and neural mechanisms.
- 14:45** **Xiaohong Wan** (Beijing Normal University, China) Neural representations and integration of own and others' confidence for decision-making.
- 15:15** **Lusha Zhu** (Peking University, China) Neurocomputational mechanisms of learning on social networks.
- 15:45** **Break**
- 16.00** **18th Mid-Career Prize Lecture**
Professor Matthew Rushworth, University of Oxford
Activation and disruption of a neural network for making novel decisions.
[\[Click here to join via the Session A link\]](#)

START OF PARALLEL SESSION B – ([Click here to join this session](#))

- 12:30** **Rebecca Lawrence***, **Jakke Tamminen** and **Kathy Rastle** (Royal Holloway, University of London) (Sponsor: Kathy Rastle) Tolerance of exceptions in generalisation of sound-spelling correspondences.
- 13:00** **Basma Elkhafif***, **Jelena Havelka**, **Melanie Burke*** and **Anna Weighall** (University of Leeds, Helwan University, Egypt, University of Sheffield) (Sponsor: Jelena Havelka) Semantic and syntactic interference in sentence comprehension: A comparison between first and second language.
- 13:30** **Aris Terzopoulos***, **Lynne Duncan**, **Georgia Niolaki** and **Jackie Masterson** (Birmingham City University, University of Dundee, Bath Spa University, University College London) (Sponsor: Georgia Niolaki) Semantic processing of translations with bilingual adults and children in partially similar scripts.
- 14:00** **Break**
- 14:15** **Daniel Yon** (Goldsmiths, University of London) Enhanced metacognition for unexpected action outcomes.
- 14:45** **Ruihan Wu*** and **Sarah White** (University College London) (Sponsor: Sarah White) Does prompted instruction in an anticipatory looking paradigm trigger compensation?
- 15:15** **Andrea Orlandi***, **Emily Cross*** and **Guido Orgs*** (Sapienza University of Rome, Italy, Macquarie University, Australia, Goldsmiths, University of London) (Sponsor: Daniel Yon) Timing is everything: Dance aesthetics depend on the complexity of movement kinematics.
- 15:45** **Break**
- 16.00** **18th Mid-Career Prize Lecture**
Professor Matthew Rushworth, University of Oxford
Activation and disruption of a neural network for making novel decisions.
[\[Click here to join via the Session A link\]](#)

START OF PARALLEL SESSION A – ([Click here to join this session](#))

- 10:00** **Roni Tibon***, **Kamen Tsvetanov***, **Darren Price***, **David Nesbitt***, **Cam-CAN***,
and Richard Henson (MRC Cognition & Brain Sciences Unit, Department of
Clinical Neurosciences, Department of Psychology, Cambridge Centre for Ageing
and Neuroscience (Cam-CAN), Department of Psychiatry, University of Cambridge)
(Sponsor: Richard Henson) Rapid alternations of resting-state MEG networks in
cognitive ageing.
- 10:30** **Pedro Douglass-Kirk***, **Mick Grierson***, **Nick Ward***, **Fran Brander***, **Kate
Kelly***, **Will Chegidden***, **Dhiren Shivji*** and **Lauren Stewart** (Goldsmiths
University of London, UCA Creative Computing Institute, UCL Queen Square
Institute of Neurology, National Hospital for Neurology and Neurosurgery, University
College London Hospitals, Royal Free London NHS Foundation Trust) (Sponsor:
Daniel Yon) Reducing compensatory movements in stroke rehabilitation with the
aid of auditory feedback.
- 11:00** **Eleanor Smith***, **Trevor Crawford** and **Vincent Reid*** (University of Cambridge,
Lancaster University, University of Waikato, New Zealand) (Sponsor: Trevor
Crawford) To what extent does schizotypic maternal personality influence sensory
and perceptual development in infancy?
- 11:30** **Break**
- 11:45** **2020 BSA / EPS Undergraduate Project Prize Talk**
Lenard Dome, University of Plymouth
Clearing confounds from the inverse base-rate effect: Irrationality and concurrent
load.
[\[Click here to join via the Session A link\]](#)
- 12:30** **Poster Session on [Gather](#) / [Twitter](#) / [YouTube](#)**

START OF PARALLEL SESSION B - ([Click here to join this session](#))

- 10:00** **Michel Belyk* and Carolyn McGettigan** (University College London) (Sponsor: Carolyn McGettigan) Voices of social manipulation: Real-time MRI videography of vocal size exaggeration.
- 10:30** **Bryony Payne*, Angus Addlesee*, Verena Rieser* and Carolyn McGettigan** (University College London, Heriot Watt University) (Sponsor: Carolyn McGettigan) What makes a voice “mine?”: Perceptual prioritisation of self-associated voices.
- 11:00** **Alejandro Estudillo*, Peter Hills and Wong Hoo Keat*** (Bournemouth University, University of Nottingham Malaysia) (Sponsor: Peter Hills) Face matching is a resource limit problem: Evidence from the Covid-19 pandemic.
- 11:30** **Break**
- 11:45** **2020 BSA / EPS Undergraduate Project Prize Talk**
Lenard Dome, University of Plymouth
Clearing confounds from the inverse base-rate effect: Irrationality and concurrent load.
[\[Click here to join via the Session A link\]](#)
- 12:30** **Poster Session on [Gather](#) / [Twitter](#) / [YouTube](#)**

START OF PARALLEL SESSION A – [\(Click here to join this session\)](#)

- 13:45** **Alicia Rybicki***, **Bianca Schuster***, **Sophie Sowden** and **Jennifer Cook** (University of Birmingham) (Sponsor: Jennifer Cook) Dopaminergic modulation of learning from social and individual sources.
- 14:15** **Sara De Felice*** and **Antonia Hamilton** (University College London) (Sponsor: Antonia Hamilton) Social interaction matters in (online) learning.
- 14:45** **Paddy Ross***, **Beth Atkins***, **Laura Allison***, **Holly Simpson***, **Catherine Duffell***, **Matthew Williams*** and **Olga Ermolina*** (Durham University) (Sponsor: Tessa Flack) Children can't ignore what they hear: Evidence for an auditory dominance in emotion recognition development.
- 15:15** **Break**
- 15:30** **Christopher Madan***, **Marcia Spetch***, **Fernanda Machado***, **Alice Mason*** and **Elliot Ludvig*** (University of Nottingham, University of Alberta, Canada, University of Warwick) (Sponsor: Mark Haselgrove) Encoding context determines risky choice.
- 16:00** **Rebecca Helm*** (University of Exeter) (Sponsor: Gavin Buckingham) Cognition in decisions to self-incriminate: Innocence, incentives, and gist.
- 16:30** **Online Social Event on Gather** – [Click here to join us for this event.](#)

End of Meeting

START OF PARALLEL SESSION B - ([Click here to join this session](#))

- 13:45** **Andy Wills, Charlotte Edmunds and Fraser Milton** (University of Plymouth, Queen Mary University of London, University of Exeter) The synthesis of integral dimensions.
- 14:15** **Giorgio Ganis* and Luca Battaglini*** (University of Plymouth, University of Padova, Italy) (Sponsor: Jackie Andrade) Using perception to investigate imagery: An event-related potential study.
- 14:45** **Nicholas Shipp*, Laura Davidson* and Susan Anthony*** (University of Hertfordshire) (Sponsor: Lia Kvavilashvili) Thematic and taxonomic categorisation in autistic adults.
- 15:15** **Break**
- 15:30** **Emily Crowe and Eli Brenner*** (Vrije Universiteit Amsterdam, The Netherlands) Background motion nudges interceptive actions.
- 16:00** ~~**Valentina Cazzato, Cosimo Urgesi* and Carmelo Mario Vicario*** (Liverpool John Moores University, University of Udine, Italy, Scientific Institute, IRCCS E. Medea, Italy, University of Messina, Italy) ‘Hunger can make people look better!’: The effect of hunger and satiety on the aesthetic appreciation of the body. *Withdrawn.*~~
- 16:30** **Online Social Event on Gather – [Click here to join us for this event.](#)**

End of Meeting

1. **Mila Mileva, Andrew Young, Rob Jenkins and Mike Burton** (University of Plymouth, University of York) Recognising faces across the adult lifespan: Evidence for age-invariant idiosyncratic facial information.
2. **Laura Manno*, Stephanie Rossit, Andrew Bayliss and Mintao Zhao*** (University of East Anglia) (Sponsor: Stephanie Rossit) Perceptual similarity between facial emotions in static and dynamic faces.
3. **Laura Sexton*, Natalie Butcher and Jonathon Reay*** (Teesside University) (Sponsor: Natalie Butcher) Do individuals with developmental prosopagnosia benefit from motion during face recognition?
4. **Moudhi Al Twaijri*, Ellen Poliakoff and Karen Lander** (University of Manchester) (Sponsor: Ellen Poliakoff) Research Plan - Exploring the recognition of emotion from dynamic and static faces by people with Parkinson's.
5. **Jing-Ying Wong*, Atsunobu Suzuki* and Chang Hong Liu** (Bournemouth University, University of Tokyo, Japan) (Sponsor: Chang Hong Liu) Is face perception associated with fiction reading?
6. **César Lima*, Patrícia Arriaga*, Andrey Anikin*, Ana Rita Pires*, Sofia Frade*, Leonor Neves* and Sophie Scott** (Instituto Universitário de Lisboa (ISCTE-IUL), Lisboa, Portugal, University College London, Equipe de Neuro-Ethologie Sensorielle (ENES) / Centre de Recherche en Neurosciences de Lyon (CRNL), University of Lyon/Saint-Etienne, CNRS UMR5292, INSERM UMR_S 1028, Saint-Etienne, France, Lund University, Lund, Sweden) (Sponsor: Nadine Lavan) Facial responses during perception predict authenticity evaluations of laughter.
7. **Carina de Klerk*** (University of Essex) (Sponsor: Cecilia Heyes) Research plan - Copy me, copy you: Investigating the development of facial mimicry in infancy.
8. **Vilma Pullinen*, Monica Duta*, Patric Bach, Louise Phillips and Margaret Jackson** (University of Aberdeen) (Sponsor: Margaret Jackson) Emotion prediction and the role of ambiguity.
9. **Eleonora Parrotta* and Patric Bach** (University of Aberdeen) (Sponsor: Patric Bach) Predicting and imaging others' actions: Towards a unifying perspective.
10. **Katrina McDonough* and Patric Bach** (University of Aberdeen) (Sponsor: Patric Bach) Seeing is believing? Prior knowledge of others' beliefs biases perception of their action.

- 11. Paola Del Sette***, **Serena Lecce***, **Markus Bindemann** and **Heather Ferguson** (University of Pavia, University of Kent) (Sponsor: Heather Ferguson) Testing the automaticity of altercentric perspective-taking in natural scenes.
- 12. Annita Gkioka***, **Laura Smith** and **David Wilkinson** (University of Kent) (Sponsor: David Wilkinson) Vestibular contributions to allocentric representations of space during navigation.
- 13. Catia Margarida Oliveira***, **Emma Hayiou-Thomas** and **Lisa Henderson** (University of York) (Sponsor: Lisa Henderson) Procedural learning in the SRT task: A long road to stability.
- 14. Thomas Hein*** and **Maria Herrojo Ruiz*** (Goldsmiths, University of London, National Research University Higher School of Economics, Moscow, Russian Federation) (Sponsor: Daniel Yon) State anxiety alters the neural oscillatory representations of predictive coding during reward learning.
- 15. Nick Simonsen*** and **Christopher Madan*** (University of Nottingham) (Sponsor: Gavin Buckingham) Research Plan – How does reward anticipation influence episodic memory for unrelated images presented in a decisions-from-experience task?
- 16. María Quintero***, **Joaquín Morís*** and **Francisco López** (University of Málaga, Spain, University of Granada, Spain) (Sponsor: Francisco López) Research Plan – Evaluating the effects of counterconditioning, novelty-facilitated, and standard extinction on the spontaneous recovery of threat expectancy and conditioned stimulus valence.
- 17. Kaichi Yanaoka***, **Félice van 't Wout**, **Satoru Saito** and **Christopher Jarrold** (University of Tokyo, Japan, University of Exeter, Kyoto University, Japan, University of Bristol) (Sponsor: Satoru Saito) Learning task knowledge concerning cognitive control processes in adults and 9 to 10 year olds.
- 18. Sho Ishiguro*** and **Satoru Saito** (Kyoto University, Japan) (Sponsor: Satoru Saito) The detrimental effect of semantic similarity on immediate serial recall.
- 19. Xiaotong Yin***, **Jelena Havelka** and **Richard Allen** (University of Leeds) (Sponsor: Richard Allen) Exploring strategy use in the value effect on item-colour binding memory.
- 20. Riccardo Sacripante***, **Sergio Della Sala*** and **Robert Logie** (University of Edinburgh) (Sponsor: Robert Logie) Long-term learning and forgetting of conjunctive binding in free verbal recall.

