Open exchange of new ideas is central to EPS meetings. To foster up-to-date discussion, presenters are mandated to report work that is not yet published. We ask that attendees respect this mandate. Please do not record or publish presented material (e.g. via Twitter or Facebook) without the presenter's permission. To remove any ambiguity regarding permission, this programme now includes a symbol next to every abstract (the hashtag shown on this page), where the presenter has agreed permission for their work to be shared on social media. Where no symbol is shown for a given presentation, there should be absolutely no filming, pictures, or social media of any kind. For explicit guidance on reporting at EPS meetings, please refer to the EPS handbook.
A scientific meeting will be held at Swansea University, Singleton Campus, Swansea, SA2 8PP, between 12th – 14th July 2023.

The local organiser is Jeremy Tree.

**21st Mid-Career Prize Lecture.**
*Thursday 13th July, 5.45pm – 6.45pm, Glyndwr D Lecture Theatre*

Plasticity in language processing, 24/7.
Gareth Gaskell, University of York

**2023 EPS/BSA Undergraduate Prize Talk.**
*Wednesday 12th July, 3.30pm - 4.15pm, Glyndwr D Lecture Theatre*

Developing an understanding of the relationship between dissociation and panic symptoms in adolescents.
Lottie Shipp, University of Oxford

**EPS President’s Address.**
*Wednesday 12th July, 4.30pm - 5.30pm, Glyndwr D Lecture Theatre*

Making a difference with Experimental Psychology: Lessons from the ‘Reading Wars’.
Kathy Rastle, Royal Holloway, University of London

**Workshop: Making it as an Early Career Academic.**
*Thursday 13th July, 9.00am – 12.30pm*

This half day workshop will cover getting your first lectureship to how to survive your first year as an academic on an open-ended (permanent) contract and will be a mixture of delivered content and facilitated discussion.

**EPS Swansea Social Event: ECR Networking and Pub Quiz.**
*Wednesday 12th July at BrewStone, arrival from 7pm onwards. The quiz will kick off at 8pm. 33 Uplands Crescent, Uplands, Swansea SA2 0NP*

**Poster Session**
There will be a poster session, to be held on Wednesday 12th July between 5.45pm and 6.45pm in the Wallace Building Ground Floor and First Floor Foyers with an accompanying wine reception. All posters will also be available virtually on the EPS website from Monday 10th July 2023 at 9am.

**Conference Dinner**
The conference dinner will be held on Thursday 13th July from 7.15pm at La Braseria, 28-29 Wind Street, Swansea, SA1 1DZ

For more details on how to book a place at the conference dinner, please see page 83.
START OF PARALLEL SESSIONS

Session A - Glyndwr B Lecture Theatre

09:15  Ronan McGarrigle, Lyndon Rakusen*, Sarah Knight and Sven Mattys (University of Bradford, University of York) Barking up the wrong tree? Why attempts to reduce listening effort might be misguided.

09:30  Lewis Ball*, Matthew Mak, Adam Curtis*, Rachel Ryskin*, Jennifer Rodd and Gareth Gaskell (University of York, University of California, United States of America, University College London) The time-course of verb specific priming.

09:45  Charlotte Lee*, Ascensión Pagán, Hayward Godwin* and Denis Drieghe (University of Southampton, University of Leicester) Individual differences and the transposed letter effect during reading.

10:00  Emily Bellerby*, Sara Milledge, Kristofor McCarty* and Hazel Blythe (Northumbria University, University of Central Lancashire) Individual differences in word learning associated with reading skill and vocabulary: An eye-movement investigation.

10:15  Sean McCarron* and Kate Nation (University of Oxford) Semantic fluency for author names as predictor of L2 language skill.

10:30  Tea / Coffee – Wallace Building, First Floor Foyer

11:00  Yuzhen Dong*, Yaling Hsiao, Nicola Dawson* and Kate Nation (University of Oxford, University of Birmingham) The development in emotional content of children's writing: Are children getting less happy?

11:30  Emma James, Paul Thompson*, Lucy Bowes* and Kate Nation (University of York, University of Warwick, University of Oxford) The characterisation and consequences of reading comprehension difficulties: A data-driven approach.

12:00  Yaling Hsiao and Megan Hubbard* (University of Birmingham) Earlier is better: The impact of home literacy environment and print exposure in adult word recognition.

12:30  Lunch
START OF PARALLEL SESSIONS

Session B - Glyndwr C Lecture Theatre

09:15 Isla Jones*, Ilias Tachtsidis* and Antonia Hamilton (University College London) Neural and cognitive mechanisms of audience effects across cultures.

09:30 Gaia Giampietro*, Nicholas Furl*, Thora Bjornsdottir, Ryan McKay* and Laura Mickes* (Royal Holloway, University of London, University of Bristol) Impact of altered face distinctiveness on eyewitness identification performance.

09:45 Martin Thirkettle* and Charlotte Wilson* (Sheffield Hallam University) Anger or happiness superiority effect in multi-target face search. **Withdrawn**

10:00 Francesca Carbone*, Abigail Pitt*, Angela Nyhout*, Stacie Friend*, Murray Smith* and Heather Ferguson (University of Kent, University of Edinburgh) Single vs multiple perspectives in films: The impact on viewers' open-mindedness.

10:15 Ljubica Damjanovic, Anna Roberts* and Sam Roberts* (Liverpool John Moores University, Adam Mickiewicz University, Poland) What's Up? Agreeableness and the vertical representation of affect.

10:30 Tea / Coffee – Wallace Building, First Floor Foyer

11:00 Joanna Wincenciak, Órla Bracken* and Eve Esteban* (University of Glasgow) Developmental trajectory of emotion authenticity perception and its link to socioemotional skills development.

11:30 Emmanuele Tidoni, Emily Cross, Nathan Caruana* and Michele Scandola* (University of Hull, ETH Zurich, Switzerland, Macquarie University, Australia, University of Verona, Italy) The prediction of human and artificial behaviour from gaze observation.

12:00 Edwin Burns* (Edge Hill University) Do we need more self-reports in cognitive psychology? Lessons from prosopagnosia.

12:30 Lunch
START OF PARALLEL SESSIONS

Session A - Glyndwr B Lecture Theatre

13:30  Adam Parker, Jo Taylor and Jennifer Rodd (University College London) Readers use recent experience with word meanings to support the processing of lexical ambiguity: Evidence from eye movements.

14:00  Denis Drieghe, Charlotte Lee* and Hayward Godwin* (University of Southampton) A multiverse exploration of choices in cleaning and analysing eye movements during reading.

14:30  Maria Korochkina*, Marco Marelli*, Marc Brysbaert and Kathleen Rastle (Royal Holloway, University of London, University of Milano-Bicocca, Italy, Ghent University, Belgium) The Children and Young People's Books Lexicon (CYP-LEX): How does book language change as children transition into and through adolescence?

15:00  Tea / Coffee – Wallace Building, First Floor Foyer

15:30  2023 EPS / BSA Undergraduate Prize Talk
Lottie Shipp, University of Oxford - Glyndwr D Lecture Theatre
Developing an understanding of the relationship between dissociation and panic symptoms in adolescents.

16:15  Break

16:30  EPS President’s Address - Glyndwr D Lecture Theatre
Kathy Rastle, Royal Holloway, University of London
Making a difference with Experimental Psychology: Lessons from the ‘Reading Wars’.

17.45  Poster Session – Wallace Building Ground Floor and First Floor Foyers
EPS Poster Session - Online Posters and Talk Through Videos

19.00  EPS Swansea Social Event: ECR Networking and Pub Quiz
Organised by Emma James.
For more information, please see our ‘Next Meeting’ webpage.
START OF PARALLEL SESSIONS

**Session B - Glyndwr C Lecture Theatre**

13:30  **Rebecca Crowley*, Amir-Homayoun Javadi and Jakke Tamminen** (Royal Holloway, University of London, University of Kent) Retrieval-induced forgetting causes newly learned words to fragment.

14:00  **Felice Van 't Wout** (University of Exeter) Investigating the contribution of language to learning via instructions.

14:30  **Mark Haselgrove, Emily Gray* and Sue Lyn Mah*** (University of Nottingham) Relative familiarity and latent inhibition.

15:00  **Tea / Coffee – Wallace Building, First Floor Foyer**

15:30  **2023 EPS / BSA Undergraduate Prize Talk**  
Lottie Shipp, University of Oxford - Glyndwr D Lecture Theatre  
Developing an understanding of the relationship between dissociation and panic symptoms in adolescents.

16:15  **Break**

16:30  **EPS President’s Address - Glyndwr D Lecture Theatre**  
Kathy Rastle, Royal Holloway, University of London  
Making a difference with Experimental Psychology: Lessons from the ‘Reading Wars’.

17.45  **Poster Session – Wallace Building Ground Floor and First Floor Foyers**  
EPS Poster Session - Online Posters and Talk Through Videos

19.00  **EPS Swansea Social Event: ECR Networking and Pub Quiz**  
Organised by Emma James.  
For more information, please see our ‘**Next Meeting**’ webpage.
Thursday 13th July, am

Session A - Glyndwr B Lecture Theatre

09:00 Workshop: Making it as an Early Career Academic. Organised by Gavin Buckingham

10:30 Tea / Coffee – Wallace Building, First Floor Foyer

11:00 Workshop: Making it as an Early Career Academic. Organised by Gavin Buckingham

12:30 Lunch / EPS Business Meeting for Ordinary and Postgraduate Members Plymouth Lecture Theatre

Joe's Ice Cream to be provided to attendees (while stocks last!) during lunch.
Session B - Glyndwr C Lecture Theatre

09:00  Ilhan Raman, Evren Raman* and Burcu Kaya Kiziloz* (Eastern Mediterranean University, Cyprus, University of Westminster) A new 500 colour picture Age of Acquisition norm in Turkish.


09:30  Lydia Munns* and Catherine Preston (University of York) The effects of pregnancy bodily experience on mother-infant outcomes.

09:45  David Sanderson (Durham University) Temporal bisection: Evidence against bisection at the arithmetic mean.


10:15  Dominic Dwyer, Sophie Cattalini* and Grace Williams* (Cardiff University) Trial order in human learning: Evidence for a primacy effect.

10:30  Tea / Coffee – Wallace Building, First Floor Foyer

11:00  Andrew Lucas, Shane Lindsay, Richard O'Connor and Kevin Riggs* (University of Hull) The properties of novel word representations.

11:30  Matthew Mak, Alice O'Hagan*, Aidan Horner and Gareth Gaskell (University of York) Sleep (versus wake) increases both veridical and false memory in the DRM paradigm: A registered report.

12:00  Harriet Smith, Elizabeth Buchanan-Worster*, Rebecca Gilbert and Matthew Davis (University of Cambridge, Massachusetts Institute of Technology, United States of America) Converging evidence against speech perception deficits as a causal explanation of short-term memory impairment.

12:30  Lunch / EPS Business Meeting for Ordinary and Postgraduate Members Plymouth Lecture Theatre

Joe's Ice Cream to be provided to attendees (while stocks last!) during lunch.
Session A - Glyndwr B Lecture Theatre

Mid-Career Prize Symposium
Complementary memory systems for learning, remembering, and using language.
Organised by Jelena Mirković, Matt Davis and Jenni Rodd.

14:00  James McQueen (Radboud University, The Netherlands) Lexicalization of new words in different languages and at different ages.

14:30  Melissa Duff (Vanderbilt University, United States of America) Hippocampal contributions to semantic representation over time: Evidence from amnesia.

15:00  Jenni Rodd (University College London) The contribution of learning mechanisms to skilled language comprehension.

15:30  Tea / Coffee – Wallace Building, First Floor Foyer

16:00  Bjorn Rasch (University of Fribourg, Switzerland) Memory reactivation during sleep.

16:30  Lisa Henderson (University of York) The impact of sleep on language development: From theory to translation.

17:00  Jakke Tamminen (Royal Holloway, University of London) Does sleep restore word learning capacity?

17:30  Break

17:45  21st Mid-Career Prize Lecture
Gareth Gaskell, University of York - Glyndwr D Lecture Theatre
Plasticity in language processing, 24/7.

Conference Dinner
Session B - Glyndwr C Lecture Theatre

14:00 Yicheng Qiu* and Walter van Heuven (University of Nottingham) Investigating distinct components of Stroop interference and facilitation using Chinese characters and pinyin.

14:30 Xun He and Chang Hong Liu* (Bournemouth University) Judging the proportion of a facial expression in a set of faces.

15:00 Trisevgeni Papakonstantinou* and David Lagnado (University College London) Exploring the effects of advisor updating strategies and environmental stability on learning and performance trust.

15:30 Tea / Coffee – Wallace Building, First Floor Foyer

16:00 Carina de Klerk* and Chloe Richmond* (University of Essex) Copy me, copy you: Investigating the development of facial mimicry in infancy.

16:30 Burcu Goz Tebrizcik*, Alexandra Georgescu, Susannah Pick* and Eleanor Dommett* (King's College London) The relationship between interoceptive abilities and interpersonal synchrony in ADHD.

17:00 Jade Norris, Rachel Prosser*, Anna Remington*, Laura Crane* and Katie Maras* (University of Bristol, University of Oxford, University College London, University of Bath) The impact of autism diagnosis disclosure on perceptions of candidates in employment interviews.

17:30 Break

17:45 21st Mid-Career Prize Lecture
      Gareth Gaskell, University of York - Glyndwr D Lecture Theatre
      Plasticity in language processing, 24/7.

Conference Dinner
START OF PARALLEL SESSIONS

**Session A - Glyndwr B Lecture Theatre**

09:00  Andrew Paice*, Andrew Johnson, Rebecca Legg*, Eleonore Smalle* and Michael Page (University of Hertfordshire, Bournemouth University, Ghent University, Belgium, Tilburg University, The Netherlands) Investigating a metrical Hebb effect for lists of words.

09:15  Bethanie Richards*, Henning Holle and Shane Lindsay (University of Hull) Breathing and Memory: Investigating the boundaries of nasal respiration's influence on memory consolidation.

09:30  Ruolan Zhang*, Colette Hirsch* and Charlotte Russell (King's College London) Negative faces impair memory for contextual information.

09:45  Aidan Horner, Bardur Joensen*, Jennifer Ashton*, Sam Berens* and Gareth Gaskell (University of York, Uppsala Universitet, Sweden, University of Sussex) Holistic reinstatement of episodic events following a one-day delay.

10:00  Scott Cairney, Marcus Harrington* and Michael Anderson (University of York, University of East Anglia, University of Cambridge) Neural mechanisms of memory suppression are critically dependent on sleep.

10:15  Emma Sullivan*, Cade McCall*, Lisa-Marie Henderson, Scott Cairney (University of York) Using virtual reality to understand the anxiogenic impact of sleep deprivation.

10:30  Tea / Coffee – Wallace Building, First Floor Foyer

11:30  Sami Boudelaa*, Noha Fathi* and Sameh Al Ansary* (United Arab Emirates University, United Arab Emirates, Alexandria University, Egypt) Are semantic ambiguity effects modulated by task? Insights from lexical decision and semantic categorization in Arabic.