- 21. Jade Pickering*, Lisa Henderson and Aidan Horner** (University of Southampton, University of York) (Sponsor: Aidan Horner) Retrieval practice transfer effects for multielement event triplets.
- 22. Nan Kang* and Satoru Saito** (Kyoto University, Japan) (Sponsor: Satoru Saito) Phonological processing of Japanese Kanji by Chinese second language learners: Evidence from consistency and frequency effects in word and nonword reading tasks.
- 23. Abigail Bradshaw and Carolyn McGettigan** (University College London) Phonetic convergence effects during choral speech.
- 24. Laura Mirams and Ellen Poliakoff** (Liverpool John Moores University, University of Manchester) Social context moderates the spatial boundaries of visuotactile interactions.
- 25. Tom Arthur*, David Harris*, Gavin Buckingham, Mark Brosnan*, Mark Wilson*, Genevieve Williams* and Sam Vine*** (University of Exeter, University of Bath) (Sponsor: Gavin Buckingham) Expecting the unexpected: An examination of active inference in autistic adults using immersive virtual reality.
- 26. Jack Owen Evans*, Krasimira Tsaneva-Atanasova* and Gavin Buckingham** (University of Exeter) (Sponsor: Gavin Buckingham) Using immersive virtual reality to remotely examine performance differences between dominant and non-dominant hands.
- 27. Lydia Hickman*, Dagmar Fraser* and Jennifer Cook** (University of Birmingham) (Sponsor: Jennifer Cook) Research Plan – Examining movement kinematic differences in Autism Spectrum Disorder and Parkinson’s Disease: A matched-groups comparison study.
- 28. Sophie Sowden, Lydia Hickman*, Bianca Schuster*, Alicia Rybicki*, Dagmar Fraser* and Jennifer Cook** (University of Birmingham) Effects of dopamine D2 receptor antagonist Haloperidol on movement speed in a drawing task.
- 29. Megan Rose Readman*, Neil McLatchie*, Ellen Poliakoff, Trevor Crawford and Sally Linkenauger*** (Lancaster University, University of Manchester) (Sponsor: Ellen Poliakoff) How far can I reach? The perception of upper body action capabilities in Parkinson’s Disease.
- 30. George Evangelou*, James Moore* and Hannah Limerick*** (Goldsmiths, University of London, Ultraleap Ltd, Bristol) (Sponsor: Daniel Yon) I feel it in my fingers! Mid-air haptics and the latent agent.

- 31. Sonia Malvica***, **Letizia Palumbo** and **Valentina Cazzato** (University of Messina, Italy, Liverpool Hope University, Liverpool John Moores University) (Sponsor: Valentina Cazzato) The beauty of tourist destinations: Perceptual and embodiment dimensions of tourist aesthetic judgment.
- 32. Michael Jeanne Childs***, **Alex Jones**, **Peter Thwaites***, **Sunčica Zdravkovic***, **Craig Thorley***, **Atsunobu Suzuki***, **Rachel Shen***, **Qi Ding***, **Edwin Burns***, **Hong Xu*** and **Jeremy Tree** (Swansea University, Keimyung University, Korea, University of Novi Sad, Serbia, James Cook University, Australia, University of Tokyo, Japan, Nanjing University, China, Edge Hill University, Nanyang Technological University, Singapore) (Sponsor: Jeremy Tree) Exploring the reliability of other-ethnicity effect scores.
- 33. Ying Lee***, **Lily Fitzgibbon** and **Kou Murayama*** (University of Reading, University of Tuebingen, Germany, Kochi University of Technology, Japan) (Sponsor: Lily Fitzgibbon) Research Plan - Individual differences in curiosity: An ontological framework.
- 34. Denise Dal Lago*** and **Thomas Wilcockson*** (Loughborough University) (Sponsor: Antonia Hamilton) Cognitive biases and holistic processing for alcohol-related stimuli in light versus heavy drinkers.
- 35. Panyuan Guo***, **Alvaro Benito Ballesteros***, **Lyn Curtis***, **Muzaffer Kaser***, **Ruby Liu***, **Arka Saha*** and **Lucy Cheke** (University of Cambridge, University of Amsterdam, The Netherlands, University of Exeter) (Sponsor: Lucy Cheke) The impact of COVID-19 infection on cognition.
- ~~**36. Eleanor Hassan***, **Andrew Jones*** and **Gavin Buckingham** (University of Exeter) (Sponsor: Gavin Buckingham) Evaluating a new method to induce mental fatigue. *Withdrawn.*~~
- 37. Richard Stephens*** (Keele University) (Sponsor: James Grange) Effect of swearing on strength: Disinhibition as a potential mediator.
- 38. Gabriele De Maio***, **Gabriella Bottini*** and **Elisa Raffaella Ferré** (University of Pavia, Pavia, Italy, Royal Holloway University of London, Centre of Cognitive Neuropsychology, Niguarda Hospital, Milan, Italy) (Sponsor: Elisa Raffaella Ferrè) Galvanic vestibular stimulation influences risk-taking behaviour.
- 39. Renata Sadibolova**, **Curtis Widmer***, **Zoe Fletcher***, **Soraya Weill*** and **Devin Terhune*** (Goldsmiths, University of London, University College London, University of Oxford) Distinguishing unidimensional and multidimensional models of interval timing: A convergence of multiple analytical approaches.

- 40. Konstantinos Voudouris***, **Matthew Crosby***, **Benjamin Beyret***, **José Hernández-Orallo***, **Murray Shanahan***, **Marta Halina*** and **Lucy Cheke** (University of Cambridge, Leverhulme Centre for the Future of Intelligence, United Kingdom, Imperial College London, DeepMind, Universitat Politècnica de València, Spain) (Sponsor: Lucy Cheke) Direct Human-AI comparison in the Animal-AI Environment.

How to Engage with Poster Presenters

Please find below the best ways to engage with our poster presenters during the EPS Online Poster Session on Thursday 15th April.



We encourage you to view posters on the EPS website and to link up with presenters on Gather, Twitter and YouTube. Talk-through videos will be available alongside posters on Gather and on the EPS website. Presenters with the YouTube symbol below will also be able to respond to any YouTube comments.

Please use #EPSPosterQs to help others follow the discussion!

If you do not receive a response straight away during the poster session, it means you have chosen a popular poster! A reply may reach you outside of the poster session.

Poster No.	Name of Presenter	Gather	YouTube	Twitter
1	Mila Mileva			 @MilaMileva09
	mila.mileva@plymouth.ac.uk			
2	Laura Manno			
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3	Laura Sexton			 @laura_sexton
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4	Moudhi Al Twajri			 @Al_moudhi
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How to Engage with Poster Presenters

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How to Engage with Poster Presenters

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31	Sonia Malvica			
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32	Michael Jeanne Childs			 @MJeanneChilds
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33	Ying Lee			 @YingLeeTUD
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34	Denise Dal Lago			 @denise75100800
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35	Panyuan Guo			 @CAMBLab
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36	Eleanor Hassan <i>Withdrawn</i>			
37	Richard Stephens			 @psychologyrich
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38	Gabriele De Maio			
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39	Renata Sadibolova			 @renatasadi
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Parallel Session A

Mid-Career Prize Symposium.
Inference of others' minds.
Organised by Xiaohong Wan.

Social brain networks in human and non-human primates.

Jérôme Sallet
University of Oxford
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To compare socio-cognitive functions in primates, we first studied the structure of the circuits supporting those functions and often called the social brain. We identified using resting-state fMRI strong similarities between macaque and human social brains; even in the Temporo-Parietal Junction (TPJ) a region associated with the ability to attribute thoughts to others, a key process to support complex social decision-making and often thought to be uniquely human. We have identified the middle Superior Temporal Sulcus (mid-STS) in macaques as a potential homolog to the human TPJ. Our following projects aimed at testing in macaques the functions associated with mid-STS region in monkeys. To do so we notably used a set free-viewing fMRI task. Importantly videos used were constructed to test a prediction of the computation supported by the human TPJ. Again, we identified in the macaque mid-STS a coding of a social prediction error, a core computation at the basis of mentalising ability. Overall, this study shows that the mid-STS region in macaque shares some structural and functional properties with the human TPJ. This suggests that mentalising functions in humans stem from a social brain precursor that was present in the last common ancestor to humans and monkeys.

Social decision-making and social gaze interaction in the primate prefrontal-amygdala circuits.

Steve Chang
Yale University, United States of America
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The primate brain possesses remarkable abilities to extract and interpret social information and use that knowledge to guide complex social interactions. This presentation will describe our recent work from studying single-neuron codes and interregional coordination in the prefrontal-amygdala circuits during social decision-making and social gaze interaction in rhesus macaques. From investigating decision-making impacting the reward outcome of a conspecific monkey, we found that expressing a prosocial decision preference, compared to an antisocial preference, is associated with enhanced frequency-specific and direction-selective coordination of neural activity between the anterior cingulate gyrus and the basolateral amygdala. Additionally, from studying neural activity during spontaneously occurring, face-to-face, social gaze interactions between pairs of monkeys, we found that neurons in the aforementioned areas, as well as in the orbitofrontal cortex and the dorsomedial prefrontal cortex, exhibit multiple key components supportive of their roles in contingent and dynamic social gaze interaction – selectivity for social versus non-social regions of interest, interactive gaze selectivity with an agent-specific interactive sequence, and social gaze monitoring from the perspectives of self, other, or both. Taken together, our findings from different social

behavioral domains support the relevance of the primate prefrontal cortex and the amygdala in regulating complex social interaction.

Roles for medial prefrontal cortex and dopaminergic midbrain nuclei in social reward monitoring and valuation.



Masaki Isoda
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Behaviors are influenced by rewards to both oneself and others. Neural mechanisms behind reward monitoring and valuation in social contexts are largely unknown. To address this issue, we devised a social Pavlovian conditioning procedure for two monkeys (self and partner) facing each other. Despite constant in amount and probability, the subjective value of forthcoming self-rewards, as indexed by licking and choice behaviors, was decreased as the partner-reward probability was increased. This value modulation was absent when the conspecific partner was replaced by a nonsocial object or when the partner had no access to a reward. Neurons in the medial prefrontal cortex (MPFC), a central node in social brain networks, encoded agent-specific reward information, whereas midbrain dopaminergic neurons encoded a subjective reward value. Simultaneous recordings of local field potentials revealed that responses to reward-predictive stimuli started substantially earlier in the MPFC than in the dopaminergic midbrain nuclei, and the neural information predominantly flowed in a MPFC-to-midbrain direction. These findings demonstrate divergent yet coordinated roles for the MPFC and dopaminergic midbrain nuclei in signaling subjective reward value by taking other-reward information into consideration.

Prosocial learning and motivation: lifespan changes and neural mechanisms.



Patricia Lockwood
University of Birmingham & University of Oxford
p.l.lockwood@bham.ac.uk

The question of whether humans are fundamentally selfish or prosocial has intrigued many disciplines from philosophy to economics for centuries. From small acts of kindness to major sacrifices, just how willing are humans to help others? Here I will discuss recent work that examines prosocial motivation – how willing we are to incur costs to help others – and prosocial learning – how we learn from the outcomes of our choices when they affect other people. Whilst prosocial behaviour has largely been studied in childhood and young adulthood, our work demonstrates that there may be important changes in prosocial behaviour as we grow older. Next I will present studies probing the neural basis of prosocial motivation and prosocial learning using computational modelling and functional neuroimaging. This work shows that different aspects of prosocial motivation and learning can be distinguished by signals in brain areas that might be somewhat specialised for prosocial behaviour.

Neural representations and integration of own and others' confidence for decision-making.

Xiaohong Wan
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We communicate with each other by sharing our own mental states. Thereby, we should represent the others' mental states, along with our own mental states, in our brains. The representations and manipulations of the others' mental states are mentalizing, while those processes of our own mental states are metacognition. However, it remains unclear how we dissociate the neural representations of our own and the others' mental states in our brains. One of the critical mental states bridging mentalizing and metacognition is decision confidence (uncertainty), the degree of subjective belief that the decision is correct (incorrect). We often estimate and utilize the decision uncertainty from the others' performance. In this presentation, I will introduce our recent findings on neural representations and manipulations of the others' decision confidence to incorporate our own decision-making.

Neurocomputational mechanisms of learning on social networks.



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Many social species are embedded in social networks, including our own. The structure of networks plays an important modulatory role in decision-making, ranging from foraging to sharing information about job opportunities and new technologies. However, it remains largely unknown how social network structures are represented in the brain and integrated with other information to guide decision-making. In this talk, I will present new fMRI evidence that learning in complex, interconnected social environments can be realized by means similar to the well-established reinforcement learning mechanism. Such learning is constrained to decisions of well-connected individuals, likely through signals encoded in the dorsal anterior cingulate cortex. These results shed light on the neurocognitive constraints that shape learning and decision-making within complex social settings, pointing to potential implications of individual computational inefficiency to collective maladaptive behavior, such as the spread of misinformation, on the increasingly digitized and interconnected networks of human interactions.

End of Symposium.

Parallel Session B

Tolerance of exceptions in generalisation of sound-spelling correspondences.



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How are learners able to generalise knowledge in the face of exceptions to regular patterns? The Tolerance Principle (TP) (Yang 2016) is a theory of rule-learning and generalisation in language acquisition stating that learners form productive rules only if the number of exceptions to a pattern falls below a critical threshold. Here, we applied the TP to reading to assess whether it can predict learners' generalisation of novel sound-spelling correspondences. We used an artificial orthography paradigm to train and test learners on pronunciations of non-words featuring novel vowel symbols. We manipulated the sound-spelling consistency of these symbols during training before examining participants' generalisation of the pronunciation patterns. In Experiment 1, the TP had an effect on learners' vowel pronunciations beyond type and token input frequencies; this effect was greater for children (N=24) than adults (N=24). In Experiment 2, the high frequency of irregular items during training removed the effect of the TP on adults' (N=24) generalisation, contrary to theoretical predictions. In Experiment 3, adults (N=24) were unable to extract vowel pronunciation rules conditioned by preceding consonantal context. These findings about the consistency, frequency and context of exemplars required to form productive rules have implications for the TP, statistical learning and models of reading.