12:00  Rachael Hulme*, Anisha Begum*, Kate Nation and Jennifer Rodd (University College London, University of Oxford) Diversity of narrative context disrupts the early stages of learning novel word meanings.

12:30  Yani Qiu* and Jo Taylor (University College London) The effect of inconsistency on lexical quality development during self-teaching.

13:00  End of Meeting
START OF PARALLEL SESSIONS

**Session B - Glyndwr C Lecture Theatre**

**09:15**  
Simon Dymond*, Gemma Cameron*, Daniel Zuj* and Martyn Quigley*  
(Swansea University, Reykjavík University, Iceland, University of Tasmania, Australia) Far from the threatening crowd: Generalisation of conditioned threat expectancy and fear in lockdown.

**09:30**  
Dario Fuentes Grondon* and Nina Kazanina (University of Bristol) Accents’ Party: Exploring the formation of accents’ representations.

**09:45**  
Martyn Quigley*, Alexander Bradley* and Mark Haselgrove (Swansea University, University of Portsmouth, University of Nottingham) Schizotypy dimensions do not predict overshadowing in a causal judgment task.

**10:00**  

**10:15**  
Scott Houghton* and Mark Moss* (Northumbria University) Exploring the impact of safer gambling promotion on social media: An experimental study.

**10:30**  
Tea / Coffee – Wallace Building, First Floor Foyer

**11:30**  
David George and Josephine Haddon (University of Hull, Cardiff University) Extinction of causal learning is not regulated by a common error term.

**12:00**  
Susanne Eisenhauer*, Tirso Gonzalez Alam*, Piers Cornelissen*, Jonathan Smallwood* and Elizabeth Jefferies (University of York, Northumbria University, Queen's University, Canada) Individual word representations dissociate from linguistic context along a cortical unimodal to heteromodal gradient.

**12:30**  
Daniel Graham*, Santra Mathew*, Gary Smerdon*, Hannah Windmill*, Alastair Smith, Jonathan Marsden* and Stephen Hall* (Brain Research and Imaging Centre, University of Plymouth, School of Psychology, University of Plymouth, DDRC Healthcare, School of Health Professions, University of Plymouth) Neural correlates of CO2-induced anxiety.

**13:00**  
End of Meeting
The poster session will be held in the Wallace Building Ground Floor and First Floor Foyers between 5.45pm - 6.45pm, with an accompanying wine reception.

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

1. Şerife Özbiler*, Serpil Varoğlu*, Mürşide Gül Yılmaz* and Ilhan Raman (Eastern Mediterranean University, Cyprus) (Sponsor: Ilhan Raman) Age of Acquisition (AoA) affects free recall in Turkish monolinguals and Turkish (L1)-English (L2) bilinguals.


3. Joao Vieira*, Elisangela Nogueira*, Erica Rodrigues* and Denis Drieghe (University of Southampton, Universidade Federal do Ceara, Brazil, Pontificia Universidade Catolica do Rio de Janeiro, Brazil) (Sponsor: Denis Drieghe) When function words carry content.

4. Cesar Gutierrez*, Rachael Hulme*, Joanne Taylor and Jennifer Rodd (University College London) (Sponsor: Joanne Taylor) The time-course of word meaning priming and semantic priming.

5. Kinga Patterson*, James Street* and Andriy Myachykov (Northumbria University) (Sponsor: Andriy Myachykov) Phrasal frequency and literacy as predictors of on-line processing and comprehension of English subject-verb agreement.


7. Isabelle O'Halloran* and Jelena Mirkovic (York St John University) (Sponsor: Jelena Mirkovic) Research Study - Grammar learning in adults: A role for offline consolidation and prior knowledge.

8. Eva Kimel*, Dafna Ben Zion*, Anat Prior*, Gareth Gaskell, Ilana Hairston* and Tali Bitan* (University of York, University of Haifa, Israel, Tel Hai Academic College, Israel, University of Toronto, Canada) (Sponsor: Gareth Gaskell) Sleep components involved in the consolidation of new vocabulary and morphological regularities.

9. Emily Rice*, Sven Mattys, Angela de Bruin and Sarah Knight (University of York) (Sponsor: Sven Mattys) Selective auditory attention in native and non-native listening.

10. Victoria Poulton*, Mate Aller*, Lucy MacGregor* and Matt Davis (University of Cambridge) (Sponsor: Matt Davis) Neural representations of selected versus suppressed meanings: an MEG/EEG study of ambiguous words in spoken sentences.

12. Rebecca Norman*, Jo Taylor and Jennifer Rodd (University College London) (Sponsor: Joanne Taylor) Contextual diversity, lexical processing, and word learning: A scoping review.

13. Ruth Corps and Antje Meyer (Max Planck Institute for Psycholinguistics, The Netherlands, Radboud University, The Netherlands) Word frequency effects are unstable during picture naming.

14. Samuel Weiss-Cowie* and Matthew Davis (University of Cambridge) (Sponsor: Matt Davis) Flexible speech perception in response to multiple learning objectives.

15. Chengjie Jiang* and Ruth Filik (University of Nottingham) (Sponsor: Ruth Filik) Hanging clothes in the refrigerator: Reversed bias in counterfactual semantic integration.

16. Chloe Brunskill*, Phot Dhammapeera*, Robin Hellerstedt and Zara Bergström (University of Kent, Chulalongkorn University, Thailand, Universidad Politécnica de Madrid, Spain) (Sponsor: Zara Bergström) Counterfactual imagination as a source of memory distortion: cognitive and brain mechanisms.


20. Abigail Bradshaw, Emma Wheeler*, Carolyn McGettigan and Daniel Lametti* (University College London, University of Cambridge, Acadia University, Canada) Sensorimotor learning in speech is modulated by interaction with another voice.

21. Connor Doyle*, Máté Aller* and Matthew Davis (University of Cambridge) (Sponsor: Matt Davis) Time-course of neural computations supporting perception and misperception of degraded speech.

22. Nick Perham, Nathan Taylor*, Amy Blades*, Sidhra Arshid* and John Marsh (Cardiff Metropolitan University, University of Central Lancashire) Ear Goggles: Can preference for music influence ratings of attractiveness?

23. Aaron Laycock*, Guy Schofield* and Cade McCall* (University of York) (Sponsor: Richard Cook) Complex decision-making in threatening environments.


25. Gozde Kadioglu* (City, University of London) (Sponsor: Stian Reimers) The influence of emotional context on perceptual decision making investigated using a 3D game.


28. Helgi Clayton McClure*, Kevin Riggs, Stephen Dewhurst* and Rachel Anderson (University of Hull) (Sponsor: Rachel Anderson) Fuzzy feelings? Relationships between depressive symptoms, goal vividness and goal-related emotions


30. Céline Souchay, Lise Brun*, Nathan Faivre*, Aïna Chalabaev* and Estelle Palluel* (Universite Grenoble Alpes, France) Sport metacognition: How do basketball players use the visual cue to assess the outcome of their free throws?


32. Matthew Rouse*, Siddharth Ramanan*, Ajay Halai*, Karalyn Patterson, James Rowe* and Matthew Lambon Ralph (University of Cambridge) (Sponsor: Matthew Lambon Ralph) The effects of bilateral versus unilateral anterior temporal lobe damage on face processing and semantic memory.


34. Louisa Butler*, Julia Vogt* and Rachel McCloy* (University of Reading) The role of motivational in the relationship between resource scarcity and self-regulation: An exploratory study.

35. Helen Hodgetts, Cindy Chamberland*, Serge Pelletier*, François Vachon*, Sébastien Tremblay* (Cardiff Metropolitan University, Universite Laval, Canada) Security surveillance and vulnerability to attentional failures.

Barking up the wrong tree? Why attempts to reduce listening effort might be misguided.

Ronan McGarrigle¹, Lyndon Rakusen², Sarah Knight² and Sven Mattys²

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Knowledge of the underlying mechanisms of effortful listening could help to reduce cases of social withdrawal and mitigate oft-reported fatigue in certain populations (e.g., older adults). However, the relationship between transient effort and longer-term fatigue is likely to be more complex than originally thought. The current study manipulated monetary reward to examine the role of motivation and mood state in governing changes in perceived effort and fatigue. In an online study, 185 participants were randomly assigned to either a ‘reward’ (n = 91) or ‘no reward’ (n = 94) group and completed a dichotic listening task along with a series of questionnaires assessing changes over time in perceived effort, mood, and fatigue. Effort ratings were lower overall, yet fatigue ratings showed a steeper increase over time, in the ‘no reward’ group. Mediation analysis revealed an indirect effect of reward on fatigue ratings via perceived mood state; reward induced more positive mood states which was associated with reduced fatigue. These results suggest that: (a) listening conditions rated as more ‘effortful’ may be less fatiguing if the effort is deemed worthwhile, and (b) alterations to one’s mood state represents a potential mechanism by which fatigue may be elicited during unrewarding listening situations.

The time-course of verb specific priming.

Lewis Ball¹, Matthew Mak¹, Adam Curtis¹, Rachel Ryskin², Jennifer Rodd³ and Gareth Gaskell¹

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We conducted two experiments to investigate the longevity of verb specific priming (Ryskin et al., 2017). We made use of syntactically ambiguous sentences, such as “The woman verb-ed the dog with the stick”. Verbs such as “hit” favour an instrument interpretation (the woman used the stick), whilst verbs such as “chose” favour a modifier interpretation (the dog possessed the stick). In a study phase, we presented participants with sentences containing verbs along with visual scenes which constrained the less favoured interpretation of the verb. In Experiment 1, ~10 minutes later, the verbs were encountered in such a way that both syntactic interpretations were viable. An interaction between priming and verb bias was found, suggesting that prior exposure influenced how verbs are later processed. This extends previous research which found verb specific priming at shorter intervals of ~2 minutes (Ryskin et al., 2017). In Experiment 2, a ~12 hour delay including sleep separated the study and test phases. No interaction was found, suggesting limited influence of prior exposure. These results suggest that verb specific priming is relatively weak around ~12 hours after priming exposure, and that verb processing is largely guided by pre-existing knowledge.

Individual differences and the transposed letter effect during reading.

Charlotte Lee¹, Ascensión Pagán², Hayward Godwin¹ and Denis Drieghe¹

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When a preview contains substituted letters (SL; markey) word identification is more disrupted for a target word (monkey), compared to when a preview contains transposed letters (TL; mnokey). The transposed letter effect demonstrates that letter positions are encoded more flexibly than letter identities, and is a robust finding in adults. Letter position encoding gradually becomes more flexible as reading skills develop. However, it is unclear whether it reaches maturation in skilled adult readers, or whether differences in the magnitude of the TL effect remain in relation to individual differences in cognitive skills. We examined 100 skilled adult readers who read sentences containing a correct, TL or SL preview. Previews were replaced by the correct target word when the reader’s gaze triggered an invisible boundary. Cognitive skills were assessed and grouped based on overlapping variance via PCA and subsequently used to predict eye movement measures for each condition. Consistent with previous literature, adult readers generally encoded letter position more flexibly than letter identity. Very few differences were found in the magnitude of TL effects between adults based on individual differences in cognitive skills. The flexibility of letter position encoding appears to reach maturation (or near maturation) in skilled adult readers.

Individual differences in word learning associated with reading skill and vocabulary: An eye-movement investigation.

Emily Bellerby¹, Sara Milledge², Kristofer McCarty¹ and Hazel Blythe¹

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A large proportion of an individual's vocabulary is learned incidentally, during reading. We examined individual differences in lexical acquisition during reading and compared the processing of pseudowords and low frequency words during lexical acquisition. Participants' eye-movements were measured as they read sentences each containing a novel word (low-frequency or pseudoword). Each novel word was presented in eight meaningful sentences, providing a diverse semantic context. Individual, standardised assessments of both reading ability and vocabulary were also collected. Two measures of lexical acquisition were employed (1) eye-movement recordings, to provide an index of the ease with which participants were able to read the novel words, and (2) a semantic categorisation task, to examine whether participants had successfully formed semantic representations for the new words. No significant interactions were found between phase and word type, suggesting lexical acquisition during reading did not differ between pseudowords and low-frequency words. Analyses show that individual differences in reading ability, but not vocabulary, are associated with successful lexical acquisition. This research validates the use of pseudowords in word learning experiments. Furthermore, we show that individuals with stronger reading skills, as measured by standardised tests, are more successful in instantiating new lexical representations as they read.
Semantic fluency for author names as predictor of L2 language skill.

Sean McCarron and Kate Nation
University of Oxford
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Purpose: Recent findings suggest L2 connectives knowledge is attributable to L1 print exposure through language transfer. However, these findings index print exposure using the Author Recognition Test (ART), which has concerns about its reliability in L2 populations (McCarron and Kuperman, 2021). We developed a fluency measure, the “Author Naming Task” (ANT) and evaluated in comparison to ART. Method: 60 L1 French / L2 English speakers had 3 minutes to list as many authors as possible, both in L1 and L2. ARTs and LexTALEs were also administered in L1/L2. Response measures were tasks of English connectives (adapted from Wetzel et al., 2020) and collocations (DÄ…browska, 2014).

Results: L2 ANT significantly predicted L2 connectives and collocations performance even when controlling for L2 proficiency, whereas ART did not. L2 measures were more reliable predictors compared to L1 analogues. Conclusions: Semantic fluency for author names is associated with individual differences in connectives and collocations knowledge in L2. Contrary to previous findings, this suggests that L2 reading is an important source of vocabulary knowledge which is difficult to teach explicitly. These results also have wider implications for memory research, as the discrepancy between recall and recognition measures illustrates the distinction between explicit and implicit memory.


The development in emotional content of children's writing: Are children getting less happy?

Yuzhen Dong¹, Yaling Hsiao¹,², Nicola Dawson¹ and Kate Nation¹
¹ University of Oxford
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Emotion is closely associated with language, but we know little about how children express emotion in their own writing. We used a large-scale data-driven approach to investigate whether emotional expression via writing changes through development, and whether it varies for boys and girls. We used natural language processing to analyse a large corpus of stories (N > 100,000) written by 7- to 13-year-old children. We first used a lexicon-based bag-of-word approach (after Hipson and Mohammad, 2020) to identify emotional content in the children's writing; Generalized Additive Models were then used to model changes in sentiment across age and gender. Two other approaches (BERT and TextBlob) validated and extended these analyses, revealing converging findings that positive sentiments in children's writing decrease with age. These findings echo previous studies.
showing lower mood and increased acquisition of negative emotion words across development. We also found stories by girls contained more positive sentiments than boys. Our study shows the utility of large-scale data-driven approaches to reveal the content and nature of children's writing. Future experimental work should further investigate the complex relationships between written language and emotion across development.

The characterisation and consequences of reading comprehension difficulties: A data-driven approach.

Emma James¹, Paul Thompson², Lucy Bowes³ and Kate Nation³
¹ University of York
² University of Warwick
³ University of Oxford
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Approximately 5-10% of children are thought to struggle with reading comprehension despite successfully decoding written words. Experimental studies have compared these “poor comprehenders” to control children matched on age, decoding ability, and nonverbal IQ, and typically observed core weaknesses in oral language. However, this case-control approach relies on arbitrary performance thresholds, and the resulting small group comparisons have little scope for detecting heterogeneity. Instead, we used latent variable mixture modelling to identify reading profiles in a sample of 6,846 children from the Avon Longitudinal Study of Parents and Children (ALSPAC). The preregistered model did not identify a poor comprehender profile aligned with previous studies, and indicated that reading difficulties most commonly span decoding and comprehension. However, an exploratory analysis identified children with relative comprehension weaknesses across the spectrum of decoding ability (n = 947). These children typically had weaknesses in vocabulary and nonverbal ability, with a subset (18.9%) demonstrating broader cognitive difficulties. The results indicate that comprehension weaknesses are best considered along a dimension of overall reading skill, and that strengths and weaknesses in other cognitive domains likely contribute to the severity of reading problems. Ongoing analyses are examining the implications for educational attainment and wellbeing.

Earlier is better: The impact of home literacy environment and print exposure in adult word recognition.

Yaling Hsiao and Megan Hubbard
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Home literacy environment is an established predictor of early literacy and language outcome (Hamilton et al., 2016). Print exposure is also positively linked to the performance on literacy tasks, with the strength of association becoming stronger as children grow (Mol and Bus, 2011). Prior studies rarely examined both of them together, especially on how their effects on reading persist into adulthood. In the current study, we examined home literacy environment in childhood and print exposure concurrently. We also measured adult participants’ current literacy environment and their engagement with literary materials. Forty-five adult participants took part in an author recognition
test (indexing print exposure), two surveys on home literacy environment (one about childhood and other about adulthood), and lastly a lexical decision task. Multiple regression analysis on word recognition accuracy indicated significant effects of print exposure and home literacy environment in childhood but non-significance of literacy environment in adulthood. The findings replicated previous studies on the crucial roles of print exposure and childhood home literacy environment on lexical processing, even in adulthood. However, the literacy environment in adulthood did not contribute to the variance, suggesting that there is more pressure on quality literacy environment early in development to provide for reading skills in later life.

Neural and cognitive mechanisms of audience effects across cultures.

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Audience effects refer to changes in our behaviour when we are watched by another person, or believe that we are being watched (Hamilton and Lind, 2016). This phenomenon was first described in the 1890s, but it is still not well understood. The present study aimed to investigate the neural and physiological correlates of audience effects in a videocall setting, in a large sample of 103 individuals across the UK and Japan. Participants completed easy/hard maths questions, in three different audience conditions: no audience, hidden audience (participants believed they were being watched, but could not see their audience), and visible audience (participants could see the audience members they believed were watching them). Neuroimaging data were collected over the prefrontal cortex using functional near-infrared spectroscopy. We find significant differences in behavioural audience effects across the UK and Japan samples, as well as significant correlations between reaction time when watched and personality measures such as self-esteem and social anxiety scores. Initial analyses of neuroimaging data (n = 16) using the same task revealed a significant increase in activation in social brain areas such as the medial prefrontal cortex when participants believed they were being watched.

Impact of altered face distinctiveness on eyewitness identification performance.

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Eyewitnesses of crimes often make identification errors, leading to exculpation of guilty individuals and punishment of innocents. In prior research, participants performed more accurately on standard recognition memory tests (old/new recognition tests) if face stimuli were caricatured. However, it is not clear whether this effect is specific to standard recognition tests, or if it moreover extends to face matching and simultaneous line-ups, test types resembling real-world eyewitness settings. We therefore tested whether altered distinctiveness of unfamiliar faces, reached through production of caricatures and anti-caricatures, impacted recognition performance for different test types: showups, face matching, and simultaneous line-ups. Across all test types, participants showed poorer
recognition for anti-caricatures, as expected. However, contrary to our hypothesis, participants performed more accurately when shown veridical than caricatured faces. Additionally, the detrimental effect of caricature was observed to increase at delay. Present findings suggest that encoding specificity may have a greater impact on recognition performance of unfamiliar faces, as compared to the caricature effect. Caricature may improve recognition when face distinctiveness is consistent between encoding and test. In the context of forensic practices, where unfamiliar faces are encoded as veridical, caricature may lead to inaccurate recognition.

Anger or happiness superiority effect in multi-target face search. Withdrawn

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

Single vs multiple perspectives in films: The impact on viewers' open-mindedness.

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A common philosophical assumption is that art can open people's minds by providing new perspectives and reshaping their experience and perception of the world. However, this conceptual claim has not yet been explored empirically. The present study addressed this gap by testing the impact of perspective-taking in films on various characteristics of open-mindedness. In a between-subjects design, 150 adult participants were randomly assigned to watch a film clip (taken from Jackie Brown) entailing either multiple perspectives or a single perspective on the same event (film conditions) prior to measuring open-mindedness, or to complete the open-mindedness tasks without having watched a film (control condition). In addition to the battery of open-mindedness tasks (assessing creativity, imaginability, cognitive flexibility, openness to new evidence), we measured online indicators of attention and arousal while participants watched the film (eye-tracking, heart
rate) and individuals’ aesthetic fluency (film expertise). Results showed that cognitive flexibility was greater after watching a film than no film (no difference between perspective conditions), and that real-time arousal levels (i.e. pupil diameter and heart rate) were greater when the film depicted multiple perspectives compared to a single perspective. These findings suggest that watching films that require perspective shifting may impact on viewers’ open-mindedness.

What's Up? Agreeableness and the vertical representation of affect.

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High levels of agreeableness tend to be associated with interpersonal strategies which favour positive social relationships. Cognitive aspects of this personality dimension have been shown to reflect differences in the attentional processing of prosocial vs antisocial stimuli. However, it is currently unclear whether such cognitive differences may also operate at a more implicit level. We investigated this issue by measuring the saliency of the “UP = GOOD” metaphor in our visual search task by presenting angry and happy face targets and neutral distracter faces in top, bottom, left, and right locations on the computer screen (see Damjanovic and Santiago, 2016). The “UP = GOOD” metaphor was activated in individuals low in agreeableness as evidenced by faster detection of happy faces in the top relative to the bottom location. In contrast, for individuals high in agreeableness an advantage for metaphor incompatible locations was observed, such that response times were faster to angry faces located at the top relative to the bottom location. These findings are discussed in terms of the flexible nature of the vertical representation of affect and its relationship with increased self-control during interpersonal conflict.


Developmental trajectory of emotion authenticity perception and its link to socioemotional skills development.

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The COVID-19 pandemic have had a documented impact on children's social-emotional wellbeing and development. Here, we measured the developmental changes in social-emotional skills including empathy, emotion regulation, and emotion recognition in 4-6 year-old children, following participation in a school-based social-emotional learning programme utilising puppetry. Based on Zins et al. framework for Social and Emotional Learning (SEL), the programme utilised the power of puppetry and storytelling to promote five broad clusters of competencies in children. In a mixed-methods, quasi-experimental design, we evaluated the impact of the intervention on children's (n=15) social-emotional and ToM skills. Analysis of within-individual changes, showed on average 15% increase in empathy, 26% less peer problems, and 10% more pro-social behaviour. Accuracy in
emotion recognition measured using a authenticity perception paradigm, increased by 16%. Children's ability to self-regulate emotion and interpret emotional states of others, strongly underpin their ability to establish positive and trusting relationships. Here, we present evidence that art-based interventions using puppetry have the potential to contribute to the development of social-emotional skills and promote wellbeing in young children.

The prediction of human and artificial behaviour from gaze observation.

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Do people ascribe intentions to humanoid robots as they would to humans or non-human-like animated objects? In a series of experiments, we investigated how well people understand non-mentalistic (i.e., where an agent is looking) and mentalistic (i.e., what an agent is looking at; what an agent is going to do) information from gaze cues performed by humans and human-like robots or spatial cues produced by a non-human-like object. People were faster to infer the mental content of human agents than robot agents. However, spatial cues modulated people's ability to understand what a robot was doing. Specifically, biasing people's attention towards the object the observed agent can interact with can improve people's ability to understand what humanoid robots will do. We suggest that the human-like shape of an agent and its physical capabilities (i.e., gazing, grasping) facilitate the prediction of its upcoming actions. Our findings expand current models of gaze perception and may have important implications for human-human and human-robot collaboration.

Do we need more self-reports in cognitive psychology? Lessons from prosopagnosia.

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Psychologists assume experimental tests are reflective of cognitive processes utilised in daily life, rejecting self-reported data as subjective and unreliable. These assumptions have formed the basis of how a condition called developmental prosopagnosia, characterised by difficulties recognising faces, is diagnosed and researched. Recently, authors have argued in favour of using the DSM-5 approach to neurocognitive disorders to diagnose prosopagnosia, i.e., an individual must score more than 1 SD below neurotypical norms on two face processing tests. In this talk I show that almost 40% of prosopagnosia cases will never achieve a diagnosis using this approach, despite exhibiting group level impairments on a variety of face processing measures. By contrast, every single case reported highly abnormal real-world behaviours (i.e., more than -2 SDs below a neurotypical norm) after completing a symptom questionnaire called the prosopagnosia index. I argue that while cognitive tests lack the ecological validity to diagnose prosopagnosia, they can be used to validate the prosopagnosia index as a diagnostic tool. Given these findings, we should incorporate more self-report data in our studies to identify, and correct, deficiencies in cognitive tests when disparities between the two arise.
Readers use recent experience with word meanings to support the processing of lexical ambiguity: Evidence from eye movements.

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Fluent reading comprehension demands that readers can rapidly access and integrate word meanings. This can be challenging when lexically ambiguous words have less frequent meanings (e.g., the ‘dog’ meaning of ‘boxer’). Indeed, readers fixate lexically ambiguous words for longer than matched control words when embedded within identical sentence contexts that bias a subordinate meaning; an effect termed the subordinate bias effect. Non-reading studies have shown that listeners can flexibly use recent experiences with word meanings to support the subsequent processing of ambiguous words even after substantial delays. We conducted two experiments to examine whether these observations extend to silent reading. Both experiments employed a 2 (ambiguity: low-ambiguity control vs high-ambiguity) by 2 (priming: unprimed vs primed) within-participants design, with a 1-minute delay between prime and ‘test' in Experiment 1 and a 30-minute delay in Experiment 2. Both experiments showed that there were greater reductions in go-past times and total reading times for target words following priming for ambiguous words than for matched control words. This benefit was also present in gaze durations in Experiment 1. Thus, recent encounters support the integration of word meanings during silent reading and this effect extends beyond simple repetition of a target word.

A multiverse exploration of choices in cleaning and analysing eye movements during reading.

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Datasets from eye tracking research during reading inevitably involves processing raw data into a form suitable for statistical analyses. For a reading experiment, this will typically include deciding whether to merge small fixations located close to each other, and whether to remove very short and/or very long fixations. Outlier analyses can include removing fixations 3 or 2.5 standard deviations from the grand mean, the overall participant mean or the mean of a participant for a specific condition. Subsequently, Linear Mixed Models are often reported on untransformed, log-transformed or using GLMMs which do not assume an underlying normal distribution (Lo and Andrews, 2015). Here we conducted a multiverse analysis, which consisted of running thousands of LMMs representing all reasonable combinations of choices in cleaning and analysing fixation data. In this talk, we will explore the impact of these choices focusing on the reported size of the frequency effect during a reading experiment using an EyeLink 1000. Amongst our findings is that the frequency effect in single fixation durations can vary by more than 5 milliseconds depending on the data processing choices made, even though we restricted ourselves to cleaning and analysis methods that would be considered acceptable practice by researchers.
The Children and Young People's Books Lexicon (CYP-LEX): How does book language change as children transition into and through adolescence?

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We present CYP-LEX, a large-scale lexical database derived from most popular fiction and nonfiction books for children and young people in the UK. CYP-LEX includes 1,200 fiction and nonfiction books evenly distributed across three age bands (7-9, 10-12, 13+) and comprises over 70 million tokens and 105,000 types. Books were selected and classified into age bands using national reading surveys, publisher recommendations, and book sales statistics from websites such as Amazon, BookTrust, Goodreads, LoveReading4Kids, and School Reading List. For each book and each age band, we report all lexical items and the number of sentences, tokens, and types. For each word, we provide its raw and Zipf frequencies and all parts-of-speech in which it occurred, with the frequency and lemma for each occurrence. We also report metrics for multiword expressions and, for each age band, semantic similarity of the books within it. In our talk, we focus on the insights that CYP-LEX provides into the nature of language in books that children read and the important changes that take place in the book language as children age.

Retrieval-induced forgetting causes newly learned words to fragment.

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Little is known about how elements of newly learned words, such as written form and aspects of meaning, become integrated with each other and whether the elements break apart across forgetting. We examined whether there is an association between retrieval successes of different elements of the same new word (i.e., retrieval dependency) and whether this remains a week later after some words are forgotten. Across five experiments, participants encoded new words made from an orthographic word form (e.g., “flimir”) presented alongside pictorial (e.g., balloon) and auditory (e.g., baby crying) elements representing semantic context. Retrieval dependency was present immediately after encoding showing that the elements become rapidly bound together. The manner in which they are forgotten however was subject to retrieval-induced forgetting (RIF). The word elements remained bound together one week later when no immediate retrieval test occurred after training. However, when half of the words were tested post-learning, the untested half later fragmented (i.e., no dependency at delayed test). This fragmentation was prevented when learning of untested words occurred after retrieval of tested words. We suggest that RIF may extend to learning and forgetting of new words, and call for an update of word learning theories which account for forgetting.
Investigating the contribution of language to learning via instructions.

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How do people encode and implement instructions? Prior research has shown that language plays a critical role in instruction following (Van ’t Wout and Jarrold, 2022). The two experiments (total N=96) reported here investigated whether language facilitates memory for (“knowing”) or implementation of (“doing”) newly instructed stimulus-response (S-R) rules. In both experiments, participants completed a series of novel choice-reaction time tasks. Each task consisted of six arbitrary S-R rules and was preceded by a 10 second instruction phase (a visual representation of the correct S-R rules). During the instruction phase, participants performed either a verbal or non-verbal distractor task. Experiment 1 found that both memory for and implementation of newly instructed S-R rules was impaired in the verbal distractor task condition. Experiment 2 replicated this finding, and furthermore found that the detrimental effect of the verbal distractor task remained significant when participants were given unlimited time to encode the instructions. Crucially, both experiments found that the verbal distractor task only impaired the implementation of S-R rules, when the instructions had not been perfectly encoded. Together, these results demonstrate that a verbal distractor task impairs the encoding of (and consequently the implementation of) newly instructed S-R rules.

Relative familiarity and latent inhibition.