Yang, C. (2016). *The price of linguistic productivity: How children learn to break the rules of language*. MIT Press.

Semantic and syntactic interference in sentence comprehension: A comparison between first and second language.



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Sentence comprehension is shaped through the frequency of exposure to a particular structure throughout the perceiver's prior knowledge (Mitchell et al., 1995). Not only is the frequency of a whole syntactic structure taken into account, but also the frequency information that are tied to individual lexical items in the input (Kleinschmidt et al., 2012; Kleinschmidt & Jaeger, 2015). One lexical entity that might affect the comprehension of the prepositional phrase (PP) attachment structure is the semantic role of the prepositional phrase. The current study employs syntactic priming to investigate whether the syntactic representation of prepositional-phrase (PP) attachment structure can occur independent of the PP semantic role assignment. Another aim was to examine whether the same mechanism underlies processing in both first and second language processing. The study employed eye-tracking technique to monitor eye movements of first language (L1) English speakers and Arabic second language (L2) speakers of

English while reading one of two lists of sentences. Sentences in the first list all shared the same structure and PP semantic role (within-role), whereas in the second list, sentences in the last block shared the structure with the rest of the list but differed in the PP semantic role (cross-role). Results revealed syntactic priming across noun phrase-attached PP sentences that had the same and different semantic roles in L1, indicating the occurrence of an abstract semantically independent syntactic processing in this structure type. L2 speakers revealed weak cross-role syntactic priming which was attributed to over-reliance on the semantic components of the input.

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Kleinschmidt, D. F. & Jaeger, T. F. (2015). Robust speech perception: Recognize the familiar, generalize to the similar, and adapt to the novel. *Psychological Review*, 122(2), 148–203.

Mitchell, D. C., Cuetos, F., Corley, M. M. B., & Brysbaert, M. (1995). Exposure-based models of human parsing: Evidence for the use of coarse-grained (nonlexical) statistical records. *Journal of Psycholinguistic Research*, 24, 469–488.

Semantic processing of translations with bilingual adults and children in partially similar scripts.

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The aim of the study was to investigate semantic processing of translations with partially similar scripts (Greek-English) and with both bilingual adults and children tested on a dominant language (L1) environment. Past research has focused on adults only tested in a second language (L2) environment and with completely similar or different scripts. Experiments 1 with young adults (N = 42) and 2 with children (N = 44, 10-11 years old) involved masked priming semantic categorisation tasks in which experimental stimuli were cognate and non-cognate translations where either the prime was in the L1 and the target in the L2, or vice versa. Linear mixed-effects modelling revealed significant priming effects for cognate translations in the L1-L2 direction for adults, unlike previous studies that reported L2-L1 priming. For children, priming was found in the L2 - L1 direction only. In both experiments, there were no effects of script similarity which was attributed to task demands and script differences. It is argued that, while for adults the L1 testing environment influenced translations' semantic processing leading to L1-L2 priming, in the case of children the teaching method affected the developing bilingual semantic organisation leading to L2-L1 priming.

Enhanced metacognition for unexpected action outcomes.



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Metacognition allows us to explicitly represent the uncertainty in our perceptions and decisions. Recent theories suggest that we use predictive models of our environment to optimise these introspective processes, but extant accounts disagree about the role prediction plays: some accounts suggest that we should have more sensitive subjective insight for predictable events, while others stress that metacognition should be enhanced for surprising prediction errors. Here two experiments compare these accounts. Participants performed actions to generate visual outcomes that could move in expected or unexpected directions. Across both experiments, signal detection analyses revealed enhanced metacognition for unexpected outcomes. A combination of reverse correlation and computational modelling suggested this advantage arose because metacognitive processes are more sensitive to unexpected information. These results are consistent with higher order inference models of introspective awareness and point to a mechanism that may optimise diverse aspects of cognition and behaviour in an unstable world.

Does prompted instruction in an anticipatory looking paradigm trigger compensation?



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Southgate et al. (2007)'s anticipatory looking paradigm has been increasingly challenged for its reliability and the interpretation of the data. This study attempts to advance this paradigm by adding a prompted instruction "Please think about which window the person's hand will come through to retrieve the ball", using a multi-trial paradigm with two blocks and matched false-belief and true-belief conditions. Through comparing it with a well-established verbal mentalizing task, we aim to investigate the validity of this paradigm, and its relationship with individual differences in camouflaging and autistic traits. Mentalizing abilities of 62 neurotypical adults were measured by the two aforementioned tasks. Individual differences in autistic and camouflaging behavioural traits were assessed with questionnaires. We found that, although the false-belief reasoning in the anticipatory looking task and the self-reported camouflaging behavioural traits were not related, they were both significantly correlated with verbal mentalizing performance. Both mentalizing tasks therefore seems to tap into the same underlying cognitive mechanism, supporting the prompted anticipatory looking task as a mentalizing test. Only the verbal mentalizing task appears to involve camouflaging, possibly triggering compensatory strategies to reason logically about mental states, whilst the prompted anticipatory looking task was not susceptible to compensation.

Timing is everything: Dance aesthetics depend on the complexity of movement kinematics.



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What constitutes a beautiful action? Research into dance aesthetics has largely focussed on subjective features like familiarity with the observed movement, but has rarely studied objective features like speed or acceleration. We manipulated the kinematic complexity of observed actions by creating dance sequences that varied in movement timing, but not in movement trajectory. Dance-naïve participants rated the dance videos on speed, effort, reproducibility, and enjoyment. Using linear mixed-effects modelling, we show that faster, more predictable movement sequences with varied velocity profiles are judged to be more effortful, less reproducible, and more aesthetically pleasing than slower sequences with more uniform velocity profiles. Accordingly, dance aesthetics depend not only on which movements are being performed but on how movements are executed and linked into sequences. The aesthetics of movement timing may apply across culturally-specific dance styles and predict both preference for and perceived difficulty of dance, consistent with information theory and effort heuristic accounts of aesthetic appreciation.

18th Mid-Career Prize Lecture.

Activation and disruption of a neural network for making novel decisions.



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Decision making is not just guided by immediately available sensory evidence but by information held in memory. In this talk I will review some recent studies that have used a combination of fMRI and transcranial ultrasound stimulation to both record from and perturb frontal cortical brain circuits for decision making in macaques. Activity patterns in different parts of cingulate and prefrontal areas appear to guide different types of decision making – for example when planning a future change in behaviour or when trying to make a novel decision that has not been made in the past. By manipulating activity in the same brain area it is possible to demonstrate specific patterns of impairment that are consistent with specific causal decision making roles for the different areas. In one recent experiment macaques chose between two options while retaining information about a third option that could become available to choose on a future trial. Activity in the medial temporal lobe, in the hippocampus, tracked the value of currently unavailable options – counterfactual choices – and was predictive of accuracy in future decisions concerning that option. Anterior cingulate cortex activity also tracked counterfactual choice value but in a distinct framework linked to the best alternative. Temporary disruption of anterior cingulate cortex compromised translation of counterfactual values into actual choices. In a second experiment macaques learned that attributes of visual stimuli predicted either reward magnitude or probability. After extensive training, activity in anterior temporal, perirhinal, and orbitofrontal cortex tracked the value of the stimuli. Animals were, however, also able to combine information about both attributes when they encountered novel stimuli comprising features of both original stimulus sets. The ability to make such novel decisions was related to activity in an anterior medial frontal cortical region that is homologous to one identified in many human neuroimaging experiments. Some features of the activity suggested a grid-like encoding of an abstract value space occurred in these regions. Temporary disruption of this area compromised monkeys’ ability to make novel decisions.

Parallel Session A

Rapid alternations of resting-state MEG networks in cognitive ageing.

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In order to support cognitive functioning, brain networks need to flexibly reorganise and coordinate over a millisecond time-scale. This ability might play important role in the maintenance of cognitive function in old age, yet it had been overlooked due to limitations of previous data and methods. Magnetoencephalography (MEG) provides the required temporal resolution to investigate transient dynamics of neural networks. We applied Hidden Markov Models (HMMs) to resting-state MEG data from a large cohort (N=595) of population-based adults (aged 18-88), who also completed a range of cognitive tasks, in order to characterise transient neural states and their relations to ageing and cognition. We found that decreased occurrence of “lower-order” brain networks, coupled with increased occurrence of “higher-order” networks, was associated with both increasing age and decreased fluid intelligence. These results challenge current theories of age-related functional compensation, and instead support theories of age-related reductions in neural efficiency.

Reducing compensatory movements in stroke rehabilitation with the aid of auditory feedback.

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Growing evidence suggests that a focus on high dose and quality of movement produces clinically significant outcomes in stroke rehabilitation. The current study assesses the use of real-time auditory feedback to help reduce compensatory movements such as trunk leaning thereby increasing optimum movement patterns during an active reaching task. 20 stroke patients took part in the study undertaking 100 repetitions of an active seated reaching task while listening to favourite self-selected music. A within-subject design with two conditions (with auditory feedback vs without auditory feedback) presented in a randomised counterbalanced order was used. A paired t-test assessed the difference between conditions. The proportion of time patients spent compensating with auditory feedback was lower (M = 19.3%, SD = 18.7%) compared to the proportion of time in error without feedback (M = 39.4%, SD = 26.5%). There was a statistically significant reduction of 20.1% - 95%

CI [10.6%, 29.6%], $t(19) = 4.44$, $p < .001$. The standardised effect size was large (Cohen's $d = 0.99$). Patients can make use of auditory feedback increasing the amount of time they spend in optimum movement patterns. The approach provides a motivating framework that encourages high dose with a key focus on quality of movement that can lead to home based rehabilitation.

To what extent does schizotypic maternal personality influence sensory and perceptual development in infancy?



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From early life our parents' personalities, and the environment we grow up in, have a direct impact on development. Developmental models propose that exposure to parent's personality, combined with increased genetic risk, contribute to later psychiatric end-states (Klein et al., 2011). The present research therefore asks the question, for mothers who exhibit schizotypic traits – personality traits resembling the symptoms of psychosis in an attenuated, subclinical form (Ettinger et al., 2014), would they and their offspring display atypical neural responses similar to those on the schizophrenia-spectrum? Six-month-old infants ($n=101$) and their biological mothers ($n=57$) participated, exploring endophenotypes of the schizophrenia-spectrum associated with sensory gating and perceptual development. Event-related component and time-frequency data (derived from 128-channel EEG) were collected from both cohorts. Results confirmed that a greater neural deficit was shown among those mothers who experienced schizotypic traits in both sensory ($p=.01$) and perceptual ($p=.01$) paradigms. This highlights the continuity of deficit across the schizophrenia-spectrum into the sub-clinical realm. The infant cohort, however, displayed no group-level differences. Thus, having a schizotypic mother did not influence their high-level sensory/perceptual development. Nevertheless, analyses using dimensional measures of schizotypy revealed clear impacts on individual differences in cognitive abilities that may become discernible later in development.

Parallel Session B

Voices of social manipulation: Real-time MRI videography of vocal size exaggeration.



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The voice carries a wealth of social information beyond its more obvious functions as a carrier for the signals of speech. Listeners readily make judgements about speakers from their voices, for instance in judging how tall someone sounds. Taller speakers have longer vocal tracts which in turn can be heard in the acoustic properties of their voice. However, speakers are able to lengthen and shorten their vocal tracts to appear larger or smaller in different social contexts. Singers and non-singers imitated spoken words that were manipulated with elongated or shortened apparent vocal tract lengths. Real-time Magnetic Resonance Imaging was used to monitor the shapes of participants' vocal tracts. Trained singers were most effective at lengthening or shortening their vocal tracts, although there was considerable individual variation. The strongest vocal modulators produced greater contrasts in the acoustics of their voice, and this translated into a greater influence on their apparent height as assessed by an independent pool of listeners. Further research is needed to determine whether vocal training has a causal role in increasing this socially relevant skill and the extent to which this may provide an unanticipated benefit to a musical education.

What makes a voice “mine?”: Perceptual prioritisation of self-associated voices.



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The self is flexible and can be extended to include different types of information at different levels of processing. Here we ask whether it is possible to give people a new voice - a voice they prioritise perceptually and feel a sense of agency over - and whether this is modulated by using the voice in a real-life social interaction. We compared participants (n=44) who played an online game in which self- and other- voices were learned and used interactively, to a control group (n=44) who had only brief exposure to the voices. Using a perceptual matching paradigm and an intentional binding paradigm we demonstrate that it is possible to incorporate a new voice into the self; the self-voice not only accrues a processing advantage as a self-associated stimulus but also an increased sense of agency. Surprisingly, the self-prioritisation and intentional binding effects were evident in both groups, showing that using the voice in a social interaction did not modulate bias towards, or agency over, it. Together, the results suggest that the fundamental knowledge of what is “mine” may be sufficient to generate a perceptual bias and a sense of agency, which speaks to the automaticity of this cognitive self-bias.

Face matching is a resource limit problem: Evidence from the Covid-19 pandemic.