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Latent inhibition refers to the observation that the association between a novel cue and an outcome is more rapidly acquired than the association between a familiar cue and an outcome. Byrom et al. (2018) noted that in studies of latent inhibition, pairings of the novel and familiar cues with the outcome often occur in a familiar context, and argue that faster learning about the novel cue is a consequence of the familiarity-mismatch between the context and the cue. To test Byrom et al.’s proposal the familiarity of contextual stimuli was manipulated. Preexposure and training were conducted in a context established as either (a) familiar (operationalized by repeatedly intermixing a small set of distractors with target trials) or (b) in a context that maintained novelty (operationalized by intermixing trial-unique distractor stimuli with target trials). In the former case the normal latent inhibition effect was observed. However, in keeping with Byrom et al.'s analysis, in the latter case, learning was faster to the familiar cue than the novel cue - latent inhibition was reversed. We explain these results by appealing to familiarity and novelty as representational elements that affect generalization and discrimination.
2023 EPS / BSA Undergraduate Prize Talk

Developing an understanding of the relationship between dissociation and panic symptoms in adolescents.

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Panic symptoms are common amongst adolescents, and have a detrimental effect on psychological wellbeing and functioning. They often co-occur with dissociative symptoms, and are associated with the habitual use of maladaptive emotion regulation strategies in adults. However, there is a lack of evidence exploring the links between these concepts within an adolescent population. The aim of the current study was to further our understanding of the longitudinal relationship between dissociation (with particular emphasis on the subset of experiences relating to a ‘felt sense of anomaly’ (FSA)) and panic symptoms, with respect to the mediating roles of two cognitive emotion regulation strategies (expressive suppression and cognitive reappraisal). A large community sample of adolescents participated in an online survey which took place at two time points, one month apart. Mediation analyses were conducted to assess both the cross-sectional and longitudinal associations between variables. It was found that both cognitive emotion regulation strategies partially mediated the longitudinal relationship between dissociative experiences, and panic symptoms reported one month later. These results are interpreted in light of cognitive models, and expand our knowledge of the links between dissociation and panic symptoms. Future investigation of these relationships within clinical groups is required.

EPS President’s Address

Making a difference with Experimental Psychology: Lessons from the ‘Reading Wars’.

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EPS talks frequently begin by articulating why some set of research questions has implications for problems in the outside world. However, it is much less common to hear about how basic research in Experimental Psychology is actually making a difference in the world. This talk considers the relationship between fundamental research on reading and the history of global policy and practice regarding reading instruction. I show how research in Experimental Psychology is now making a real difference to reading instruction around the world and describe what I see as the next major policy target for this research field. I conclude by drawing out some lessons for interacting with policy and practice domains – why this is interesting, what makes these interactions successful, and why research from our discipline is so valuable.
A new 500 colour picture Age of Acquisition norm in Turkish.

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The role of AoA as a psycholinguistic variable on reading and spelling tasks has been the topic of much recent research with evidence showing how early acquired items, such as words and pictures, are processed faster and more accurately in comparison to late acquired items. An interesting development in psycholinguistics, despite its Anglocentric research origin, has been the discovery that AoA influences lexical processing across a wide range of languages including Turkish which possesses an extremely transparent orthography (see Juhasz, 2005 for a review; Raman, 2006; Raman et al 2014). Previous research in Turkish led to the creation of a 216 colour picture norm based on the original Snodgrass and Vanderwart (1981) line drawings. However, it has increasingly become clear that selecting experimental stimuli from 216 items is rather limiting once other psycholinguistic variables (such as familiarity, frequency and length) start being considered and controlled for. Recently, Duñabeitia et al (2022) have published a new psycholinguistic norm for 500 colour pictures that includes Turkish in a multilingual context. We report a new AoA normative data set for 500 colour pictures in Turkish with the purpose of utilising them in future psycholinguistic experiments and assessments.

Measuring metacognition in autobiographical memory: A coherence approach.

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Theories of autobiographical memory (AM) describe a higher-order control process which guides retrieval, although there is a lack of empirical work exploring such a metacognitive process. This is due to the verification of the personal past being time-consuming, rendering metacognitive sensitivity analyses based on 'ground truth' difficult. Moreover, categorizing memories as 'correct' or 'incorrect' is irrelevant in theoretical conceptualisations of AM, which see it as a reconstructive, allowing a coherent self-representation. We aimed to assess metacognitive awareness by examining confidence for AM organisation. Firstly, eighty-three participants retrieved AMs from two different lifetime periods. These memories were then re-presented to participants in pairs, for which the participant had to report in which order the events occurred. Across blocks, participants made two such judgements of order for the pairs, allowing us to categorise the judgements as coherent or non-coherent. Participants then reported their confidence in this ordering. Participants were able to distinguish pairs that were coherent with AM chronology from pairs which were not. There was also an effect of response time on confidence, suggesting common properties between metacognition for autobiographical memory and other forms of memory. This is an important step towards a paradigmatic approach to considering metacognition in AM.
Converging evidence against speech perception deficits as a causal explanation of short-term memory impairment.

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Phonological short-term memory (pSTM) impairments are well-documented in developmental language and reading disorders. Perceptual deficit accounts, which attribute pSTM impairments to problems with speech-sound processing, persist. We addressed whether impaired speech perception weakens phonological short-term memory (pSTM) using multiple methods. Firstly, we manipulated speech-sound discrimination in a pSTM task, whereby typical adult listeners (N=36) recalled sequences of audio-morphed syllables with varying perceptual ambiguity. Recall for high-ambiguity syllables from letter name (“B”-“P”) continua was poorer than for low-ambiguity equivalents, but ambiguity did not affect recall of syllables from letter-word continua (“B”-”we”) or transfer across items. Therefore, disrupting speech-sound discrimination did not cause generalised pSTM difficulties. Furthermore, individual differences in speech perception acuity did not predict pSTM capacity in typical adults (N=75). We also tested speech perception acuity and non-speech spectro-temporal processing in children (10-15 years) with phonological dysfunction, and age-matched controls (N=20). These groups did not differ on either speech or non-speech auditory perception. An ongoing functional MRI study (N=31) will assess whether perceptual demands and pSTM demands load on shared brain networks. Bringing together evidence from typical and language-impaired individuals, and both adolescents and adults, we suggest that poor speech perception is not a sufficient causal explanation for pSTM deficits.

Temporal bisection: Evidence against bisection at the arithmetic mean.

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In a temporal bisection procedure, participants are trained to discriminate between two durations of a stimulus. In the test phase, probe durations that are intermediate to the previously trained durations are presented and the categorisation of probe durations as either short or long is used to determine the perceived midpoint. A complication in determining the bisection point is that linearly distributed probe durations result in bisection at the arithmetic mean, but a logarithmic distribution results in bisection at the geometric mean. In three experiments, the influence of probe duration distribution was avoided by presenting a single probe duration of either the geometric or the arithmetic mean of the trained durations. It was found that the number of participants that categorised the arithmetic mean as long was significantly larger than those that responded short. The number of participants that categorised the geometric mean as either short or long did not significantly differ. This was true for trained durations of 0.4 vs. 1.6 s (Experiments 1-3), 0.2 vs. 3.2 s (Experiment 2) and 0.4 vs. 6.4 s (Experiment 3). The results are consistent with logarithmic encoding of time, or a comparison rule based on relative rather than absolute differences.

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Fast Cortical Mapping (FCM) is an incidental learning process hypothesised to allow rapid, cortical-based memory formation, which challenges the standard systems-level memory consolidation view in by-passing the hippocampus in learning. Existence of FCM in adults is controversial [1], but Coutanche and Thompson-Schill (2014) used a fast mapping (FM) learning procedure and an implicit reaction time measure, and reported evidence of lexical competition 10 minutes after pseudoword learning in the FM condition, but not in a conventional explicit encoding learning procedure [2]. We performed 3 pre-registered experiments that attempted to replicate Coutanche and Thompson-Schill (2014). Experiment 1 (n=56) found no evidence of a same-day lexical competition effect. Instead, a post-hoc analysis suggested evidence of semantic priming. Experiment 2 (n=180) tested whether semantic priming remained when making the stimulus set fully counterbalanced. No evidence for either lexical competition nor semantic priming was detected, and Bayes Factors for the combined data supported the hypothesis of no effect of lexical competition. Experiment 3 (n=64) tested whether referent (a)typicality boosted FM effects, but we replicated our previous null findings. These results question whether FCM exists in healthy adults, at least in this specific FM paradigm.


Trial order in human learning: Evidence for a primacy effect.

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Associative learning models typically make predictions insensitive to trial order and/or frequency - even though the frequency of events influences behaviour beyond the reward probability (e.g., Estes, 1976). Don et al. (2019) found that human participants chose cues presented more frequently in training, even when they had lower reward probability. Theoretical modelling suggested these frequency effects should be largely determined by later training trials (i.e., a recency effect). We tested this prediction by exposing human participants to multiple cues, some (A/E) reinforced with 65% probability and others (C/G) 75% probability. Moreover, cues A and G were presented twice as often in the first half of training than cues C and E; with the reverse true later in training. If later trials determine responding, then participants would be expected to chose C over A and E over G (C/E being experienced more frequently at the end of training than A/G). The opposite was observed, participants chose A over C and G over E - a primacy effect was observed regardless of reward frequency. This supports the neglected idea that trial order and/or frequency influence
learning beyond reward probability, but challenges recent modelling predicting such effects should be largely based on recency.


The properties of novel word representations.

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Previously believed to depend upon time and sleep, recent research shows that novel word lexical competition effects may emerge immediately following learning. However, demonstrations of pre-sleep lexical competition have relied on form-based methods where word meanings are not learnt or tested. One exception is an eye-tracking study (Weighall et al., 2017) where novel words were paired with novel objects. Experiment 1 sought to replicate the pre-sleep lexical competition effects demonstrated in that study with a new and accessible paradigm: mouse tracking. Mouse tracking provides a sensitive and continuous measure of competition effects in real-time lexical processing. Using mouse tracking, we replicated novel word lexical competition effects in words trained with meaning. Experiment 2 then tested if word meaning was responsible for those observed novel word competition effects. Given that semantic information supports lexical activation in familiar words (Gow and Olson, 2015), if word meaning was responsible this would suggest a similarity between familiar and novel word competition effects. Evidence was mixed, although there was some evidence that word meaning caused novel word lexical competition. This supports the claim that, immediately after learning, representations of novel words may display similar properties to those of familiar words.

Sleep supports the word-superiority effect by enhancing perceptual details of newly learnt letter strings.

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This study used a Reicher-Wheeler paradigm to determine whether sleep supports perceptual learning of orthographic information. Seventy-two participants learnt pairs of new orthographic neighbors (e.g., ‘alarchy’/‘afarchy’) for two sets of English hermit words. Whereas the PM-group learnt Set 1 of pairs of neighbors at 20:00 and Set 2 at 08:00 the next day, the AM-group learnt Set 1 at 08:00 and Set 2 at 20:00 on the same day. At a 12 hr test (immediately after learning Set 2), the PM-group showed signs of enhanced perceptual learning for Set 1, which they had slept on, compared to Set 2, whereas the AM-group showed the opposite. The benefit of sleep was confirmed at a 36 hr retest: The PM-group having slept twice on Set 1 showed an even stronger word-superiority effect compared to Set 2, whereas the AM-group having now slept once on both sets showed equal discriminability. Clearly, sleep supports the word-superiority effect by enhancing perceptual details of newly learnt letter strings. Withdrawn
Sleep (versus wake) increases both veridical and false memory in the DRM paradigm: A registered report.

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Human memory is known to be supported by sleep. However, less is known about the effect of sleep on false memory. In the laboratory, false memories are often induced via the Deese-Roediger-McDermott (DRM) paradigm where participants are presented with semantically related words like nurse, hospital, and sick. Subsequently, participants are likely to falsely remember that a lure word like doctor was presented. Multiple studies have examined whether DRM false memories are influenced by sleep, with contradictory results. A recent meta-analysis suggests that sleep may increase DRM false memory when short lists are used. We tested this in a registered report (N=488) with a 2 (Interval: Immediate vs. 12-hr Delay) x 2 (Test Time: AM vs. PM) between-participant DRM experiment, using short DRM lists (8 words/list) and free recall. We found that (i) completing free recall in the evening (vs. morning) led to a selective increase in intrusions (i.e., neither studied nor lure items) but not total responses, (ii) the Sleep (vs. Wake) participants produced more false memories (when intrusions were controlled for) and recalled more studied items. Our findings support the view that sleep may facilitate gist abstraction and/or spreading activation, alongside strengthening/protecting encoded memories.
**Mid-Career Prize Symposium**

Complementary memory systems for learning, remembering, and using language.
Organised by Jelena Mirković, Matt Davis and Jenni Rodd.

**Lexicalization of new words in different languages and at different ages.**

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The “cathedruke” word-learning paradigm pioneered by Gaskell and Dumay (2003) has provided strong support for the idea that the mental representations of newly-acquired words undergo a qualitative change through sleep-related consolidation. A novel word such as cathedruke starts out as an episodic memory representation (supported by the hippocampus) that is not integrated into the lexicon. After consolidation, however, it becomes a semantic memory representation (supported by the neocortex) and is lexicalized (such that it competes with existing words such as cathedral). In this talk, I will first briefly review older evidence from behavioural and neuroscientific experiments using the cathedruke paradigm in which Dutch-speaking adults learned new Dutch words. These experiments suggest that the lexicalized representations of newly-acquired words are phonologically abstract and become part of a lexical hub in the left posterior middle temporal gyrus. I will then present more recent data from studies asking three further questions. First, does the same lexicalization process take place when participants learn words in a second or a completely new language? Second, how similar is lexicalization in adults and children? Third, is lexicalization modulated by the amount of prior knowledge the learner has about the meaning of the new words?

**Hippocampal contributions to semantic representation over time: Evidence from amnesia.**

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Word learning is supported by complementary memory mechanisms. Hippocampal dependent memory plays a critical role in the arbitrary binding of form and meaning for new word learning. The traditional view has been that this role is time limited and that semantic representations become independent of the hippocampus over time via neocortical consolidation. Evidence for this view came, in part, from patients with hippocampal amnesia who did not have aphasia or semantic dementia and who performed within normal limits on neuropsychological measures of vocabulary knowledge and naming for information acquired before the onset of amnesia. I will present data across a series of studies demonstrating impoverished remote semantic memory, impaired naming, and disruptions in the relations among words in individuals with hippocampal amnesia using experimental designs and stimuli with increased sensitivity to detect impairment. These findings challenge the historical view that semantic memory becomes independent of the hippocampus over time and that remote semantic memory is intact in amnesia. This work suggests that hippocampal dependent memory plays a long-term role in maintaining, strengthening, and enriching semantic representations over time.
The contribution of learning mechanisms to skilled language comprehension.

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Successful communication requires sophisticated, stored knowledge about the different shades of meanings for the many words in our shared vocabulary (e.g., “shades of meaning” vs “shades of paint”). In addition to a stored catalogue of lexical meanings, fluent comprehension is aided by distributional knowledge about the likelihoods of a word’s different interpretations. This knowledge can reduce unnecessary interference from irrelevant word meanings, and avoid cognitively demanding misinterpretations. This stored knowledge about word meanings and about their likelihood of occurrence, must be highly flexible in order to adapt to changes in our linguistic environment. These changes may be driven by global changes in the language itself (e.g., technological and cultural developments) or by more idiosyncratic changes to our local linguistic community (e.g., changes in interests, friendships, employment). I will present recent findings concerning how learning and memory mechanisms contribute to fluent language comprehension by allowing us to (i) acquire new meanings and (ii) update our current knowledge about highly familiar word meanings.

Memory reactivation during sleep.

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Sleep is beneficial for memory. The sleep-associated memory benefits are assumed to rely on a spontaneous reactivation of memories during sleep. In the last years, targeted memory reactivation (TMR) has been established as an efficient technique to experimentally induce reactivation processes during sleep, with positive effects on memory performance. In my talk, I will review our work on targeted memory reactivations during sleep, with a special focus on reactivating word-pairs during sleep. I will discuss the results and the most common limitations and open questions. Finally, I will give an outlook on our current work using word presentation during sleep to improve sleep quality.
The impact of sleep on language development: From theory to translation.

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Evidence from adults, much of it from the Gaskell lab, suggests that sleep facilitates the consolidation of newly learned language, working to strengthen memories of new words exactly as they are learned and integrate them with existing lexical networks. However, just over ten years ago, we recognised that we were lacking understanding of how these mechanisms might change over development. This is a valid and theoretically important question given the substantial variability in both sleep and processes of language learning across and within development. This talk will first present research that shows how studying variation in sleep over development can advance our mechanistic understanding of the role that sleep plays in supporting language acquisition. We will consider how the sleep-associated mechanisms that contribute to language learning might change over development, in interaction with the prior knowledge that varies over age. We also consider how this work might feed into understanding how we might optimize the vocabulary consolidation process. Finally, we will consider recent secondary data analyses that demonstrate that sleep has a real-world impact on language development, allowing us to move the fundamental science towards translation.

Does sleep restore word learning capacity?

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An extensive body of work by Gareth Gaskell and collaborators has shown that sleep plays a key role in consolidating newly learned spoken words, and in integrating them in the mental lexicon. However, the importance of sleep before word learning is less well understood. The synaptic homeostasis hypothesis proposes that new learning saturates memory encoding capacity during wake, and slow-wave sleep restores it. I will present data from two meta-analyses that review the existing evidence on whether total sleep deprivation and partial sleep restriction impact subsequent memory encoding ability. Both manipulations were found to have a statistically significant impact on memory. I will also present data from a lab-based study where adult participants took a polysomnographically-monitored nap or remained awake before learning new spoken words. Pre-learning nap did not increase the number of correctly recalled words but it did result in more accurate responses. It had no impact on lexical integration, however. Slow-wave sleep did not predict subsequent word learning but participants with more sleep spindles showed larger increases in lexical integration between immediate and delayed test. We suggest that a pre-learning nap has some benefits for learning new words, but these appear to be mediated by spindles rather than slow-waves.

End of Symposium
Investigating distinct components of Stroop interference and facilitation using Chinese characters and pinyin.

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Research has suggested that Stroop effects have different loci that are related to response, semantic, and task processing (Augustinova et al., 2019). However, no study so far has investigated distinct Stroop components in Chinese. Thus, a series of experiments were conducted using manual Stroop tasks with Chinese characters and pinyin to investigate semantic and phonological processing. Pinyin is interesting because it is an alphabetic writing system that represents the phonology of Chinese characters. There is limited evidence of Stroop effects with pinyin and pinyin has the potential for measuring phonological processing in a more direct way. The results revealed Stroop interference effects with Chinese characters and pinyin stimuli, whereas Stroop facilitation effects only occurred in pinyin. Further analyses revealed that semantic conflicts occurred only with characters, whereas semantic facilitation and task conflicts were found only with pinyin stimuli. These findings suggested that 1) pinyin can activate the meaning of Chinese characters through the phonology, 2) semantic facilitation found in both pinyin and French (e.g. Augustinova et al.’s) indicates a link between alphabetic writing systems, 3) Stroop effects can be decomposed into distinct components. Besides response, semantic, and task components, we also find phonological components using Chinese characters and pinyin.


Judging the proportion of a facial expression in a set of faces.

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Although observers can rapidly extract an average facial expression from multiple faces (Haberman and Whitney, 2009), it remains unknown whether they can also judge the proportion of faces showing the same expression. We studied this question in three experiments. Participants saw a set of 28 faces in each trial. Each face had either a neutral or angry expression. The proportion of the two expressions was manipulated. Participants judged the percentage of faces showing the angry or neutral expression. The set of 28 faces was presented for 500 ms in Experiment 1 but shortened to 200 ms in Experiment 2. While Experiments 1 and 2 were conducted online, Experiment 3 was designed to replicate the findings in a laboratory setting. All experiments showed a linearly increased judgement when the real proportion level increased. However, the reported percentage range was consistently narrower than the actual range and the range was further reduced with the short duration. The data suggest that although the difference between percentages of a facial expression can be judged fairly well, the actual size of the difference is typically underestimated or compressed, particularly when the face set exposure time is brief.

Exploring the effects of advisor updating strategies and environmental stability on learning and performance trust.

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It's now received wisdom that humans are averse to epistemic change and that our beliefs are remarkably immovable, even in the face of disconfirming evidence. One possible reason could be the perceptions of updating strategies and belief change in others.

In this study, we aimed to examine this effect. In a fishing game, we introduce an “expert player” that advises participants on the best lake to fish from. In every round, participants are called to make a choice between two lakes and get feedback from both. There are three possible advisors: Bayesian, Volatile (under-weighs priors) and Rigid (over-weighs priors), who also learn from both lakes and update their advice accordingly. Environment is also manipulated; in one condition the distribution of fish in the lakes remains stable, and in another, there is a switch halfway through. Qualitative preliminary findings from a pilot experiment (N=98) show that the majority of participants were able to detect the advisor's updating strategy. However, we found no significant main effect of advisor strategy on advice-taking, trustworthiness, or competence ratings, in either environment condition. These results point to a need for further investigation to understand the factors that influence how individuals perceive and respond to belief-updating strategies.

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 the role of experience in its ontogeny is still debated. I will present the results of two studies that test the hypothesis that sensorimotor experience is critical in the development of facial mimicry. The first study showed a relationship between mothers' tendency to imitate their 4-month-olds' facial expressions during a parent-child interaction session and the infants' tendency to mimic others as measured by electromyography. In the second preregistered study we are systematically manipulating infants' experience with their own facial actions by giving 4-month-olds two weeks of daily sensorimotor experience with their own facial actions via a toy mirror, while infants in the control condition play with the same toy without the mirror. Before and after this intervention, we measure infants' facial mimicry using electromyography while they observe videos of other infants' facial actions. Data collection for this study is currently ongoing but will be finalised by the time of the conference. Together these studies provide insight into the role of correlated sensorimotor experience in the development of facial mimicry.
The relationship between interoceptive abilities and interpersonal synchrony in ADHD.

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Difficulties in social functioning and social reciprocity are common characteristics of attention deficit hyperactivity disorder (ADHD). These challenges in back-and-forth interaction may be associated with atypical motor coordination and interpersonal synchrony. Individuals with ADHD also experience impaired interoceptive awareness and research examining the link between bodily sensations, emotions, and behaviours in ADHD may help better understand the condition. This, in turn, could inform new treatment approaches. Despite that, the relationship between interoceptive abilities and interpersonal synchrony is understudied. Thirty adults with ADHD and 57 Healthy Controls (HC) aged 16-35 years participated in the study. The data acquisition methods ranged from screening tools and scales in common comorbidities to psychophysiological measurements during computerised tasks and motion tracking during face-to-face conversations. Besides participants' demographics and other conditions, interoceptive abilities and social synchrony were analysed. The results demonstrated a positive correlation between interoceptive and synchronising abilities. The ADHD group displayed lower performance in interoceptive tasks and less motor synchrony in one-on-one conversations than the control group. The current research provided evidence for the physiological basis of social processes in ADHD and its contribution to future interventions.

The impact of autism diagnosis disclosure on perceptions of candidates in employment interviews.

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Employment interviews can be challenging for autistic people due to recall difficulties exacerbated by standard questioning, and also due to behavioural features of autism (e.g., atypical emotional expression, eye-contact, and gestures), which can lead to negative first impressions. Prior experimental research using vignettes and ‘thin slices’ of communication indicate that perceptions of autistic people can be improved when their diagnosis is disclosed prior to observation/interaction. However, no studies have examined this after an entire interaction. In the current study, we investigated the impact of autism diagnosis disclosure on perceptions of candidates undergoing an entire mock employment interview. A total of 119 rater-participants watched a video of one interview, after which they provided overall impressions of the candidate on factors such as confidence, motivation, and knowledgeability. Raters were either (i) unaware of the interviewee's autism diagnosis, (ii) aware of their diagnosis, or (iii) aware of their diagnosis and provided with additional information about autism. Results indicate that diagnostic disclosure improved perceptions across all dimensions compared to no disclosure. Receiving additional information about autism did not further improve ratings. The findings have important implications for employers and autistic people, who should consider the impact of diagnostic disclosure prior to interview.
21st Mid-Career Prize Lecture

Plasticity in language processing, 24/7.

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Throughout our lives as language users we need to adapt to new linguistic circumstances and refine our accumulated knowledge. In this talk I will discuss the properties of the system that allows this plasticity, as I see it. Key components of this system support the rapid episodic encoding of new linguistic material, plus a more stable long-term repository of language knowledge. Sleep provides one means by which dialogue between these components can update more crystallised knowledge. This framework applies most obviously to situations where we have something novel to learn, such as an unfamiliar word, and I will discuss evidence that daytime encoding and night-time consolidation operate to allow this new learning to occur. However, even when linguistic materials are fully familiar there is learning to be done, in terms of updating our semantic knowledge associated with words and keeping track of conversations and texts. Therefore, I will also address the extent to which the same encoding/consolidation system can operate 24/7 to support plasticity and learning in these domains.
Investigating a metrical Hebb effect for lists of words.

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The Hebb Effect comprises the gradual improvement in the recall of a list of items that is repeatedly presented among multiple serial-recall trials. The repeating list, often referred to as a Hebb-list, contains the same items in the same position upon each presentation. Repetitions of the Hebb-list are usually interleaved among a larger set of lists containing no further list repetition, sometimes called filler lists. The gradual improvement in performance on the Hebb-list is thought to reflect the transfer of sequence information from short-term to long-term memory. The understanding of how order is represented is of significant importance to many aspects of everyday memory. The Hebb Effect has been observed in multiple domains, including verbal, visual, olfactory, and kinetic. Here we show a novel manifestation of the effect, that focuses on the metrical properties of verbal stimuli. We show evidence for a metrical Hebb effect and examine the character of that effect over four short experiments. To our knowledge, this is the first description of a Hebb Effect, or a Hebb-like Effect, for lists of words wherein the words themselves vary across presentations of the Hebb-list but where underlying list-level patterns are held constant across “repetitions”.

Breathing and Memory: Investigating the boundaries of nasal respiration’s influence on memory consolidation.

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Recent research has shown how breathing can influence brain activity and cognitive processing. One such finding is nasal breathing enhancing memory consolidation of odours compared with oral breathing (Arshamian et al., 2018). It remains unclear whether this effect is specific to olfactory stimuli or generalises to other modalities. Two experiments were conducted to assess generalisability, with Experiment 1 using nouns to test consolidation of declarative memory and Experiment 2 using facial stimuli to test perceptual memory, both using a recognition memory task. After encoding, participants quietly rested for an hour while breathing through their nose or mouth, using a nose clip or mouth tape direct airflow. Our results thus far suggest that nasal breathing's effect on memory consolidation is specific to olfactory stimuli, and do not generalize to other memory systems. Additionally, we will discuss a Stage 1 pre-registered report further testing the generalisation of the nasal consolidation effect on declarative memory. Here we use a waking-rest paradigm to compare the effect of breathing pathway on the waking rest effect, aiming to see if oral respiration disrupts the waking rest advantage similarly to an active task.
Negative faces impair memory for contextual information.

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Evidence suggests that negative valence impairs binding between core content and context in episodic memory, while the memory for negative core content itself is enhanced (Bisby et al., 2018; Madan et al., 2017). Previous work defined core content as centrally placed words, faces or images and context as paired background images. The current study uses centrally placed face stimuli and probes more subtle visual-spatial processing of backgrounds as the contextual background photos participants chose between are of the same place photographed from different perspectives. In addition to behavioural measures of recognition, we used eye tracking to see if eye movements explain performance disparity under different valences. Forty-nine participants completed encoding and recognition trials while a web camera tracked eye movements. In encoding, participants viewed scenes of positive/neutral/negative faces superimposed on neutral backgrounds. In recognition trials, they were asked whether they had seen the faces. If they did, they chose the perspective of the associated background.

Participants' memory of faces did not vary by valence. However, participants' memory of backgrounds linked to negative faces was significantly worse than memory of backgrounds related to neutral faces. However, participants' eye-movement to background images was significantly higher for scenes paired with negative central content.

Holistic reinstatement of episodic events following a one-day delay.

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Episodic memory retrieval is associated with the holistic reinstatement of event elements in the neocortex, including those incidental to the retrieval task. This reinstatement is supported by the hippocampus, which engages in a process of pattern completion during episodic memory retrieval. In this study, we assessed whether episodic representations continue to be retrieved holistically over time, and if retrieval continues to be supported by the hippocampus. Participants learnt complex 'events' from multiple overlapping pairs of event elements (e.g., person-object, object-location, location-person). Importantly, encoding was completed immediately prior to, or 24-hours before, memory retrieval. During memory retrieval, all pairwise associations were tested. Using fMRI, we found evidence of neocortical reinstatement of events encoded 24-hours before memory retrieval, suggesting that event representations continue to be retrieved in a holistic manner after a delay. Further, the amount of neocortical statement correlated with hippocampal activity following a delay, suggesting that the hippocampus is still driving the holistic retrieval of events following a 24-hour delay (and a night of sleep). Our results provide evidence that complex events continue to be retrieved in a holistic manner following a delay, involving hippocampal pattern completion and neocortical reinstatement of all event elements.
Neural mechanisms of memory suppression are critically dependent on sleep.