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Forensic face matching requires to determine whether two simultaneously presented faces depict the same or two different identities. Although important in applied settings, such as passport control, this task is error prone. Due to Covid-19 pandemic, different governmental authorities recommend the use of face masks in public spaces. These masks cover the bottom part of the face, entailing a new challenge for face identification. The present study explores whether, and to what extent, face matching ability is impaired by face masks. Performance in face matching decreased when a face mask was superimposed on one face (Experiment 1) and both faces (Experiment 2) of a pair of faces. However, a considerable number of observers performed with perfect or near-perfect accuracy in the mask condition. These results suggest not only that faces contain enough information for face identification, but also that the top part of the face can suffice for face matching.

2020 BSA / EPS Undergraduate Project Prize Talk

Clearing confounds from the inverse base-rate effect: Irrationality and concurrent load.



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In the inverse base-rate effect (IBRE), people learn how two overlapping compounds of cues, occurring at different frequencies predict common or rare outcomes. When tested on a combination of conflicting cues unique to each outcome, participants prefer the rare outcome, which is clearly irrational. Previous experiments used concurrent load during test to evaluate attentional-learning explanations of the effect. My reanalyses of their data set provided evidence that participants under concurrent load allocated more time to think during the main classification task. Under these conditions, participants can potentially compensate for the load with increased uninterrupted thinking. More time to think might either allow or facilitate attentional allocation to cues, which has been hypothesized to be sensitive to concurrent load. We experimentally controlled for this confound by introducing a time limit. The results indicate the absence of the IBRE in the load condition, but it is still comparable to controls. We will discuss the implication of these results and potential future pathways to investigate the IBRE.

Parallel Session A

Dopaminergic modulation of learning from social and individual sources.



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Whether (social) learning from other people is underpinned by the same, ‘domain-general’, mechanisms underpinning learning from one’s own experience (individual learning) has been the subject of considerable debate. For existing dissociations between social and individual learning, social information often comprises an ‘indirect source’, used to supplement one’s own, ‘direct’, experience. Thus, learning source (social/non-social) and directness (indirect/direct) are often confounded. We recently argued that social and individual learning can be dissociated at a neurochemical level along the directness, but not the learning source axis (Cook et al, 2019). Here we test this idea. On two separate days’ participants ingested 2.5mg Haloperidol, or placebo, and completed a probabilistic learning task which demanded learning from two sources (social, non-social). The ‘direct’ condition featured social as the direct (and non-social as the indirect) learning source, the ‘indirect’ condition featured social and the indirect (and non-social as the direct) source. A mixed-effects model with fixed factors drug, learning source and condition, and random intercepts for subject, was employed to test our hypothesis that Haloperidol would affect direct-learning irrespective of its social/non-social nature. Results showed an effect of drug along the social but not directness axis, providing evidence for domain-specific neurochemical mechanisms for social learning.

Social interaction matters in (online) learning.



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What matters the most in learning online? We taught 24 participants about bizarre animals, musical instruments, exotic foods and ancient objects. Using a 2 by 2 paradigm, we manipulated social contingency (live vs recorded lecturing), and the view on the teacher (full face and hands vs hands only). Learning was tested straight after the session (immediate performance) and after one week (delayed performance). Participants remembered better things learned via a live session, compared to a recorded video, and the live-learning advantage remained after a week. There was an interaction effect between the type of call (live or recorded) and whether the student could see the teacher’s face: when learning from a recorded video, after a week participants remembered better things learned by seeing the teacher’s face. We show that active engagement is important in online social learning. Furthermore, the social context of learning can have an impact in long-term retention of novel information. These results are particularly important in the context of remote learning during the Covid-19 pandemic. This work is part of a bigger project that aims to look at face to face social learning at the behavioural level (motor and verbal coordination) and in the brain using fNIRS hyperscanning.

Children can't ignore what they hear: Evidence for an auditory dominance in emotion recognition development.



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Effective emotion recognition is imperative to successfully navigating social situations. Our previous work has shown differing developmental trajectories for the recognition of bodily and vocal emotion, but as these studies demonstrate, emotions are usually studied using each modality in isolation and rarely considered as multimodal stimuli in the literature. When adults are presented with basic multimodal sensory stimuli (lights and tones), the Colavita effect suggests that they have a visual dominance, whereas more recent research finds that a reverse Colavita effect (auditory sensory dominance) may be present in children under 8 years of age. However, it is not currently known whether this phenomenon holds for more complex multimodal social stimuli. In this talk I will present evidence of an auditory dominance in children using emotionally meaningful stimuli. By presenting congruent and incongruent visual and auditory stimuli, we show that children find it extremely challenging to recognize bodily emotion while trying to ignore incongruent vocal emotional information. We pose questions as to the potential mechanisms behind this phenomenon, ask if it will hold for emotion recognition from the face, and question whether the auditory stimulus even has to be human.

Encoding context determines risky choice.



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Both memory and choice are influenced by context: memory is enhanced when encoding and retrieval contexts match, and choice is swayed by available options. Here, we assessed how context influences risky choice in an experience-based task. Within a single session, we created two separate contexts by presenting blocks of trials in distinct backgrounds. Risky choices were context-dependent; given the same choice, people chose differently depending on other outcomes experienced in that context. Choices reflected an overweighting of the most extreme outcomes within each local context, rather than the global context of all outcomes. When tested in the non-trained context, people chose according to the context at encoding and not retrieval. In subsequent memory tests, people displayed biases specific to distinct contexts: extreme outcomes from each context were more accessible and judged as more frequent. These results pose a challenge for theories of choice that rely on retrieval as guiding choice.

Cognition in decisions to self-incriminate: Innocence, incentives, and gist.



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Criminal justice systems across the world rely on decisions of defendants to self-incriminate by pleading guilty. These decisions are cognitively complex, involving assessments of risks and benefits (since systems typically incentivise guilty pleas) in addition to guilt and fairness related considerations (e.g. Helm, 2018). This research examines the cognition involved in such decisions, and tests predictions of fuzzy-trace theory (FTT) relating to how cognition might differ for guilty and innocent defendants and how incentives might be tailored to appeal to the guilty but not the innocent. Predictions were tested in vignettes completed by 3,375 participants across 48 experimental conditions varying guilt, incentive to plead, and probability of conviction. Results provide support for FTT predictions. Participants in the guilty condition pled guilty more, considered guilt status less, and appeared more responsive to small sentence discounts and variations in expected value of plea and trial. Participants in the innocent condition overwhelmingly pled not guilty unless a categorically different sentence was available when pleading guilty compared to if convicted at trial. These results, particularly when combined with other experimental and field work, provide insight that can be used to develop evidence-based guilty-plea procedure in order to protect innocent defendants from self-incriminating.

Parallel Session B

The synthesis of integral dimensions.



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Integral stimuli (e.g. colours varying in saturation and brightness) are classically considered to be processed holistically (i.e. as undifferentiated stimulus wholes); analysis into their consistent dimensions occurring only under substantial time, effort, training, or instruction (Foard & Kemler Nelson, 1984). In contrast, Combination Theory (Wills, Inkster & Milton, 2015) argues that the dimensions of integral stimuli are quickly combined. We compared these two theories through use of the 'triad' free classification task (Garner, 1976 et seq.). In this task, three stimuli are presented simultaneously. Two stimuli (A and B) are identical on one dimension (e.g. saturation) but dissimilar on another (e.g. brightness). Two stimuli (B and C) are similar on both dimensions but identical on neither. The dimension on which two stimuli are identical varies unpredictably from trial to trial. On each trial, the participant is asked to indicate which two stimuli 'go together' (or which is the odd one out). No feedback is given. Classifying B and C together is described as overall similarity classification. Single-dimension classification occurs where the participant's responses are under the control of a single dimension (e.g. brightness). Combination Theory predicts that the prevalence of single-dimension classification will increase as stimulus presentation time reduces. Differentiation Theory predicts the opposite. Across three experiments, we show that manipulation of stimulus presentation time supports Combination Theory and disconfirms Differentiation Theory. We conclude that integral stimuli are not slowly analysed, they are quickly synthesized.

Using perception to investigate imagery: An event-related potential study.

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To examine the interplay between visual imagery and perceptual processes we examined the effect of generating a visual mental image of a face or a house on the neural responses to a subsequently presented visual stimulus (test stimulus). Event-related potentials (ERPs) were time-locked to the test stimulus, eliminating the problem of image generation time variability. The effect of imagery was then inferred from the modulation of neural activity to the test stimulus. Results showed a double dissociation between test stimulus orientation and imagined stimulus category, with test stimulus orientation modulating the occipital P1 and imagined stimulus category modulating the right occipito-temporal N170 and later potentials. Specifically, the occipital P1 was modulated by test stimulus orientation, but not by the type of imagined stimulus. In contrast, the right occipito-temporal N170 was larger in response to the test stimulus when imagining a face than a house, but it was not modulated by test stimulus orientation. Machine learning analyses confirmed this spatiotemporal pattern and also showed that this pattern is similar to that found during the perception

of faces and houses. This ERP paradigm holds promise for characterizing neural representations of visual mental images by assessing their effect on perceptual representations.

Thematic and taxonomic categorisation in autistic adults.



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Research on conceptual processing has shown that neurotypical adults make flexible use of both taxonomic and thematic relations in categorisation tasks. Based on evidence that autistic adults show a reduced sensitivity to contextualised information, category differences were investigated in participants with high levels of autistic traits predicting a decreased use of thematic relations in such individuals. Participants (N = 150) completed the forced-choice triad task making explicit thematic (boat-river) or taxonomic (boat-train) choices, and a category verification task where participants quickly identified if a member of the target category (ANIMAL) appeared in thematically related (cow-milk) or unrelated (horse-keyboard) word pairs. Autistic traits were measured using the revised version of the RAADS14. The results showed that while participants were overall more thematic on the triad task, higher levels of autistic traits were associated with lower levels of thematic choices. Autistic traits were not associated with performance on the category verification task and in contrast with previous data from neurotypical adults, the current sample showed no thematic advantage when responding to related word pairs. These results suggest that individuals with high levels of autistic traits are less influenced by thematic relations when making categorical decisions compared with neurotypical adults.

Background motion nudges interceptive actions.



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The Covid-19 pandemic remains a major public health issue with increasing concerns about the highly contagious new variant. Since the virus can survive on surfaces, increasing the variability with which people interact with shared surfaces, such as doors, could help reduce transmission. ‘Nudging’ leads to implicit behaviour change by modifying the environment to alter people’s behaviour in a predictable manner. Since nudging overcomes the requirement of public compliance, we will investigate the possibilities of using visual stimuli to modify the hands movement during an interceptive action (i.e. similar to interacting with a door). Background motion is a good candidate to use as a ‘nudge’ because the fast response of the hand in the direction of background motion is well-documented. To identify the parameters of background motion that give rise to the largest response, we asked participants to hit a static horizontal bar when a second moving horizontal bar was aligned with it. At fixed times during participants’ interceptive action, background motion was applied. Participants showed the largest response when fast, abrupt background motion occurred late in their movement. This suggests visual stimuli could be used to nudge interceptive actions and increase the variability in contact points with shared surfaces.

'Hunger can make people look better!': The effect of hunger and satiety on the aesthetic appreciation of the body. *Withdrawn.*



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Research evidence suggests physiological state of hunger might affect preference for female body weight, such that hungrier, compared to satiated men, prefer heavier body weight and rate as more attractive than heavier female figures. Here, we seek to expand these findings by investigating the effect of fasting and snacking on aesthetics judgements of the body of conspecifics in both women and men. We compared aesthetic appreciation of round and slim human bodies and faces in a sample of 44 participants, under at least 12h of overnight fasting and immediately after having eaten a snack (i.e., bananas). Measures of sensitivity to disgust, eating attitudes, levels of body comparison, and of participants' Body Mass Index (BMI) were collected. We found that participants' aesthetic judgements were higher for slim bodies and faces compared to round ones. However, after fasting, participants rated round faces and bodies as more attractive compared to when they had a snack. Importantly, this effect was modulated by participants' BMI so that heavier participants (higher BMI) provided higher aesthetic judgements for rounder bodies and faces of conspecifics. Our results indicate that both the modification of the physiological state and BMI might affect body and face appreciation of human conspecifics.

Recognising faces across the adult lifespan: Evidence for age-invariant idiosyncratic facial information.



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While we can easily recognise the faces of our friends, family members or colleagues, recognising unfamiliar faces is a surprisingly difficult and error-prone task. This is true even under the most favourable circumstances, with good quality images taken only minutes apart. In everyday life, however, we are challenged with much greater amounts of person variability. One important source of such variability that has not been sufficiently addressed in the literature concerns differences in age. Across a number of behavioural studies, we use photos of the same people from their 20s to their 70s in a face matching task and observe significant decreases in accuracy as we increase the age gap between images. Previous research has shown that exposure to within-person variability facilitates face learning and subsequent recognition accuracy. Therefore, we also explore how access to within-person variability, from the entire adult lifespan or more constrained time periods, can help us build an age-independent face representation that can support successful recognition across time. These studies suggest there might be some age-invariant idiosyncratic information in the human face that can be accessed through exposure to within-person variability.

Perceptual similarity between facial emotions in static and dynamic faces.