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Intrusive memories occur when everyday events trigger the retrieval of aversive experiences. In previous work, we showed that the ability to suppress intrusive memories when confronted with reminders is impaired by sleep deprivation. Memory suppression is orchestrated by right dorsolateral prefrontal cortex (rDLPFC), which, via top-down inhibitory pathways, downregulates memory retrieval operations in hippocampus. In the current study, we tested the hypothesis that sleep deprivation impairs this memory suppression network. Participants learned face-scene associations before a night of sleep or sleep deprivation. The next morning, participants were presented with face cues while undergoing fMRI and were instructed to retrieve or suppress the corresponding scenes. Sleep deprivation (vs sleep) led to weaker engagement of rDLPFC during memory suppression, but stronger engagement of hippocampus, suggesting that rDLPFC was unable to downregulate hippocampal retrieval operations following an absence of sleep. In the sleep condition, rDLPFC engagement during memory suppression was predicted by the amount of rapid eye movement (REM) sleep obtained in the preceding night. Our findings suggest that an impairment of top-down inhibitory memory control by rDLPFC is a mechanism by which sleep deprivation gives rise to intrusive memories, and that REM sleep might underpin the overnight restoration of memory suppression networks.

Using virtual reality to understand the anxiogenic impact of sleep deprivation.

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Although research shows that sleep deprivation amplifies anxiety, we know little about how it affects reactivity and recovery over the course of a threatening experience. In the current study, we combined virtual reality (VR) and psychophysiology to test the hypothesis that sleep deprivation not only amplifies anxiety responses to ambiguous threats but impairs recovery from anxiety after the threat has dissipated. Following a night of sleep or total sleep deprivation, N=54 adults entered an immersive VR world that cycled between periods of ambiguous threat and safety, during which their skin conductance level (SCL) was monitored. Participants then watched a replay of their VR experience and retrospectively rated how they felt at each moment. When examining the ambiguously threatening parts of the VR world, we found that SCL remained elevated in the sleep deprivation group and dissipated in the sleep group. For the recovery of anxiety in the safe periods of the VR world, subjective ratings of arousal were lower in the sleep group compared to the sleep deprivation group. These findings suggest that firstly, physiological responses to ambiguous threats remain elevated after a night of sleep deprivation and secondly, sleep is pivotal in promoting subjective recovery from a threatening experience.
Are semantic ambiguity effects modulated by task? Insights from lexical decision and semantic categorization in Arabic.

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Unlike English, Arabic words sharing a root (e.g., ‘ktb’) prime each other in covert and overt tasks even if their semantic relationship is opaque (e.g., [kati:bah]-[maktab] squadron-office). This cross-linguistic difference may be useful to understand semantic ambiguity effects. Accordingly, we conducted five experiments to ask (a) whether the oft-reported ambiguity advantage for polysemic words with multiple related senses and the disadvantage for homonymic words with multiple unrelated meanings can be observed in Arabic, and (b) whether these effects will vary across tasks. The results show that with easy non-words there is an ambiguity advantage for both polysemic and homonymic words along with a relatedness of meaning effect (exp. 1). In contrast, when the non-words were difficult (exp. 2 and 3), there was an ambiguity advantage for polysemes, but an ambiguity disadvantage for homonyms. Experiment 4 used a small semantic category (food) and showed an ambiguity advantage for polysemes, while Experiment 5 used a large category (living thing) and found an ambiguity advantage for polysemes coupled with a disadvantage for homonyms. These results suggest that a semantic ambiguity advantage can co-exist with a relatedness of meaning effect in lexical decision and that, for Arabic, semantic ambiguity effects are comparable across tasks.

Diversity of narrative context disrupts the early stages of learning novel word meanings.

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High quality lexical representations develop through repeated exposures to words in different contexts. Evidence suggests that highly familiar words are processed more quickly if they tend to occur in diverse contexts, but the impact of diversity on learning new words is less clear. In two preregistered experiments we investigated how diversity of narrative context affects the earliest stages of word learning via reading across one day (Experiment 1) and three days (Experiment 2). Adult participants learned invented meanings for eight pseudowords, which each occurred in written paragraphs either within a single coherent narrative context or multiple different narrative contexts. The words’ semantic features were controlled across conditions to avoid influences from polysemy (lexical ambiguity). Post-tests included graded measures of word-form recall (spelling accuracy) and recognition (multiple-choice), and word-meaning recall (number of semantic features). Diversity of narrative context did not affect word-form learning, but more semantic features were correctly recalled for words trained in a single context across both one day (Experiment 1) and three days (Experiment 2). These findings indicate that learning the meanings of novel words is initially boosted by anchoring them to a single coherent narrative discourse early in the time course of word learning.
The effect of inconsistency on lexical quality development during self-teaching.

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High lexical quality is characterised by well-specified representations of written form (orthography; O), oral form (phonology; P), and meaning (semantics; S) of words, as well as robust bindings between them (O-P, O-S, P-S) within each word. In English, many words contain letters that do not follow common letter-sound mappings (O-P inconsistency). For example, “break” contains “ea”, whose pronunciation (/eɪ/) is inconsistent with the common pronunciation (/iː/ as in “leak”). The self-teaching hypothesis (Share, 1995) predicts that inconsistency will hinder self-teaching of O, O-P, and O-S. The spelling pronunciation account (Elbro & de Jong, 2017) predicts that inconsistency will undermine P. However, according to the episodic context account of retrieval-based learning (Karpicke et al., 2014), inconsistency might benefit S and S-P. This study tested these predictions and assessed how inconsistency affects lexical quality during self-teaching. Eighty adults learned P and S for eight pseudo-words and then read sentences presenting their O. Half the items were consistent (“zeak” pronounced /ziːk/) and half inconsistent (“zeak” pronounced /zeɪk/), counterbalanced across participants. Post-tests indicated that inconsistency had negative effects on O, P, O-P, and O-S learning. Exploratory analyses provide preliminary evidence for beneficial effects of inconsistency on S and S-P learning.

Far from the threatening crowd: Generalisation of conditioned threat expectancy and fear in lockdown.

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Fear conditioning and generalisation are widely used trans-diagnostic paradigms for investigating pathogenic markers of fear in anxiety and stressor-related disorders. Once learned, fear readily spreads or generalises, and thus increases the range of potential threats in the environment. Our previous work successfully conducted fear conditioning and generalisation online with large samples. The current study investigated fear generalisation with a novel online task using COVID-19 relevant stimuli and implemented during pandemic lockdown restrictions in the United Kingdom. Participants (N = 50) first completed clinically relevant trait measures before commencing a habituation phase, where two CSs (i.e., a busy or quiet high street/mall scene) were presented. Participants then underwent fear conditioning where one conditional stimulus (CS+) was followed by an aversive unconditional stimulus (US) and another (CS-) was not. In a test phase, generalisation stimuli were presented and the US was withheld. Fear generalisation was observed for both threat expectancy and fear ratings. In conclusion, for the first time, a generalisation gradient was evident using an online remote-administered generalisation task during COVID-19 lockdown restrictions.
The effects of pregnancy bodily experience on mother-infant outcomes.

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Antenatal attachment (AA) is linked to positive outcomes, including healthier pregnancy behaviours, stronger postnatal attachment, and reduced depression risk. Our bodily experience, including appearance satisfaction and interpretation of internal signals (interoceptive sensibility), connects with AA. Mixed literature results suggest complex relationships, requiring broader investigation. We aim to examine the effects of pregnancy bodily experience (body satisfaction and interoceptive sensibility) on multiple mother-infant outcomes, including AA. It is hypothesised that poor body satisfaction and interoceptive sensibility during pregnancy will have negative impacts on these outcomes. Data from a larger longitudinal study of 253 pregnant mothers (mean age=32) were analysed. Measurements included body satisfaction, interoceptive sensibility, AA, mood, and attitudes on parental ambivalence and touch. Linear regressions and network analysis explored the importance of the bodily experience during pregnancy. Low body satisfaction predicted higher anxiety, depression, interoceptive sensibility, and AA. Network analysis revealed relationships between body satisfaction during pregnancy and mother-infant outcomes, including depression and AA. Our results highlight the importance of the interplay between internal and external bodily cues for maternal wellbeing and AA. Understanding the impact of the pregnancy bodily experience can help identify at-risk individuals and inform interventions.

Accents’ Party: Exploring the formation of accents’ representations.

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Due to the different factors that shape a non-native accent, non-native speakers are easy to recognize. Moreover, listeners can even identify the native language of a non-native speaker, which might suggest the existence of a specific representation for that specific accent. In this study, we explored whether features unrelated to accents, such as the speakers' gender, influence the formation of accent representations. In an online experiment, we used a training-then-test paradigm that exposed 90 listeners to different accents and then tested the influence of accent familiarity, speaker familiarity and gender of speakers on the recognition of accents and speakers. During training, the proportion of male and female speakers in each trained accent was manipulated. During the test phase, accent and speaker recognition was tested by combining old and new accents/speakers in speaker and accent recognition tasks. Our results indicate that, after short exposure, listeners can build an accent category that affects both, accent and speaker recognition. However, the prominence of male and female voices also influenced listeners’ performance in both tasks, suggesting that accent representations can incorporate non-related accent features that are prominent among the speakers of each accent group.
Schizotypy dimensions do not predict overshadowing in a causal judgment task.

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When two cues are presented together and reliably predict an outcome (AB-O1) an “overshadowing” effect is typically observed. That is, the relationship between these cues and the outcome is learned about less well than a cue presented on its own with an outcome (e.g., C - O1). The current study sought to explore the relationship between the positive and negative dimensions of schizotypy and the overshadowing effect. A total of 256 participants completed a causal judgement task (i.e., the Food allergist paradigm) and the Short Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE), which measured the different dimensions of schizotypy (i.e., Cognitive Disorganisation, Introvertive Anhedonia, Impulsivity Non-conformity and Unusual Experiences). A unilateral overshadowing effect was observed (whereby only one cue was overshadowed by the other), however, none of the dimensions of schizotypy were associated with this effect. These results are the first to demonstrate this finding using an appropriately powered sample and reveal that a tendency to experience symptoms of schizophrenia does not impact upon the overshadowing effect. These results raise questions about the strength of the relationship between schizotypy and cue-competition effects.

A webcam-based eye tracking experiment on usability of responsible gambling information on gambling operators' websites.

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Risks of online gambling have drawn growing attention from researchers and practitioners, and there is an increasing need for innovative research methods and evidence-based prevention approaches. In this experiment, we used webcam-based eye tracking to investigate how responsible gambling (RG) information on gambling operators' websites are perceived by users. This study differs from previous research which was either restricted to a laboratory setting or traditional self-reported approaches that may be unintentionally inaccurate. 31 adult participants browsed 6 gambling websites on RealEye platform with full-screen display in a randomised order, each for 5 minutes, with a task to search for all RG information. 61.83% of eye-tracking data were analysed after low-quality data were cleaned (i.e. sampling rate < 10Hz and fixations could not be computed). Areas of Interest (AOIs) were categorised based on RG formats (i.e., banners, icons, text links, and text without link). The results of eye-tracking data analysis revealed differed usability amongst different formats of RG information on gambling webpages. This work also demonstrates the feasibility along with limitations disclosed for using in-built webcams for conducting eye tracking experiments on online behaviours on a larger scale with higher ecological validity than has previously been the case.
Exploring the impact of safer gambling promotion on social media: An experimental study.

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The current study assessed the effectiveness of delivering safer gambling messaging to regular gamblers on social media. It also assessed whether the content of the message impacted message effectiveness. A 3x2 mixed factorial design was employed, with 281 participants randomly assigned to follow one of three Twitter accounts. The accounts either sent out informational messages, self-appraisal messages or emotional self-efficacy messages. Participants reported gambling behaviour from the two weeks prior to following the accounts, in addition to during the two-week intervention period, using information from their online gambling accounts. Participants reported readiness to change gambling behaviour pre and post the two-week intervention period. A significant main effect of intervention stage highlighted reductions in gambling behaviour and increased readiness to change behaviour. However, there was no significant main effect of condition and no significant interaction between intervention stage and condition upon gambling behaviour or readiness to change. The findings suggest receiving safer gambling messages on social media may lead to a reduction in gambling behaviour. However, similar reductions in behaviour were observed in the experimental and control conditions. Further research is needed to clarify whether changes in behaviour observed in the current study would extend over a longer period of time.

Extinction of causal learning is not regulated by a common error term.

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Elemental models of associative learning typically employ a common prediction-error term. Following a conditioning trial, they predict that the change in the strength of an association between a cue and an outcome is dependent upon how well the outcome was predicted. When multiple cues are present, they each contribute to that prediction. The same rule applies both to increases in associative strength during excitatory conditioning and the loss of associative strength during extinction. In five experiments using the allergy prediction task, we tested the involvement of a common error term in the extinction of causal learning. Two target cues were each paired with an outcome prior to undergoing extinction in compound either with a second excitatory cue or a cue that had previously undergone extinction in isolation. At test, there was no difference in the causal ratings of the two target cues. Manipulations designed to bias participants towards elemental processing of cue compounds, to promote the acquisition of inhibitory associations, or to reduce generalization decrement between training and test were each without effect. These results are not consistent with common error term models of associative learning but might be explained, in part, by context-specific or state-based models of learning.
Individual word representations dissociate from linguistic context along a cortical unimodal to heteromodal gradient.

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When we read, the sensory input is transformed into increasingly abstract representations that are integrated with the linguistic context. Recent proposals suggest that the underlying sensory and memory-dependent processes are structured along a cortical gradient from unimodal to heteromodal brain regions. We investigated the gradient's role in sentence reading, using open fMRI and MEG recordings (N=102). We found that the gradient is recruited differentially for the processing of individual word representations (visual, orthographic, and lexical) in contrast to properties reflecting a word's relation to its linguistic context (semantic similarity and position within the sentence): Word representations mainly involved the unimodal end, while contextual representations predominated at the heteromodal end. Although word representations showed opposite effect directions in fMRI and MEG, their association with the unimodal end of the gradient was consistent across both neuroimaging modalities. MEG revealed that the distinction along the gradient persisted through time, suggesting parallel processing across word representation levels and context. Our findings indicate the gradient captures the neural organization of language by providing a gradual dissociation between word vs. contextual representations. Furthermore, the gradient reveals convergent patterns across neuroimaging modalities (similar location along the gradient) in the presence of divergent responses (opposite effect directions).

Neural correlates of CO2-induced anxiety.

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The CO2 challenge is an experimental model of anxiety, which involves inhaling elevated CO2 levels (5-9%) to induce mild, transient anxiety. While the subjective and cognitive effects are well-documented, research on its neural basis remains limited. This study elucidates the neural correlates of CO2-induced anxiety using resting-state fMRI, assessing functional connectivity (FC) changes during 6% CO2 administration. Participants underwent a 3-minute CO2 tolerance test for eligibility before completing an MRI protocol, which included a high-resolution structural scan (MPRAGE) and blinded exposure to medical air and a 6% CO2 mixture during resting-state fMRI scans. Physiological measures and subjective anxiety ratings were collected throughout the session. ROI-ROI and seed-to-voxel analyses revealed altered FC in limbic structures (amygdala, hippocampus, and insula) traditionally associated with anxiety and interoceptive processing.
The study demonstrates that CO2 manipulation can be safely and effectively applied in MRI scanners as an experimental anxiety model. It investigates the relationship between physiological, subjective, and neurological effects of CO2-induced anxiety, advancing our understanding of acute and pathological anxiety mechanisms. These findings support the CO2 model as a valuable research tool with potential implications for future research on anxiety disorders and treatment development.
Age of Acquisition (AoA) affects free recall in Turkish monolinguals and Turkish (L1)-English (L2) bilinguals.