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Many studies have investigated the perception and categorisation of stereotypical, sometimes exaggerated, facial expressions, whereas few studies have examined how we perceive the similarity or differences between two facial expressions. Here we investigated the perceptual similarity of facial emotions and how it is affected by facial motion (e.g. static vs dynamic), emotional categories (e.g., within- vs cross-category facial emotion), and stimuli-based face similarity (e.g., image similarity). Participants first categorised facial expression (Study 1) or rated emotional intensity (Study 2) of two sequentially presented faces—in static or dynamic format and depicted either within or across category facial emotions. Participants then made judgments about their emotion similarity. We found a dynamic advantage in emotion recognition, with fewer errors for dynamic than static faces. The perceptual similarity was higher for within- than cross-category facial expressions regardless of facial motion. Finally, we found significant correlations between perceived similarity and stimulus similarity for both static and dynamic faces and significant correlations between perceptual similarity and the perceived differences in emotional intensity. These results suggest that both semantic and physical similarity of facial expressions contribute to the perception of emotional similarity in both static and dynamic faces.

Do individuals with developmental prosopagnosia benefit from motion during face recognition?



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Individuals with typical face recognition abilities are more accurate when recognising familiar faces from dynamic images compared to static. One explanation, the social signals hypothesis, proposes that social cues carried in facial movement benefit recognition by attracting attention to identity-specific internal features. The current study sought to examine whether individuals with developmental prosopagnosia (DP) benefit from motion during familiar face recognition and whether the social signals hypothesis can account for any observed motion advantage. Thirty participants (14 DP, 16 control) completed a famous faces recognition task while their eye movements were tracked. Both groups demonstrated higher accuracy for moving faces and directed a higher proportion of time and fixations to the internal features (eyes, nose and mouth) of moving faces compared to static faces. Conversely, the proportion of time and fixations directed to the external features (cheeks, chin and hair) was higher for static faces. Results support the social signals hypothesis as an explanation of the motion advantage in DP by demonstrating that facial motion attracts attention to identity-specific features, facilitating recognition.

Research Plan - Exploring the recognition of emotion from dynamic and static faces by people with Parkinson's.



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Previous research has shown that healthy participants are better at recognising emotion from dynamic faces compared to static faces (Trautmann et al., 2009). This may also be the case for people with Parkinson's (see Bek et al., 2020 for preliminary work). In the proposed study we will comprehensively investigate the recognition of emotion from dynamic versus static faces by people with Parkinson's. We will compare 42 participants with mild to moderate Parkinson's disease, and 42 age matched healthy control participants. All participants will be asked to perform an online computerised emotion recognition task. A range of emotions (anger, contempt, disgust, embarrassment, fear, joy, neutral, sad, surprise) will be presented dynamic and static, at mild, moderate and high levels of intensity. A two-way mixed ANOVA will be used [group (Parkinson's vs controls) and presentation (dynamic vs static)]. We predict that controls will show better recognition of emotion from dynamic than static faces. People with Parkinson's may (or may not) show this 'moving advantage'. Further analysis will explore the findings by emotion and emotion intensity and the effect of motor symptom severity for people with Parkinson's.

Bek, J., Poliakoff, E., & Lander, K. (2020). Measuring emotion recognition by people with Parkinson's disease using eye-tracking with dynamic facial expressions. *Journal of Neuroscience Methods*, 331, 108524. doi: 10.1016/j.jneumeth.2019.108524

Trautmann, S. A., Fehr, T., & Herrmann, M. (2009). Emotions in motion: Dynamic compared to static facial expressions of disgust and happiness reveal more widespread emotion-specific activations. *Brain Research*, 1284, 100–115. doi: 10.1016/j.brainres.2009.05.075

Is face perception associated with fiction reading?



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Recognising facial identity and facial expression are common tasks of face perception routinely performed in our daily social interaction. Research has shown that social skills, including facial expression recognition, can be enhanced via fiction reading (Dodell-Ferer & Tamir, 2017). However, the relationship between face identity recognition and reading fiction is largely unknown. The present study aimed to investigate this relationship. A total of 100 undergraduate students were tested on their ability to recognise facial identity and facial expressions, and their knowledge of fiction authors (Author Recognition Test; Stanovich & West, 1989). Results showed that those who identified more author names were also better at recognising face identities and facial expressions. However, this advantage was only found in participants who scored at the high end of the Author Recognition Test relative to those scored at the low end. The finding provides initial preliminary evidence for a relationship between face identity recognition and fiction reading. The result may be mediated through an underlying high level of social interest in the two different cognitive processes (Li et al., 2010).

Dodell-Feder, D., & Tamir, D. I. (2018). Fiction reading has a small positive impact on social cognition: A meta-analysis. *Journal of Experimental Psychology: General*, *147*, 1713-1727.

Li, J., Tian, M., Fang, H., Xu, M., Li, H., & Liu, J. (2010). Extraversion predicts individual differences in face recognition. *Communicative & Integrative Biology*, *3*, 295-298.

Stanovich, K. E., & West, R. F. (1989). Exposure to print and orthographic processing. *Reading Research Quarterly*, *24*, 402-433.

Facial responses during perception predict authenticity evaluations of laughter.



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In the visual modality (e.g., facial expressions), sensorimotor mechanisms provide a route for emotion recognition. Whether and how similar mechanisms extend to audition is unclear. We examined electromyographic and electrodermal responses to nonverbal vocalizations that varied in authenticity. Participants (N = 100) listened to laughs and cries that could reflect a genuine or a posed emotion. Bayesian analyses indicated that listening to laughter evoked stronger facial

responses compared to crying. These responses were sensitive to authenticity. Genuine laughs evoked more activity than posed laughs in the zygomaticus and orbicularis, muscles typically associated with positive emotions. We also found that activity in the orbicularis and corrugator related to performance in a subsequent authenticity detection task. Stronger responses in the orbicularis predicted improved recognition of genuine laughs. Stronger responses in the corrugator, a muscle associated with negative emotions, predicted improved recognition of posed laughs. Moreover, genuine laughs elicited stronger skin conductance responses than posed laughs. This arousal effect did not predict task performance. For crying, physiological responses were not associated with authenticity judgments. Altogether, these findings indicate that emotional authenticity affects peripheral nervous system responses to vocalizations. They point to a role of sensorimotor mechanisms in auditory emotional processing.

Research plan - Copy me, copy you: Investigating the development of facial mimicry in infancy.

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Mimicry, the tendency to spontaneously and unconsciously copy others' behaviours, plays an important role in social interactions, yet little is known about its development. I will present a planned project that aims to test the hypothesis that sensorimotor experience is critical in the development of facial mimicry. Across two studies we will systematically manipulate 4-month-olds' experience with their own facial actions, and measure the effect on their sensorimotor cortex activation and facial mimicry when they observe others' facial actions. In Study 1 infants in the experimental condition will receive daily sensorimotor experience with their own facial actions via a mirror placed in their playpen. In Study 2 infants will either receive contingent or non-contingent sensorimotor experience with their own facial actions. Before and after these interventions, we will measure infants' facial mimicry using EMG and activation of their sensorimotor cortex using EEG while they observe videos of others' facial actions. The data will be analysed using repeated measures ANOVAs. We predict that infants who receive a greater amount of correlated sensorimotor experience with their own facial actions will show a greater increase in sensorimotor cortex and facial muscle activation during the observation of others' facial actions between pre- and post-test.

Emotion prediction and the role of ambiguity.



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The ability to use prior information to predict unfolding events is essential for optimal and adaptive social interaction, especially when information is ambiguous in order to help resolve uncertainty. Here we directly examined for the first time the influence of ambiguity on the use of predictive emotion information to categorise faces as angry or happy (online-Testable; N=87). Participants observed 48 'predictive' sequences of 8 or 12 angry and happy static faces where the likelihood of each emotion in a sequence was 75% or 25%, and vaguely communicated to participants at the start

of each sequence (e.g. “In this next sequence, the most likely emotion to appear is... HAPPY / ANGRY”). Critically, sequences contained faces with ‘clear’ (100% intensity) or ‘ambiguous’ (50% intensity) expressions (50/50, randomised). We hypothesised faster and more accurate emotion categorisation when the emotion matched vs mismatched the more expected emotion, and this effect would be magnified for ambiguous vs clear expressions. While we found an overall match vs. non-match benefit, and performance was better for clear vs. ambiguous expressions, the magnitude of the match benefit was not modulated by expression ambiguity. The relationship between signal strength and prediction strength are discussed in light of these findings.

Predicting and imaging others' actions: Towards a unifying perspective.



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Mental imagery has recently been conceptualized as a simulatory mechanism of perceptual experience which relies on similar pre-activation mechanism as other top-down predictive processes and acts directly on perceptual structures (Moulton & Kosslyn, 2009). The present study tests, through a series of experiments, whether mental imagery shares with predictive processes the capacity of shaping visual perception. To test this hypothesis, we turned into an imagery task a recent experimental paradigm, which demonstrated that prior knowledge of an actor’s intention shaped the viewers’ perception of the action’s kinematic towards the expected trajectory (Hudson et al., 2016; Hudson et al., 2018). In Experiment 1) participants were asked to observe videos of a hand moving and estimate its last seen position. Crucially, before action’s onset, subjects were asked to imagine a specific action trajectory. Results confirmed that perceptual judgements were - erroneously- shifted towards the previously imagined trajectory and that this perceptual distortion was eliminated when the imagery task was replaced by a counting task. Experiment 2) replicated these results, confirming that the perceptual bias could also be observed in a psychophysical probe task without motor or working memory components. These findings reveal, for the first time a perceptual bias associated to both imagery and predictive processes in social perception and provide a fruitful experimental paradigm for future research.

Hudson, M., Nicholson, T., Simpson, W. A., Ellis, R., & Bach, P. (2016). One step ahead: The perceived kinematics of others’ actions are biased toward expected goals. *Journal of Experimental Psychology: General*, 145(1), 1.

Hudson, M., Bach, P., & Nicholson, T. (2018). You said you would! The predictability of other’s behavior from their intentions determines predictive biases in action perception. *Journal of Experimental Psychology: Human Perception and Performance*, 44(2), 320.

Moulton, S. T., & Kosslyn, S. M. (2009). Imagining predictions: mental imagery as mental emulation. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1521), 1273-1280.

Seeing is believing? Prior knowledge of others' beliefs biases perception of their action.



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Recent models argue that social perception is an inferential process, where prior knowledge and goal expectations guides our perception of others' actions. We developed a novel paradigm, capturing these goal expectations, and allowing us to measure their influence on action perception. We showed that expectations of efficient action bias action observation. Participants watched others reach for objects with either efficient trajectories (reaching over an obstacle) or inefficient trajectories (reaching straight despite an obstacle). The hand disappeared, and participants judged the last seen position on a touch-screen. Judgments were biased towards action expectations, such that straight reaches were perceived higher when obstacle avoidance was predicted, and over reaches were perceived lower when the actor could have reached straight. Here, we show that these biases are influenced by beliefs attributed to the actor. When the actor expressed contradicting beliefs about the scene (e.g. stating that the path was clear despite an obstacle), perceptual biases followed the belief rather than visual information. This provides evidence for a top-down influence of prior expectation on action observation, involving sophisticated higher-order processing of theory of mind, revealing that our perceptual experience of others' actions is derived from an integration of bottom-up sensory information and high-level cognition.

Testing the automaticity of altercentric perspective-taking in natural scenes.



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Successful social interactions depend on our ability to take other people's perspectives. Even though adults can rapidly and accurately compute their own and other people's perspectives, they still experience difficulties when another person's viewpoint conflicts with their own. Across three pre-registered experiments we investigated the automaticity with which adults infer others' perspectives in complex real-life environments, and the degree to which this reflects mentalising. In Experiment 1, participants (N=157) completed a dot-probe visual perspective-taking task using real-life scene stimuli- first judging only the self-perspective, then judging both self- and other-perspectives. In Experiment 2, participants (N=170) completed a change detection task using natural scenes that contained a person; changes in the scene were either valid or invalid with respect to the person's gaze, and the person was either aware or not aware of their environment (due to clear/opaque glasses). Finally, in Experiment 3 (N=170) we replicated Experiment 2 using a between-subjects manipulation of awareness. Results suggest that the altercentric visual perspective is only activated when there is an explicit need to do so. Thus, we conclude that in real life visual perspective-taking is not an automatic system but rather requires some degree of conscious initiation.

Vestibular contributions to allocentric representations of space during navigation.



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Vestibular contributions extend beyond balance and postural control to cognitive functions, most notably spatial memory. However, the underlying psychological processes remain unclear. In a previous study, we showed visual searches for a pre-determined target were quicker when the target appeared in a spatial location previously associated with a brief pulse of galvanic vestibular stimulation (GVS). Here, we investigate whether this GVS advantage extends to a paradigm that tests spatial memory within egocentric (relative to self) and allocentric (relative to external landmarks) reference-frames. Participants first learnt the location of hidden target platforms within a virtual Morris Water Maze task in two separate, counterbalanced blocks (GVS, Control), across trials that encouraged allocentric or egocentric processing. A brief, sub-sensory pulse of GVS was covertly administered upon reaching the target platform in GVS blocks. On subsequent test trials, participants were more accurate at estimating the location of the GVS-paired hidden platform, relative to the Control, when an allocentric reference-frame was encouraged. A path analysis also revealed trajectories to the GVS-platform were more direct. These results provide the first psychological account of how vestibular inputs are integrated within spatial memory, particularly representations that rely on allocentric reference-frames, and could inform rehabilitation strategies targeting cognitive mapping.