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Monolingual oral reading and free recall in Turkish have been reported to be influenced by lexical and sublexical variables such as AoA (Raman, 2006 and Raman et al, 2018) and letter length (Kokten and Raman, 2007) respectively. The present study extends Raman et al (2018) study to in order to explore if and how AoA affects bilingual Turkish (L1) - English (L2) memory in a free recall task. In a mixed 2 (AoA: Early, Late) × 2 (Stimulus type: picture, word) × 2 (Language statues type: monolinguals, bilinguals) factorial design participants were allocated to either picture or word condition. In line with experimental predictions, both monolingual Turkish and bilingual Turkish (L1) - English (L2) data show a robust main effect for AoA in free recall irrespective of stimulus type for words and for pictures and no significant interactions. Overall, early acquired words and pictures had an advantage over late acquired items. These findings are contrary to what has been reported in the literature for monolingual English speakers but in line with the report for bilingual Russian (L1) - English (L2) soeakers (Volkovyskaya et al, 2017). Implications are discussed within the AoA and bilingual frameworks.

L1 writing system influence on consonant doubling in L2 speakers of English.

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English has probabilistic spelling norms rather than strict rules to determine consonant doubling (e.g., [f] versus [ff]). In our study, we asked how consistently L1 Spanish speakers (n = 47)-same writing system as English-applied graphotactic and phonotactic probabilistic norms to inform their spelling of new English items compared to L1 Mandarin and Korean speakers (n = 85)-different writing system from English. Participants had started learning English in primary school and had at least a B2 level. In an online experiment, participants listened to each pseudoword twice and had to spell it out. We counted the proportion of items that were spelled with a doubled medial consonant. The uncertain nature of probabilistic norms allows us to observe the influence of the L1 orthography and determine whether frequency-of-use based norms are shared between the languages of a bilingual. These data tested the effects of vowel length and number of vowel graphemes on consonant doubling in L2 English speakers. We found that although overall patterns were the same between groups, the participants with a different L1 orthography adhered more closely to the L1 English speakers, particularly with respect to vowel length, suggesting an influence of the shared writing systems.
When function words carry content.

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Most studies in eye movements during reading examine content words (CW), such as verbs and nouns. Those few studies that have analysed function words (FW), such as articles and prepositions, have reported that they are skipped more often and receive fewer and shorter fixations than CW. In the present study, we analysed data from the RASTROS corpus (Vieira, 2020) of natural reading in Brazilian Portuguese (BP), a language in which - contrary to English - CW and FW can carry semantic information such as gender and number marking (e.g. aquele/es/a/as, meaning “that one” or “those”). Differences observed between word classes were mostly limited to skipping rates of short words, whereby short FW were skipped more often than CW. Differences in fixation times were very limited and could be a consequence of the differences in skipping. We therefore suggest that since FW are more semantically rich in BP, they behave more similar to CW.


The time-course of word meaning priming and semantic priming.

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Many words have multiple meanings. Word-meaning priming studies show that encountering the subordinate meaning of an ambiguous word can enhance its availability. Rodd et al. (2013; Experiment 3) reported that word-meaning priming lasts longer than semantic priming. This suggests that word-meaning priming is driven by changes to the representation of the ambiguous word itself, rather than a gist-based representation of the sentence. We conducted a well-powered, preregistered (N=180) replication of this experiment. Participants heard prime sentences that disambiguated ambiguous words towards their subordinate meaning (e.g., “The ruler of the country was very popular”). These word-meaning primes were compared to a semantic-priming condition in which synonyms replaced ambiguous words (e.g., “leader”), and an unprimed baseline. A word association task tested whether priming boosted the availability of the primed meaning of the ambiguous words after short (3-minute) or long (20-minute) delays. The proportion of responses that were consistent with the primed meaning was significantly larger in the word-meaning priming condition (M=0.28) compared with the semantic-priming (M=0.23) and unprimed conditions (M=0.21). Semantic and unprimed conditions did not differ, and there was no effect of delay. This confirms accounts suggesting that word meaning-priming reflects a change to the representation of the specific ambiguous word.
Phrasal frequency and literacy as predictors of on-line processing and comprehension of English subject-verb agreement.

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This paper provides experimental evidence that phrase frequency and literacy impact on-line processing and comprehension of subject-verb agreement (SVA) in adult native English speakers. Using an audio-visual eye-tracking paradigm, we measured participants’ eye movement behaviour, reaction times, and accuracy in a forced-choice task. Participants completed literacy and print access assessments (Acheson et al., 2008; Marschark et al., 2011; Tarone et al., 2013), and performed an Agreement Judgment Task (AJT, designed by co-authors). The AJT involved matching auditory subject phrases with images on a screen. Two types of SVA constructions were used: Type 1, where the ’intervening’ local noun and verb match in number, and Type 2, where they do not. These types of SVA construction are more frequent in writing (Miller et al. 1998), with Type 2 producing more attraction errors (Bock et al. 2001; Dabrowska & Becker 2020).

Lower literacy participants showed slower cue processing and more attraction errors. These findings support previous research on frequency and experience effects in comprehension (Street, 2017) and highlight the interplay between linguistic and attentional processes (Tomlin & Myachykov, 2015). Additionally, the data contributes to corpus-based studies, showing that native speakers are sensitive to observed distributions during online processing (Miller et al., 1998).

Street, J. 2017. This is the native speaker that the non-native speaker outperformed: Individual, education-related differences in the processing and interpretation of Object Relative Clauses by native and non-native speakers of English. Language Sciences 59. 192-203.
Elucidating mechanisms of language growth in minimally verbal autistic individuals.

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Approximately 25% of autistic individuals remain ‘minimally verbal’, developing only limited expressive oral language skills (1). Longitudinal language research for this group is limited in sample size, duration, and age range, often excluding those with co-occurring conditions (2). The role of speech-motor planning difficulties (apraxia) is of interest due to emerging evidence that early speech production skills relate to later expressive language in autism (3,4), over and above socio-cognitive differences. Hypothesis: initial speech-motor abilities will predict later expressive language over and above socio-cognitive skills in a minimally verbal cohort. The proposed study will recruit a large, diverse cohort of 150 minimally verbal children aged 4-12yrs, combining innovative parent-mediated remote data gathering with traditional in-person child assessments and parent report measures, at four time points spread over three years. Families will be invited to join the research project via schools, independent practitioners, social media and charities. There will be no exclusion criteria to reflect the true diversity of co-occurring conditions in this population. The sample size will permit adequately powered linear mixed effects models to examine relationships between initial predictors and language trajectories. Apraxia features will also be derived from video recordings to establish their prevalence and stability in this cohort.


Research Study - Grammar learning in adults: A role for offline consolidation and prior knowledge.

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Sleep-related consolidation processes have been shown to play an important role in new word learning (Dumay & Gaskell, 2007). However, the contribution of offline consolidation to grammar learning is less clear, suggesting that it may influence grammar learning differently to word learning (Mirkovic & Gaskell, 2016). Moreover, the consolidation rate of new linguistic knowledge is likely also influenced by its dependence on prior knowledge (McClelland, 2013). We examined the contributions of sleep and wake-related consolidation to learning novel grammatical mappings that are more or less dependent on prior linguistic knowledge. Sixty participants were trained and tested online on a novel language, consisting of novel two-word phrases (e.g., tib viffeem) referring to a familiar picture (e.g., waitress). Systematic phonological properties of the novel words (tib, eem) provided a cue to grammatical categories, and were either related or unrelated to existing knowledge. Participants were trained either in the evening (sleep-first) or the morning (wake-first) and tested on their recall of the mappings immediately, after a 12-hour interval including sleep or wake, and 1 week later. Both the sleep-first and wake-first groups showed a significant reduction in their recall of the prior knowledge dependent and independent mappings after a 12-hour consolidation interval. Data analysis is ongoing. Results will be discussed in the poster.

Sleep components involved in the consolidation of new vocabulary and morphological regularities.

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The current study assessed the involvement of sleep in overnight consolidation and long term retention of novel vocabulary and plural inflections, based on implicit morpho-phonological regularities. We tested the association of vocabulary and regularity learning with fast sleep spindles in stage 2 sleep (N2), previously shown to be associated with overnight consolidation. Participants learned 36 novel names for familiar objects and novel plural inflections, which followed a morpho-phonological regularity. Words were presented either frequently or infrequently during training. Participants were trained in the evening; testing occurred: immediately after training, the morning after, 36 hours and one-week post-training. Preliminary results (N=29) demonstrated that memory for novel infrequently-presented words improved over the night after training, and declined to the post-training level across the week. Fast spindle activity during N2 explained both the overnight change and the change in the following week. For suffix learning, we found a significant improvement for the infrequent words over the second day following training, which was not explained by the spindle activity. Our results suggest that learning of vocabulary and linguistic regularity differ in terms of both temporal dynamics and involvement of sleep, and that these differences are reflected in the pattern of associations with N2 spindles.

Selective auditory attention in native and non-native listening.

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Energetic masking (EM) refers to spectrotemporal overlap between a to-be-attended (target) talker and competing talkers (maskers), which disrupts the target at the auditory periphery. Spatially separating target and masker reduces the amount of EM, making the target easier to understand. Although well-established for native listening (L1), this phenomenon is less well understood for non-native listening (L2). However, research suggests that L2 is impacted by EM more than is L1. To investigate this claim, 100 English-Spanish bilingual individuals completed a selective listening task: they heard simultaneous English and Spanish sentences, presented as collocated or dichotic (one
signal in each ear), and focused on one, ignoring the other. Results showed that: (i) sentence transcription accuracy was poorer when attending to L2 compared to L1; (ii) accuracy was poorer when sounds were collocated than dichotic; (iii) the L2 penalty was larger in the collocated than dichotic condition. The results confirm L2 listeners’ heightened sensitivity to EM, but they also show that this effect can be attenuated by spatial separation between the target and masker stimuli.

Neural representations of selected versus suppressed meanings: an MEG/EEG study of ambiguous words in spoken sentences.

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In spoken languages, multiple meanings can map onto a single surface form. For example, the English noun “bank” can refer to a sloped shoreline or a financial institution, and listeners typically recognize the appropriate meaning given sufficient context. Using MEG/EEG, we investigated two proposed computations underlying this function: sharpening computations, which enhance predictable information (i.e., corresponding to the selected meaning), and prediction error computations, which result in representations of surprising information (i.e., corresponding to the suppressed meaning). Participants (N=34) heard constraining sentences such as “While sailing down the river, she noticed the trees along the...”. Sentences ended in either a predictable ambiguous word (e.g., “bank”), a selected-meaning synonym (e.g., “shore”), or an alternative-meaning word consistent with the suppressed meaning (e.g., “cashpoint”). Evidence for sharpening will emerge as similarity (estimated via representational similarity analysis; RSA) between predictable words (“bank” and “shore”). Conversely, evidence for prediction error may emerge as similarity between ambiguous (“bank”) and alternative-meaning words (“cashpoint”), as these differ from the context in a qualitatively similar way (i.e., additionally mapping onto the meaning). We will present the results of analyses testing the timecourse of meaning representation and neural computation, in both evoked and induced responses, in MEG and EEG.

The time-course of semantic contributions to word learning in children.

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Contemporary models of memory consolidation and word learning posit that semantic information consistent with existing knowledge supports learning. However, it is less clear when semantic factors exert their contributions (i.e., at encoding or consolidation). We examined the timescale of semantic influence on learning novel word forms in 61 typically developing children using three training conditions: (i) real but rare animals (with illustrated picture referents) that are highly linkable to familiar animals, (ii) fictitious animals (also with pictures) with low linkage to familiar animals, and (iii) animal names that were associated with coloured pattern/symbol referents (i.e., with no semantic information about the animal). Knowledge of word forms and meanings was examined immediately after learning, and after 1-day and 1-week delays. Children’s word form recall improved significantly across sessions, potentially because of repeated testing and off-line consolidation.
Consistent with the Matthew Effect and previous findings, children with better receptive vocabulary showed better recall performance overall; they also benefited more from learning new animal names that were closely linked to existing knowledge. These results support models that argue for immediate benefits of semantics, but highlights the need for these models to incorporate developmental and individual differences that moderate this benefit.

**Contextual diversity, lexical processing, and word learning: A scoping review.**

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Theories suggest that experiencing words in multiple, contextually diverse environments enhances learning of word forms and meanings (Nation, 2017). Since 2006, many studies have investigated effects of contextual diversity on lexical processing and learning. We conducted a scoping review to map methodologies, findings, and identify knowledge gaps. Across the 101 papers that met the pre-registered inclusion criteria (164 experiments) diversity was inconsistently defined and operationalised, and a wide range of outcome measures were included. Experiments where diversity metrics were extracted from corpora (N=112) show that contextual diversity facilitates word-form processing regardless of operationalisation or task. However, diversity effects on word-meaning processing are mixed. In contrast, studies where diversity was experimentally induced during word learning (N=19) produced no clear pattern of results for form or meaning processing. Results are dependent on task, whether other variables are controlled (e.g., polysemy), and operationalisations of high vs. low diversity. The remaining studies identified in initial screen were either computational modelling papers (N = 19) or corpus validations (N = 14). We provide a detailed account of methodological factors that may underlie the inconsistencies in the literature, and highlight how diversity effects may be influenced by other variables in natural language.

**Word frequency effects are unstable during picture naming.**

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Frequency plays a key role in theories of lexical access. But which stages of lexical access are affected by word frequency? In an influential study, Jescheniak and Levelt (1994) found that frequency effects were stable across three repetitions during picture naming, which requires lemma access and phonological encoding, but not gender decision, which requires only lemma access. Based on these results, they concluded that word frequency is located at the phonological level. However, other studies have found that frequency affects other stages of production. To further investigate the locus of the frequency effect, we tested its stability in a three-session picture-naming experiment. Participants (N=40) were faster to name high-frequency than low-frequency pictures on their first presentation but not on their subsequent five presentations, suggesting repetition removed the frequency effect. Importantly, the effect was still absent when participants named these pictures more than two weeks later. This pattern contrasts with Jescheniak and Levelt, and extends these
findings by demonstrating that repetition leads to long-term reduction of the frequency effect. These findings suggest the frequency effect is unlikely to be solely located at the phonological level, and instead affects other stages of lexical access.

Flexible speech perception in response to multiple learning objectives.