Smith, L., Gkioka, A. & Wilkinson, D. (2020). Vestibular-guided visual search. *Experimental Brain Research* 238, 689–698. <https://doi.org/10.1007/s00221-020-05741-x>

Procedural learning in the SRT task: A long road to stability.



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The Serial Reaction Time (SRT) task, commonly used to assess procedural learning, has recently been shown to have poor stability, posing a serious obstacle to using the SRT task in individual differences research. We investigated three factors that may affect the stability of SRT task in adults. Study 1 showed that stability remained low regardless of sequence similarity ($r = .25$). Study 2 revealed that increasing the number of sessions from two to three led to greater stability (session1&2: $r = .43$; session2&3: $r = .60$). Study 3 showed that the spacing of trials affects stability: using an ISI (of 250ms) between trials led to lower stability than a version of the SRT task with no ISI (250ms-ISI $r = .08$; no-ISI $r = .42$). Finally, we found that sustained attention correlated positively with SRT performance in study 2 ($r = .45$) and study 3, even though only for the ISI group ($r = .44$), thus suggesting that this may be an important factor to take into account when using the SRT task in individual differences studies.

State anxiety alters the neural oscillatory representations of predictive coding during reward learning.

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Anxiety interferes with how humans estimate and respond to uncertainty—presenting distinct challenges for learning. Uncertainty is hypothesised to play a central role in optimising beliefs within a predictive coding framework. Growing evidence indicates that neural oscillations at specific frequencies mediate the hierarchical exchange of predictions and prediction errors (PE). Predictions expressed in alpha and beta frequencies (8-30 Hz) functionally suppress PE signals manifest at higher gamma frequencies (>30 Hz). Here, we provide empirical evidence that state anxiety alters the spectral characteristics of the electrophysiological (EEG) activity associated with prediction and PE signals during reward learning. In a reanalysis of our previous EEG and modelling data, we used convolution modelling to assess the parametric modulation of EEG oscillations by predictions and precision-weighted PEs (pwPE). The spectral correlates of predictions and pwPEs in state anxious individuals—who had more precise (biased) posterior beliefs about the reward tendency—corresponded with higher levels of alpha-beta oscillations relative to a control group. This increase was represented across frontal and sensorimotor regions for pwPEs, and in parietal and frontal regions for predictions. These results suggest that enhanced alpha and beta oscillations are one potential mechanism for explaining biased belief updating and poorer reward learning in state anxiety.

Research Plan – How does reward anticipation influence episodic memory for unrelated images presented in a decisions-from-experience task?



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Reward anticipation has consistently been found to have beneficial effects on memory (e.g., Gruber et al., 2014, Neuron). Such studies typically rely on manipulating reward value (i.e., high or low) in a primary task, followed by the presentation of unrelated images, then followed by feedback related to the primary task. Distinct from these studies, this initial procedure could be integrated with stimulus-outcome associative learning, such the reward outcomes from the primary task are contingent on the initial cues. If outcomes become predictable based on accumulating past experiences, do reward anticipatory effects on memory become reduced? The proposed study will use an established decisions-from-experience task where participants incrementally learn stimulus-outcome associations (Madan et al., 2019, Behavioural Processes). Participants will make binary choices between sets of options, either resulting in probabilistic or deterministic outcomes. In between presentation of the choice and outcome, participants will be shown an unrelated trial-unique image. In a subsequent task, memory for these unrelated images will be tested. A repeated-measures ANOVA will be used to analyze whether memory is affected by accumulated experiences, reward value, and outcome uncertainty (i.e., choosing a risky versus certain).

Research Plan – Evaluating the effects of Counterconditioning, Novelty-Facilitated, and Standard Extinction on the spontaneous recovery of threat expectancy and conditioned stimulus valence.



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Several studies have suggested that emotional aspects related to the CS valence are a key factor involved in the return of fear. After a fear conditioning phase, individuals learn not only the contingency relation between the CS and the US (threat expectancy learning), but the CS also gains negative features after being paired with an aversive stimulus (evaluative learning). A later standard extinction treatment in which the CS is presented alone may reduce threat expectancies, but the negative valence newly acquired by the CS can stay intact, which could explain the return of fear. Our study will use a fear conditioning task to compare three treatments: standard extinction, novelty-facilitated extinction (CS paired with a neutral stimulus), and counterconditioning (CS paired with a US of positive valence). After this treatment, a spontaneous recovery test will be carried out. Previous models predict that only counterconditioning should lead to a reduced evaluative conditioning of the CS and a lower fear response compared to the other two treatments. The critical tests will be two one-tailed t-tests comparing the responses in the spontaneous recovery trial between the counterconditioning group and the novelty-facilitated and standard extinction groups.

Learning task knowledge concerning cognitive control processes in adults and 9-to 10-year-olds.



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This study sought to discover whether adults and children are able to acquire task-level representations and transfer it to novel contexts. Highlighting two distinct cognitive control processes, proactive/reactive control, we conducted two online experiments for adults (n = 71) and 9-to 10-year-olds (n = 69) to investigate whether adults and children can learn task knowledge about how they engaged cognitive control. Participants were assigned to either a reactive training group or a control training group. In the reactive training group, participants engaged in a practice phase where they needed to engage reactive control, followed by a test phase using different stimuli where both proactive and reactive control can be used. In the control training group, participants engaged in a practice phase where both cognitive control processes can be used, followed once more by a same-structured test phase using different stimuli. It was shown that both adults and 9-to 10-year-olds in the reactive training group responded more slowly on earlier trials in the test phase when compared to participants in the control training group's performance in the practice phase. These findings suggest that adults and 9-to 10-year-olds can learn task knowledge and transfer it to novel task contexts.

The detrimental effect of semantic similarity on immediate serial recall.



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The literature suggests that semantic similarity has a facilitative effect on immediate serial recall (e.g., Saint-Aubin & Poirier, 1999), which contrasts a majority of memory models postulating detrimental effects of similarity and observations of a robust detrimental effect of phonological similarity. Nevertheless, a recent meta-analytic review (Ishiguro & Saito, 2020) proposed that semantic similarity would be detrimental to immediate serial recall while possible confounding factors would contribute to the apparent facilitative effect of semantic similarity. The current experiment with the immediate serial recall task tested this view by minimizing influences of the possible confounding factors (i.e., semantic association and categorical/associative cuing). Furthermore, we adopted a quantitative index of semantic similarity proposed by the review (Ishiguro & Saito, 2020). Results of the experiment demonstrated a) semantic similarity indeed impaired correct-in-position scores, b) it, however, did not affect item correct scores (i.e., null results), and c) it increased order errors. These patterns suggested that semantic similarity selectively impaired order memory. In addition, we examined effects of semantico-lexical factors (e.g., imageability, frequency, and word length): they selectively affected item memory. We suggest that semantic similarity has a detrimental effect on immediate serial recall and its locus is in order memory.

Ishiguro, S., Saito, S. (2020). The detrimental effect of semantic similarity in short-term memory tasks: A meta-regression approach. *Psychonomic Bulletin & Review*. *Advance online publication*. <https://doi.org/10.3758/s13423-020-01815-7>

Saint-Aubin, J., & Poirier, M. (1999). Semantic similarity and immediate serial recall: Is there a detrimental effect on order information?. *The Quarterly Journal of Experimental Psychology: Section A*, 52(2), 367-394. <https://doi.org/10.1080/713755814>

Exploring strategy use in the value effect on item-colour binding memory.



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When more information is present than can be remembered, people are able to prioritize more valuable information in order to optimise performance. This has been observed in the form of a memory advantage for high over low value items and has recently been extended to long-term memory for item-colour bindings, but the underlying mechanisms remain unclear. The current study aims to explore whether types of encoding strategy (maintenance vs. elaborative rehearsal) might be driving this effect. Participants studied coloured items paired with different point values in a grid display, either simultaneously (Experiment 1) or sequentially (Experiment 2). In different blocks, they were instructed to use verbal rehearsal to learn the bindings, build an association between the item and the colour, or were not given any study strategy. In the immediate test, when items were presented simultaneously, the value effect was observed in all three strategy conditions. However,

when items were presented sequentially, the value effect was eliminated using an association strategy. Delayed tests for colour and location showed similar patterns between no instruction and verbal rehearsal conditions. These results provide new insights concerning how attention and encoding strategies might be harnessed to optimise item-colour binding memory.

Long-term learning and forgetting of conjunctive binding in free verbal recall.



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Temporary conjunctive bindings can be learnt under specific experimental protocols (Logie et al., 2009; Shimi & Logie, 2019). However, how this memory trace is retained or forgotten over long-term memory is still unknown. We here aimed to investigate how conjunctive bindings are learnt and decay in long-term memory with a free-verbal recall task. 120 participants were exposed to a learning procedure where they were presented with the same study array, made up of six objects with two features (shape and colour). The shape-colour combination of each object was fixed, but their location was randomised. At the end of the session, 61 participants became aware of the repetition pattern while 59 did not. An equal number of 40 participants were followed-up after 1-day or 1-week or 1-month on the delayed free-recall task. Memory performance improved across trials, with aware participants showing a markedly higher learning for conjunctive bindings. Forgetting data suggested that memory for binding decreased only after 1-week and 1-month, while it remained stable after 1-day, although performance among unaware participants pervasively remained at floor. These findings are discussed in relation to separate cognitive systems involved in memory processing of temporary conjunctive bindings.

Logie, R. H., Brockmole, J. R., & Vandenbroucke, A. R. (2009). Bound feature combinations in visual short-term memory are fragile but influence long-term learning. *Visual Cognition*, 17(1-2), 160-179. <https://doi.org/10.1080/13506280802228411>

Shimi, A., & Logie, R. H. (2019). Feature binding in short-term memory and long-term learning. *Quarterly Journal of Experimental Psychology*, 72(6), 1387-1400. <https://doi.org/10.1177/174702181880771>

Retrieval practice transfer effects for multielement event triplets.



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Retrieval practice (RP) results in improved long-term retention relative to re-exposure to the same material. Whether this RP advantage “transfers” to different but related material is less clear. We tested for RP transfer effects in a paradigm known to induce integration of associated material. Participants learned multielement ‘event’ triplets (locations, animals, and objects). One pairwise

association from each event underwent RP or re-exposure (or was not re-exposed: control condition). Two days later we tested memory for the RP/re-exposed associations, and for the related but not RP/re-exposed associations to assess transfer within events. There was no significant RP advantage relative to re-exposure but both conditions had higher accuracy compared to the control condition. Importantly, transfer occurred within events regardless of RP or re-exposure; transfer from tested/re-exposed material to related but not tested/re-exposed material was seen, relative to the control condition. Our results suggest that RP (relative to re-exposure) may not be robust in all paradigms. Alternatively, integration of event elements may allow for re-exposure to be as effective as RP in terms of retention. This might be underpinned by a pattern completion process during both RP and re-exposure that also allows for transfer between repeated and non-repeated material within an event.

Phonological processing of Japanese Kanji by Chinese second language learners: Evidence from consistency and frequency effects in word and nonword reading tasks.



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Previous studies investigating phonological processing of Japanese Kanji words indicate that words with higher frequency or consistency show better reading performance in speed and accuracy. Consistency is known as the index representing the sub-word level regularity and typicality of the pronunciation while frequency reflects the whole-word statistics. The emergence of the two effects has supported a neurocomputational model of interaction between semantic memory and statistical property in phonological processing. In this study, we tested the two effects to examine whether the model can be applied to Chinese second language learners. Japanese word and nonword reading tasks were conducted and the effects were yielded both in the group of advanced and intermediate learners. The results suggested some similarities with that of Japanese natives from two aspects. First, sub-word and whole-word level print-sound correspondence were employed jointly in the phonological process. Second, a more robust consistency effect and frequency effect in word reading task were revealed among intermediate learners compared with the advanced group. These results, which were of high similarities to those of Japanese semantic dementia patients, not only demonstrated the generalization of the neurocomputational model but also implied insufficient statistical learning of word semantic knowledge among the intermediate learners.

Phonetic convergence effects during choral speech.



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In spoken interactions, the acoustic/phonetic characteristics of a speaker's voice tend to become more similar to their conversation partner. We aimed to investigate whether such 'phonetic convergence' can be demonstrated during choral speech; the act of speaking in synchrony with another speaker. To test this, an online experiment asked participants to read sentences aloud on their own (baseline solo reading task) and then again in synchrony with a pre-recorded voice (choral

speech task). The fundamental frequency (F0) of this pre-recorded voice was manipulated between-subjects so as to be either higher or lower than average. Convergence was measured by testing whether the distance between the participant's and the pre-recorded voice's F0 values significantly decreased from baseline to choral speech. Experiment 1 tested 20 female participants (10 per condition) and found significant convergence in F0 at the group level. However, convergence was significantly greater in the high F0 compared to the low F0 condition. Experiment 2 tested a further 10 participants with a pre-recorded voice with an even lower F0, but this did not increase downward convergence. Overall, this study provides evidence for phonetic convergence effects during choral speech, specifically in the form of upward shifts in F0.

Social context moderates the spatial boundaries of visuotactile interactions.



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Using the Somatic Signal Detection task (SSDT), we previously found that lights occurring 1cm or 17.5cm (but not 40cm) from the body, increase both correct and false reports of feeling touch. In the current study, we obtained a more detailed picture of the spatial boundaries of visuotactile interactions during the SSDT and investigated how the social context moderates these spatial boundaries. In Experiment one, 32 females were asked to detect a near threshold vibration, which occurred alone, or with a simultaneous light flash, which occurred 1cm, 9cm, 17.5cm, 28cm, and 40cm from the body. The light increased reports of feeling the touch at 1cm and 9cm, but reduced reports of feeling touch at 28cm and 40cm. In Experiment two, 40 females completed this task whilst facing a confederate, before and after 3 minutes of either synchronous, or asynchronous interpersonal multisensory stimulation (IMS). Before the IMS, the light increased reports of feeling touch at 1cm and 9cm from the hand. After the IMS, the light had different effects on the tendency to report touch depending on whether participants had received synchronous or asynchronous IMS. This suggests that the social context may indeed moderate the boundaries of visuotactile interactions during the SSDT.

Expecting the unexpected: An examination of active inference in autistic adults using immersive virtual reality.



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The integration of prior expectations, sensory information, and environmental volatility is proposed to be atypical in Autism Spectrum Disorder, yet few studies have tested these predictive processes in active movement tasks. We used an immersive virtual-reality racquetball paradigm to explore how visual sampling behaviours and movement kinematics are adjusted in relation to unexpected,

uncertain, and volatile changes in environmental statistics. In this task, participants were required to intercept virtual tennis balls that bounced with either standard or unexpectedly-high levels of elasticity. Here, expected and unexpected events were systematically varied over time to generate stable and volatile blocks of trials. Participants completed both of these conditions in a counterbalanced order. We found that prior expectations concerning ball ‘bounciness’ affected sensorimotor control in both autistic and neurotypical participants, with all individuals using prediction-driven gaze strategies to track the virtual ball. However, autistic participants showed substantial differences in visuomotor behaviour when environmental conditions were more volatile. Specifically, uncertainty-related performance difficulties in these conditions were accompanied by atypical movement kinematics and visual sampling behaviours. Results support proposals that autistic people overestimate the volatility of sensory environments, and suggest that context-sensitive differences in active inference could explain a range of movement-related difficulties in autism.

Using immersive virtual reality to remotely examine performance differences between dominant and non-dominant hands.



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Circle drawing may be a useful task to study upper-limb function in patient populations (Krabben et al., 2011). However, previous studies rely on expensive and bulky robotics to measure performance. For clinics or hospitals with limited budget and space, this may be unfeasible (Shirota et al., 2019). Virtual reality (VR) provides a portable and low-cost tool with integrated motion capture. It offers potentially a more feasible medium by which to assess upper-limb motor function. Prior to use with patient populations, it is important to validate and test capabilities of VR with healthy users. This study examined whether a VR circle drawing task could capture differences between the movement quality of the dominant and non-dominant arms in healthy individuals. We asked participants to trace the outline of a circle presented on their VR head-mounted displays, hypothesising that performance would be better when using the dominant hand. A variety of kinematics were recorded (e.g. movement time, roundness, movement smoothness). Results to date indicate that as predicted, circles drawn with the dominant hand were completed in less time than those with the non-dominant hand ($p=0.002$). This provides preliminary evidence that VR may be a feasible method for studying function in clinical populations.

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Research Plan – Examining movement kinematic differences in Autism Spectrum Disorder and Parkinson’s Disease: A matched-groups comparison study.



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Jerky movement profiles have been observed in both Autism Spectrum Disorder (ASD) and Parkinson’s Disease (PD). However, such studies show a distinction in the speed of movements, where higher values are observed in ASD but lower values in PD relative to controls. In light of reports of an increased prevalence of PD in the autistic population, it is important to quantify the extent of overlap in movement characteristics of the two conditions. This study will compare 3 groups of age, IQ and gender matched participants: ASD, PD (both on and off dopaminergic medication) and controls (CTRL). To index kinematics, participants will trace particular shapes, that have a highly predictable relationship between speed and curvature in the general population, on a touchscreen device. Linear mixed models will be employed for participants’ movement kinematics (jerk and speed), with group and shape as fixed effects. We anticipate increased jerk for both the ASD and PD-OFF groups relative to the PD-ON and CTRL groups. However, we expect increased and decreased speed for the ASD and PD-OFF groups respectively, relative to PD-ON and CTRL. This study will be the first to present such findings in a matched-groups design.

Effects of dopamine D2 receptor antagonist Haloperidol on movement speed in a drawing task.



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Decreased brain dopamine has been related to slowed movement response initiation [1] and reduced movement vigour [2], whilst disturbed handwriting kinematics follow withdrawal of dopaminergic medication in Parkinson’s Disease [3]. Few studies have investigated movement speed in tasks devoid of the reward-based motivation to move. Moreover, it is important to control for baseline working memory (WM) due to its tight association with baseline striatal dopamine [4]. We used a double-blind, placebo-controlled procedure to test the effect of the D2 antagonist Haloperidol on movement speed during a simple drawing task. On two separate days, once after receiving 2.5mg Haloperidol and once after receiving placebo, 41 healthy adult participants used a stylus to draw a range of shapes on a Wacom touchscreen. For each participant indices of overall speed were derived. A linear mixed effect model revealed that drawing speed differed as a function of shape and following administration of Haloperidol, participants’ drawing speed was significantly slowed compared to placebo. Crucially, there was an interaction between drug and baseline WM performance, such that those with low baseline WM (i.e. low baseline dopamine) showed greater slowing in drawing speed following Haloperidol than those with high baseline WM. Our results support the role of dopamine in drawing speed.

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How far can I reach? The perception of upper body action capabilities in Parkinson's Disease.



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Successful interaction within the environment is contingent upon one's ability to accurately perceive the extent over which they can successfully perform actions, known as action boundaries. Healthy young adults are accurate in estimating their action boundaries and can flexibly update them to accommodate stable changes in their action capabilities. However, there are conditions in which motor abilities are subject to variability over time such as in Parkinson's disease (PD). PD impairs the ability to perform actions and can lead to variability in perceptual-motor experience, but the effect on the perceptions of their action boundaries remains unknown. This study investigated the influence of altered perceptual-motor experience during PD, on the perceptions of action boundaries for reaching, grasping and aperture passing. Thirty participants with mild-to-moderate idiopathic PD and twenty-six healthy older adults provided estimates of their reaching, grasping and aperture passing ability. Participants' estimates were compared to their actual capabilities. Both healthy older adult controls and individuals with PD's perceptions were more conservative than previously observed in young healthy individuals. However, there was no evidence that individuals with PD's perceptions were less accurate than healthy controls. This suggests that the ability to anticipate action capabilities is preserved in mild to moderate PD.

I feel it in my fingers! Mid-air haptics and the latent agent.



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Sense of agency refers to the feeling of controlling external events through one's actions. This aspect of human experience has been widely studied in the field of cognitive neuroscience. More recently, it has also attracted growing interest from human-computer interaction (HCI) researchers, primarily

because the user's experience of control is of primary importance. In the present study we explored sense of agency when users were making actions in a virtual reality (VR) setting. We explored the effect of manipulating a) haptic feedback (using mid-air ultrasound technology) and b) the latency of the virtual hand's movement with respect to the actual hand movement. Sense of agency was measured with both an implicit and explicit measure. Results showed that haptic feedback did, under certain circumstances, increase the implicit sense of agency. Results also showed that latency led to a decrease in explicit sense of agency, but that this reduction was attenuated in the presence of haptic feedback. The implications of these findings are discussed, in particular the suggestion that haptic feedback can be used to protect, or even increase, users' experiences of agency in VR.

The beauty of tourist destinations: Perceptual and embodiment dimensions of tourist aesthetic judgment.



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Tourism destination image (TDI) is defined as the beliefs, impressions, and feelings (Lin et al., 2007; Zhang, 2020) of an individual's perception and interpretation of a touristic destination. A good TDI will lead to tourism destination loyalty, which is a guarantee of the tourist's satisfaction and their willingness to revisit the place (Sun et al., 2013; Chi, 2010). Given that destinations' photos are a pivotal source of information for the formation of intentions to visit a place (Ma et al., 2014), here we aimed at investigating the role of perceptual and embodiment components of TDI in tourist aesthetic judgment (Baloglu & McCleary, 1999). We hypothesized that the beholder's engagement (Kirillova et al., 2014) and images' asymmetry will lead to a higher tourist aesthetic judgment. By means of a self-report Qualtrics questionnaire, we asked 121 participants (mean age=22.17, SD=6.25) to evaluate perceptual and embodiment characteristics, including the senses of exploring, presence, completion, and symmetry, as well as tourist aesthetic judgements of 50 landscapes' images, using series of 0-100mm Visual Analogue Scale. Results suggested a positive correlation between all perceptual, embodiment and tourist aesthetic components. Symmetry did not predict participants' tourist aesthetic judgments. Instead, findings support an embodied approach to tourism experiences that links perception to the action's possibilities of tourist destinations.

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Exploring the reliability of other-ethnicity effect scores.

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In general, individuals are poorer at recognising faces from other ethnicities compared from their own (other-ethnicity effect; OEE). The most common face recognition test is the Cambridge Face Memory Test (CFMT), and researchers traditionally use two variants to compute an OEE score. Overall, CFMT versions themselves have robust reliability, however, the reliability of OEE as a measure of performance have not been explored. N=824 participants (n=400 Caucasians, n=424 Asians) completed Asia and Australia CFMTs. Items from each CFMT phase were randomly distributed into two halves and summed to create a split score (99 times). To calculate OEE scores, we subtracted the corresponding other-ethnicity test split score from the own-ethnicity split score, e.g. for Caucasians, Australia Split 1 – Asia Split 1. The reliability of each OEE split-pairs was analysed using Spearman-Brown correction on Python software. The mean reliability for the overall sample was $a = .64$, Caucasians $a = .66$, and Asians $a = .63$. This work demonstrates that OEE performance has lower reliability scores compared to CFMT performance themselves. This implies that work exploring individual differences and the OEE need to use test with robust reliability measures in the first place, and future research should report internal reliability scores for OEE for transparency.

Research Plan - Individual differences in curiosity: An ontological framework.



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Curiosity, the desire to know, has been studied in disparate ways across disciplines. This poses a challenge to developing an integrative framework for defining and measuring curiosity, and hinders our understanding of individual differences. Recently, a data-driven ontological approach was used to integrate various self-regulation measures (Eisenberg et al., 2019). The authors decomposed behavioural measures into latent factors, that served as vocabulary for linking diverse literature within a common space and were shown to provide reliable individual differences metrics. In this study, we sought to apply this approach to the field of curiosity. Our first goal is to identify 20 to 30 behavioural task- and survey-based measurements related to curiosity, and to describe their relationships. To facilitate this, review articles with ‘curiosity’ in the title will be identified from literature databases. Measures employed in referenced studies will be screened and implemented in an online task battery, to be completed by healthy adults. Relationships between measures will be assessed with Pearson correlations and analysed using graph-theoretic and cluster-based approach. In this way, we map our measures onto a common ontological framework and synthesise latent factors. We hypothesise that these latent factors are reliable measures of individual differences in curiosity.

Cognitive biases and holistic processing for alcohol-related stimuli in light versus heavy drinkers.



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Cognitive and attentional biases have been investigated in relation with alcohol consumption¹ and, recently, holistic processing tasks have been proposed as novel methods to explore addiction². However, still few findings are available in support of such methods. Therefore, this study aimed to investigate whether light drinkers (LDs) and heavy drinkers (HDs) differ on cognitive bias, attentional bias and holistic processing for alcohol-related stimuli. LDs (units of alcohol/week: 1-4; N= 24) and HDs (units of alcohol/week: 14-40; N= 14) completed online a cognitive bias task (REsT)³, an attentional bias task (Dot-Probe task)⁴ and a holistic processing task (Inversion task)⁵ with alcohol-related and control stimuli. Independent samples t-tests were performed for data analysis. LDs differed from HDs in term of REsT score ($t(29) = -2.145$; $p = 0.040$) and Inversion effect for alcohol-related stimuli ($t(36) = 2.200$; $p = 0.034$), but no differences were found in the Inversion effect for control stimuli ($t(22) = -0.251$; $p = 0.804$). Surprisingly, performance on the Dot-Probe task did not differ between groups ($t(27) = 0.468$; $p = 0.643$). This result might be due to the lack of more reliable measures to detect attentional biases (e.g. eye-movements)⁶. In conclusion, these results confirmed cognitive biases and differences in perceptual processing for alcohol-related stimuli in HDs.

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The impact of COVID-19 infection on cognition.



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Cognitive dysfunction is one of the top three most commonly reported symptoms in "Long Covid" (Davis et al., 2020). Given that little is known about the nature and prevalence of these cognitive problems, it is important to understand how infection with COVID-19 affects cognitive function during the period following initial illness. This study aims to explore the impact of COVID-19 infection on memory and cognition, and how these short and long-term impacts may relate to individual differences in background, medical history, and symptoms experienced. Participants are asked to report demographics, health details, experience of COVID, current or ongoing symptoms. They are also asked to complete cognitive tasks, including Relational Reasoning Task, Wisconsin Card Sorting Test, Word list Recognition Test, Associative Memory Test, 2D Mental Rotation Test, and Real Effort Number Counting Test. Given the time pressure in achieving answers with COVID-related studies, this is taking a mixed cross-sectional and longitudinal design, recruiting both those who have and have not been previously infected with COVID-19 but may be at risk of future infection, comparing between them at baseline, and following up both groups. Preliminary results suggest that participants who had suspected or confirmed COVID-19 infection exhibited cognitive deficits in word list recognition and Wisconsin Card Sorting reaction time.

Evaluating a new method to induce mental fatigue. *Withdrawn.*



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We have all experienced mental fatigue. Yet the literature on this topic is marked by a large number of contradictory findings due to conceptual differences, methodological choices, and in some cases a lack of scientific rigour. We identified two major problems for mental fatigue research. Firstly, researchers consistently find that participants report an increase in subjective fatigue. Subjective measures alone are, however, problematic due to experimenter demands. We thus aimed to develop a task which led to not only a subjective increase in mental fatigue, but a corresponding performance decrement. Secondly, in most prior studies participants have been fatigued with a single repetitive task such as the N-Back or Stroop. To move towards a more ecologically valid paradigm, participants undertook a battery of diverse cognitive tasks designed to load on different aspects of executive function. Here, 41 participants aged 20–63 completed a 2-hour battery comprising four different cognitive tasks. Subjective fatigue ratings and task performance were measured at the beginning and end of the battery. Whereas subjective ratings of fatigue increased significantly, cognitive task performance, as indexed by the AX-CPT, was unaffected. We discuss the implications of these findings for future mental fatigue research.

Effect of swearing on strength: Disinhibition as a potential mediator.



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Offensive or obscene language, known as swearing, fulfils positive functions including pain relief and benefitting physical strength. The psychological mechanism disinhibition, characterised as “not holding back”, has been proposed. This experiment aimed (i) to replicate swearing benefits on grip strength; (ii) to assess whether swearing impacts one aspect of disinhibition – risky behaviour; (iii) to assess whether risky behaviour mediates the effect of swearing on grip strength. In a repeated measures design, participants (N=56) completed a 10s verbalisation condition (repeating a swear word vs. a neutral word) before a 3-trial hand grip task and the Balloon Analogue Risk Task (BART). Mean grip performance was significantly higher for swearing vs. the neutral word condition. Significantly more balloon pumps were made on BART trials for swearing vs. the neutral word condition. However, BART scores did not predict grip strength, nor did they mediate the effect of swearing on grip strength. This study replicated the beneficial effect of swearing on grip strength and showed that swearing impacts disinhibition. However, the disinhibition theory of psychological benefits of swearing was not supported. Future research should assess other aspects of disinhibition in this context.

Galvanic vestibular stimulation influences risk-taking behaviour.



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Risk-taking behaviour is an essential aspect of our interactions with the environments. Here we investigated whether vestibular inputs influence behavioural measurement of risk-taking propensity. We have combined bipolar Galvanic Vestibular Stimulation (GVS) with a well-known and established risk-taking behaviour task, namely the Balloon Analogue Risk Task (BART). Left-anodal and right-cathodal GVS (L-GVS), which preferentially activates the right hemisphere, decreased the willingness to take risk during the BART compared with right-anodal and left-cathodal GVS (R-GVS), which preferentially activates the left hemisphere. This proved a specific vestibular effect which depends on the polarity of the stimulation. Conversely, no generic vestibular effect (the adjusted average of L-GVS and R-GVS conditions compared to a SHAM condition) emerged, excluding non-specific vestibular effects. Our results confirmed recent findings of a vestibular contribution to decision-making and strategy control behaviour. We suggest that the vestibular-mediated balancing of risk seeking behaviour is an important element of the brain's capacity to adapt to the environment.

Distinguishing unidimensional and multidimensional models of interval timing: A convergence of multiple analytical approaches.

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Precise timing of information spanning across millisecond-to-second timescales is at the core of a diverse array of cognitive processes. The mechanisms underlying interval timing may be studied through continuity of temporal performance across these timescales. Whereas a discontinuity would indicate transition between distinct/overlapping mechanisms, the lack thereof would suggest a semi-uniform system. We conducted two online experiments in which participants reproduced intervals ranging from 400 to 2400ms (Experiment 1; N=302) and 1000 to 2000ms (Experiment 2; N=302). We applied exploratory factor analysis (EFA) and structural equation modelling (ESEM) to distinguish between unidimensional and multi-dimensional latent structures in reproduced intervals and a changepoint analysis to investigate inflection points for individual participants. Corroborated by a low changepoint detection rate, the bifactor model which yielded the best fit in both datasets showed that individual differences in temporal reproduction are attributable to a general timing system and a non-specific system reflecting a central tendency bias. High factor scores for the latter were associated with reduced slopes in reproduced intervals and a lower likelihood of a changepoint. These findings contribute to ongoing debates concerning the systems governing interval timing and are consistent with Bayesian models that afford a significant role to central tendency effects.

Direct Human-AI comparison in the Animal-AI Environment.

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The Animal-AI Testbed (Beyret et al. 2019; Crosby et al., 2019; Crosby et al. 2020) is a novel benchmark for testing state-of-the-art Artificial Intelligence (AI) agents on several aspects of so-called ‘commonsense reasoning’ (Shanahan et al., 2020). It does so by evaluating agents on unseen problems inspired by experimental protocols in the field of animal cognition. These protocols range from Y-mazes to tool-use tasks. In this study we compared 30 state-of-the-art Deep Reinforcement Learning agents to 54 children between the ages of six and ten, on a set of 40 Animal-AI tasks. Children performed significantly better than the AIs, and there was no effect for age. Children performed significantly better than the two best performing AIs, ‘Trrrrr’ and ‘ironbar’ ($T^2(40,14)=258.49$, $p<0.0001$; $T^2(40,14)=129.1$, $p<0.0001$, respectively). While the AIs performed comparably to children on simple navigational tasks, all 30 AIs appeared to have difficulty with tasks involving the manipulation of tools to obtain out-of-view objects, whereas children of all ages were able to solve these tasks, suggesting these AIs have less understanding of the object concept than children. Furthermore, dimensionality reduction techniques (UMAP) and cluster analysis (k-medoids) were used, and we found that not only did the AIs perform worse than children, but they also appeared to perform in a qualitatively different way.

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See Criteria and Procedures on following page.

CRITERIA AND PROCEDURES TO JOIN

Soon after the closing date of 1st September or 1st March, 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 Autumn meeting after the September deadline, or at their July meeting after the March deadline. The Committee will decide whether each candidate is eligible for admission to Ordinary Membership, i.e. those candidates who have:

- secured a PhD.
- published at least two independent accounts of their work in reputable, peer-reviewed psychological journals.
- personally delivered an oral paper to the Society at one of the three EPS meetings held each year (due to the exceptional circumstances surrounding the Covid-19 pandemic, a poster presentation at EPS Online meetings is sufficient to satisfy this criterion).

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 Committee 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 eligible applicants will be put to the July Business Meeting, following the March deadline, and the Annual General Meeting in January, following the September deadline, for approval.



APPLYING FOR POSTGRADUATE MEMBERSHIP OF THE EXPERIMENTAL PSYCHOLOGY SOCIETY

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

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

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

Applicants must be nominated by an EPS ordinary member.

Application forms can be returned to the EPS Administrator at any time.

Postgraduate membership is required in order to apply for Grindley Grants and Study Visit Grants.

Postgraduate members are not eligible to apply for the Small Grant scheme until they become ordinary members of the Society.

To be eligible for postgraduate membership of the EPS, the applicant must either be:

- registered for a PhD, MRes or MPhil programme.
- contracted as a post-doctoral researcher (up to 2 years after receiving PhD).
- contracted as a pre-doctoral researcher.

Those who are resident outside Europe will be asked for assurance that they can engage with the Society reasonably often.

Candidates who do not meet all these criteria can be considered only in exceptional circumstances.

Identifying EPS ordinary members for nomination.

Applicants who meet all the eligibility criteria for postgraduate membership, but do not have a sponsor in the Society, are invited to contact the EPS Administrator at expsychsoc@kent.ac.uk for help identifying EPS members in their home institution, or a member of the committee, who can provide a nomination.

Annual General Meeting

The 73rd Annual General Meeting was held on Wednesday 6th January 2021 at 3:30pm via Zoom.

There were over 70 members in attendance.

MINUTES

21/01 Minutes of the last Annual General Meeting were approved without change.

21/02 Matters Arising

EPS President, John Duncan, gave a brief update on Plan S and the implication for EPS funding. There is unlikely to be much change in the next couple of years, but SAGE has come to an agreement that papers from the UK can publish open access, free of charge for the next three years. UKRI have conducted a consultation on Plan S and the committee submitted its response, which UKRI are still considering along with other responses.

21/03 Secretary's Report

21/03.1 Annual Report of the Society

The Hon. Secretary outlined some of the achievements of the EPS during 2020.

- Highly successful meetings in London (January) and online (July)
- Awarded numerous research grants (N=39), student bursaries (N=13) and travel awards (N=29), recognized scientific excellence through prizes
- Launched new Postgraduate EPS membership (70 members to date)
- Improved accessibility of EPS content through recorded talks
- Introduced Research Plan poster submissions
- New Equality and Diversity committee member
- Launched new Kuppuraj-Bishop Global South Study Visit Grant
- Continued social media engagement @ExpPsychSoc

The proposal to increase members' fees has been paused in light of the pandemic and its effect on the finances of members and Society activities.

21/04 Treasurer's Report

21/04.1 Treasurer's Report

Accounts are in very good health, with increased income and reduced outgoings between 2019 and 2020 caused by Covid-19 pandemic, most notably the cancellation of in-person meetings,

though more grants have been awarded. This has resulted in expenditure remaining constant from last year.

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

The Hon. Treasurer announced the proposed creation of an EPS Fellowship Scheme and Final Year Undergraduate Research Bursary, with the documents having been circulated to members before and during the meeting. As there were no objections raised, the new schemes were approved by a Zoom poll. Proposed changes to current funding schemes were also discussed and approved by a Zoom poll.

21/05 QJEP Editor's Report

21/05.1 Editor's Report

Professor Antonia Hamilton has formally taken over as Editor and thanked Simon Liversedge for his work with QJEP and assistance during the handover period. A new team of 16 Assistant Editors has been created and started their tenure as of January 1st 2021. 479 papers were submitted in 2019, a 12% increase from 2018, and QJEP is on track to receive more than this in 2020. The impact factor of QJEP for 2019 was 2.07, which is down from 2.48 in 2018. The long-term stability of the impact factor is very good in the last 4 years.

QJEP will welcome submissions for special issues and review papers and any proposals should be emailed to Antonia. UK authors can now publish open access with no fees in QJEP. Double blind review, data for analysis code for example, are currently flexible options and are down to individual authors, but these will not become mandatory requirements.

The Committee sought and received approval for the following nominations:

- 21/06 Confirmation of the Fiftieth Bartlett Lecturer
Professor Melvyn Goodale (University of Western Ontario, Canada)
- 21/07 Confirmation of the Twentieth EPS Mid-Career Award
Professor Kate Nation (University of Oxford)
- 21/08 Confirmation of the Twenty Ninth EPS Prize Lecturer
Dr Catherine Manning (University of Oxford)
- 21/09 Confirmation of the Tenth Frith Prize
Dr Jennifer Murphy (Royal Holloway, University of London)

The Committee sought and received approval for the following nominations:

- 21/10 Election of Officers and Committee Members
President Elect: Professor Kathy Rastle (Royal Holloway)

Ordinary Committee Members:

Dr Brianna Beck (University of Kent; EDI Representative)

Dr Joseph Brooks (Keele University; Data Protection Representative)

Dr Gavin Buckingham (University of Exeter)

Dr Joni Holmes (Cambridge University)

Dr David Sanderson (Durham University)

21/11 Admission of Ordinary Members
All applications for ordinary membership of the Society were approved.

21/12 Arrangements for future meetings

14-15 April 2021, Online

July 2021, Nottingham Trent University

January 2022, UCL

April 2022, Keele University

July 2022, University of Stirling

Organisers: Andy Johnson and Sam Hurn

Local organiser: Duncan Guest

Local organiser: Jo Taylor

Local organiser: Jim Grange

Local Organiser: Peter Hancock

21/13 Any Other Business

The President expressed considerable thanks to the three outgoing ordinary committee members; Gareth Gaskell, Mark Hasselgrove, Elisa Ferre, Jim Grange, Matt Longo and Alastair Smith, for all of their work whilst on the committee.

Many thanks were given to outgoing Conference Secretary, Ruth Filik, for all of her work during her tenure.

21/14 Date, time and place of next meeting



Professor Heather Ferguson, Hon. Secretary

Next Meeting.

Nottingham Trent University. Tuesday 29th June – Thursday 1st July 2021.

This meeting will include the 48th Bartlett Lecture by Susan Carey (with an accompanying symposium organised by Josep Call).

This meeting will also include the 27th EPS Prize Lecture by Camilla Gilmore (with an accompanying symposium organised by Silke Goebel) and the 28th EPS Prize Lecture by Sarah Lloyd-Fox (with an accompanying symposium organised by Mark Johnson).

This meeting will also include a British Science Association / EPS Undergraduate Project Prize talk by the 2021 winner, Jessica Teed of Leeds University.

The portals for this meeting will open on Monday 26th April at 10am (UK Time).

Local Organiser: Duncan Guest