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Perceptual learning and word learning are two processes that enable understanding of unfamiliar speech. Despite extensive research investigating these phenomena independently, relatively little is known about how they interact. To better understand listeners’ ability to implement both learning mechanisms, we designed an online study involving simultaneous perceptual and word learning. Participants (n=22) read pairs of sentence stems ending with the same highly predictable final word, which was initially omitted. A spoken presentation followed of either the predicted word or a pseudoword. Sentence contexts thus encouraged pseudoword meaning acquisition. Critically, half the speech stimuli were pronounced canonically, while the other half were pronounced in an artificial accent supporting perceptual learning. Follow-up word report results indicated adaptation to the trained accent and generalization of perceptual learning to previously unpresented words. Strong recognition memory for formerly accented items tested with canonical pronunciations suggested successful mapping from non-canonical surface forms to underlying word forms. Above chance pseudoword memory evidenced word learning. Listeners can effectively engage in both perceptual and word learning within a single set of trials; flexibly engaging different learning mechanisms to extract the most reasonable interpretation of speech input. Further studies will explore inter-talker generalization and the impact of sleep consolidation.

Hanging clothes in the refrigerator: Reversed bias in counterfactual semantic integration.

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Successful language comprehension requires the integration of comprehenders’ knowledge of the real world and the context. Studies have found that implausible information induces processing difficulty unless licensed by the context (e.g., Nieuwland & Berkum, 2006). However, it remains unclear how context and world knowledge interact in unconstraining counterfactual contexts, where both plausible and implausible information seem acceptable. To address this question, we conducted a self-paced reading experiment in which participants read word-by-word factual or counterfactual contexts (e.g., “Mary is telling her friends what she did/dreamt yesterday”) containing either plausible or implausible information (e.g., “she ... hung her clothes in the wardrobe/refrigerator ...”). We found longer reading times for implausible than plausible information in factual contexts. While this effect was detected in early counterfactual comprehension, it gradually diminished and ultimately reversed towards the end of the sentence. These findings suggest that comprehension in unconstraining counterfactual contexts is initially guided by world knowledge. However, context becomes increasingly important and finally overrides world knowledge during semantic integration.
at sentence-final positions. This study indicates potential extensions for language comprehension models (e.g., RI-Val Model, Cook & O’Brien, 2013), highlighting that information unrelated to both context and world knowledge may still be preferred in certain contexts.


Counterfactual imagination as a source of memory distortion: cognitive and brain mechanisms.

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Imagined events can be misremembered as experienced however, less is known regarding how counterfactual imagination can impair existing memories. We used EEG to investigate the neurocognitive processes involved when retrieving memories that are associated with a competing imagined event. Participants first performed actions with everyday objects. A week later, they were shown the objects and either imagined the action they had originally performed or imagined a counterfactual action. Subsequent tests showed that memory accuracy was reduced after counterfactual imagination when compared to a baseline condition that had not been imagined at all. Therefore, we found novel evidence that counterfactual imagination impairs memories beyond simple forgetting over time. We also analysed EEG activity recorded during the recall test, which revealed separate neural markers of memory reactivation versus executive control processes that were recruited to support recall of memories that were challenging to access. In a follow-up study we repeated the same design with only the counterfactual imagination condition, to identify neural markers associated with successful inhibition of an imagined counterfactual. The study shows that counterfactual imagination can distort existing autobiographical memories and provides an insight into the neurocognitive mechanisms that are recruited when people distinguish memories of imagined versus true actions.

Working memory prioritisation effects in tactile immediate serial recall.

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There is a growing body of evidence that higher value information can be prioritised in both visual and auditory working memory (Atkinson et al., 2021). The present study examines whether valuable items can be prioritised in the tactile domain. Employing an immediate serial recall procedure (ISR), participants reconstructed a 6-item tactile sequence by moving their fingers in the order of original
stimulation. At the start of each block, participants were either informed that one serial position was notionally worth 3 points when correctly recalled (prioritisation condition) or that all items were of equal value (control condition). In Experiment 1 (N=48), significant boosts in recall accuracy were demonstrated when the valuable position was serial positions 4 and 5 (prioritisation effects). Experiment 2 (N=24) demonstrated that the prioritisation effects remained under concurrent articulation, indicating that task performance cannot simply be explained by verbal recoding of the tactile information. Both experiments also showed significant recall costs to low value (non-prioritised) items within the sequence. Taken together these findings demonstrate that prioritisation effects occur in the tactile domain, and that finite attentional resources can be deliberately redistributed to specific items.


Accent-cued lexical effects in verbal short-term memory.

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It is well established that verbal short-term memory (vSTM) performance is strongly influenced by long-term linguistic knowledge, while the mechanisms of influence are debated. Long-term influences on vSTM have been demonstrated by effects related to the items tested in serial recall tasks, such that lists containing more familiar or meaningful forms are better recalled. Here, we consider a potential source of linguistic knowledge influence on vSTM not directly related to the lexical content of the items: the influence of speaker context. Specifically, whether lexical-semantic processes in vSTM are constrained by perceived accent and adaptation to pronunciation of the speaker -- as happens outside of that context. We tested if recall of mixed lists containing words pronounced in a familiar regional accent but not according to the prevailing speaker context (e.g., southern English speaker producing items like /kÊŠp/ instead of /kÊŒp/ for ‘cup’; northern English speaker vice versa) would -- due to impoverished lexical access -- lead to poorer recall relative to lexically matched lists where all items were pronounced in the speaker’s native accent, whether northern or southern. Across three experiments, this is what we robustly found; suggesting that pre-existing lexical-semantic representations alone insufficiently account for linguistic effects in vSTM.

Sustained effect of arousing cues on episodic memory retrieval in healthy young and old adults.

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Stimulus salience influences episodic memory retrieval by evoking a state of arousal. Evidence points towards a context-dependent effect of arousal on episodic memory, with arousing stimuli being retrieved more accurately and faster in young and old adults. Additionally, this retrieval
advantage appears to become more prominent over time, inducing a slower forgetting of arousing stimuli. However, whether arousing cues influence episodic memory retrieval of details encoded following arousal exposure is unclear. It is also unclear whether these effects are sustained throughout adulthood. We addressed these objectives using a novel experimental paradigm where fifty-three young (18-34 years) and fifty-eight old (60-76 years) adults were required to watch a video and judge a statement prompting an episodic-laboratory retrieval of the previously presented video. The results of linear mixed modelling supported the lasting capacity of arousal, indicating that arousing cues affect the retrieval of episodic details encoded even after arousal exposure and this phenomenon is likely to be sustained in healthy ageing. These findings contribute to the current debate on the role of emotional context in memory encoding and retrieval processes. The results of the study may contribute to clinical research, considering reduction in memory specificity to be a transdiagnostic process across disorders.

Sensorimotor learning in speech is modulated by interaction with another voice.

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When we speak, our sensorimotor system monitors the sound of our voice (speech auditory feedback) in order to detect and correct for speech errors. When real-time speech auditory feedback is experimentally modified, participants show unconscious adjustments to speech movements to compensate, known as speech motor adaptation. In a somewhat separate literature, it has been shown that interaction with another voice can change the way in which speakers produce speech sounds, such that they start to sound more similar to one another. This study investigated the effects of such ‘vocal convergence’ on speech motor adaptation. Participants heard their own speech feedback altered while synchronising the timing of their speech with another voice (synchronous speech). The acoustics of this other voice were manipulated in a between-subjects design, such that convergence to it either moved participants’ speech productions in the same direction as adaptation to the feedback perturbation (congruent group, n = 16), or in the opposite direction (incongruent group, n = 15). We found that when vocal convergence conflicts with adaptation, adaptation is significantly reduced compared to when it agrees with adaptation. Models of speech motor control thus require extension to incorporate this influence of other voices on sensorimotor control of speech.

Time-course of neural computations supporting perception and misperception of degraded speech.

Connor Doyle, Máté Aller and Matthew Davis
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Humans utilize prior expectations to comprehend speech, but sensory illusions occur if expectations mismatch with incoming information. Different theories explain these Bayesian computations: sharpening schemes in which neural representations are enhanced by supporting prior knowledge
and prediction error theories in which neural representations encode the difference between prior knowledge and sensory signals (Aitchison & Lengyel, 2017). A previous fMRI study showed representations of prediction error during perception of degraded speech (Blank et al., 2018). Our study aims to extend these findings using MEG to understand the time course of these computations during speech perception. Presentations of written words were used to manipulate prior knowledge while behavioural and neural (MEG/EEG) responses to noise-vocoded spoken words were recorded from 29 listeners. Written words (e.g. “kip”) and spoken words were combined into four conditions: match (spoken “kip”), total mismatch (“bath”), onset partial mismatch (“pip”) and offset partial mismatch (“kick”). We have replicated previous findings, demonstrating that partial mismatch trials can induce frequent misperceptions (P(same), onset mismatch = 0.468, offset = 0.254). In planned analyses, we will compare neural activity associated with correct and incorrect perception. The time course of these responses and multivariate analyses can distinguish between sharpening and prediction error theories.


Ear Goggles: Can preference for music influence ratings of attractiveness?

Nick Perham¹, Nathan Taylor¹, Amy Blades¹, Sidhra Arshid² and John Marsh²

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Misattribution of our levels of arousal is known to influence how attractive we perceive other people. We further explored this by manipulating alternative means of altering levels of arousal - music. In two experiments, male and female participants listened to liked music, disliked music, or silence, and then rated low, medium, and high attractive photographs of males and females faces for attractiveness whilst in quiet (Experiment 1) or rated those same photographs in the same presence of those sounds (Experiment 2). Both experiments revealed that high, medium, and low attractive faces were rated significantly different from each other in that order. Further, both experiments found that ratings of attractiveness were significantly lower for disliked music compared to quiet and liked music respectively. However, only in Experiment 1 were attractiveness ratings significantly greater for liked music compared to quiet (same trend in both experiments). No differences in the sex of participant were observed nor were there any interactions. In sum, findings suggest that being exposed to music that you dislike can decrease how attractive you find someone, and exposing someone to their preferred music before they judge how attractive you are, can make you seem more attractive.
Complex decision-making in threatening environments.

Aaron Laycock, Guy Schofield and Cade McCall
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Individuals living and working in hazardous settings (e.g., first responders, military personnel, etc.) must make complex decisions in the midst of threats. However, testing complex decision-making within threatening environments has proven difficult, given obvious safety and ethical concerns. Here we present a complex decision-making task embedded within a virtual world to allow for the direct manipulation of environmental threat. This task was developed around the functional elements of the Iowa Gambling Task (IGT), a behavioural paradigm that has been widely used to operationalise complex decision-making performance. Data gathered with our new task show comparable patterns to the IGT. Participants demonstrated the ability to discriminate between advantageous and disadvantageous choices, and this ability improved as trials progressed. As with the traditional IGT, the Outcome-Representation Learning Model provided an accurate means of modelling the behavioural data. These findings provide justification for future application of this paradigm to identify differences in learning, performance, and choice perseverance between threatening and non-threatening experimental conditions.


Gemma Lovett and Ala Yankouskaya
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People show fastidious biases towards information related to self-relevance, value-based reward, and emotional-nuance. For example, these factors have been shown to drive attention, facilitate behaviour, and modulate memory recall. We aim to address previous inconsistencies surrounding the relationship between these biases, and question if the magnitude and relationship of these biases are affected by the number of associations. We utilised two variants of an associative matching task, whereby participants had to learn associations between: identities/monetary rewards/emotions and geometric shapes (Experiment 1: Two associations, Experiment2: Three associations). In both experiments we found a prioritization effect for self-relevance, positive-emotion, and value-based reward. In Experiment 1 accuracy advantages were higher for Positive emotion- compared to Reward-bias and response time advantages were higher for Positive emotion- and Self-compared to Reward-bias, however no differences were found for advantages in Experiment 2. Correlation analyses indicated that in Experiment 1, there was a positive relationship between Self- and Positive emotion-bias and between Reward- and Positive emotion-bias and a negative relationship between Self- and Reward-bias. In Experiment 2 we found a positive relationship between Self- and Positive emotion-bias. Thus, the distinction between biases for Self-relevance, Value-based reward and Positive-emotion could be sensitive to the interaction between memory and attention.
The influence of emotional context on perceptual decision making investigated using a 3D game.

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Perceptual decision-making (PDM) and visual discrimination (VD) are crucial cognitive processes allowing individuals to categorise visual stimuli accurately. Previous research has demonstrated that colour and texture can influence how stimuli are processed, categorised, and perceived in the environment by evoking emotions that affect our behaviour. Also, the emotional valence and arousal of the background context play a crucial role in cognitive processes. Considering this interplay between stimuli and environment, we aimed to investigate how the combination of foreground stimuli and background stimuli influences response time and accuracy. This study examined how varying emotional contexts influence VD and PDM using interactive experimental paradigms with an Oculus headset. We recruited 60 participants to categorise the foreground stimuli based on their texture-colour combination. The background stimuli were manipulated regarding valence (low positive/high positive) and arousal (high/low). Reaction times were shorter, and accuracy was better for warm colours-simple textures in high arousal-high positive valence backgrounds. High positive valence background is associated with better performance compared to low ones. Our findings contribute to understanding how the interplay of colour, texture, and emotional valence in 360-degree videos influences PDM and VD. Findings have implications for designing and improving visual stimuli in virtual reality environments.

The role of fiction characteristics, empathy, and English proficiency in Theory of Mind.

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Reading fiction has been linked to enhanced Theory of Mind (ToM) (Dodell-Feder & Tamir, 2018; Kidd & Castano, 2013) but fiction characteristics such as story timeline and speech patterns in fiction has not been examined towards ToM accuracy. Further, research evidence suggests that individual traits such as reading habits and empathy have a positive relationship on ToM (Mumper & Gerrig, 2017). We first examined the effect of reading fiction on a ToM task (Social Stories Questionnaire) (n = 60) and found no significant differences between fiction and non-fiction readers. We then examined the effects of timeline and diction on ToM (n = 108) and completed a self-report on empathy, reading habits, and English language proficiency. Results showed that participants in the present timeline condition had higher accuracy in detecting some types of social transgressions compared to the past timeline condition. There was no difference for diction familiarity. Our regression analysis findings showed that aspects of affective empathy and English proficiency predicted detection of social transgressions. Our findings suggest that reading fiction with a more familiar timeline, along with higher levels of affective empathy may enhance the ability to detect social transgressions committed against other people.
Art opening minds: An experimental study of film complexity on open-mindedness.

Abigail Pitt¹, Francesca Carbone¹, Angela Nyhout¹, Stacie Friend², Murray Smith¹ and Heather Ferguson¹
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Aesthetic Cognitivism posits that artworks are valuable sources of understanding, for example, by “opening our minds” (Goodman, 1978). Works of art, such as film, are typically seen as better when they entail defamiliarization - rendering the familiar as strange or presenting remote perspectives (Shklovsky, 1917). In line with this theory, the present study investigated whether watching a film that entails defamiliarization increases open-mindedness outcomes. Defamiliarization was primed using the film Memento as it employs a non-linear temporal order. Adult participants (Ntotal=150) who watched the film in its original non-linear order were predicted to show higher scores on various cognitive open-mindedness measures compared to those who watched the same film in linear order. Both film conditions were expected to perform better than the ‘no-film’ control group. Results showed that participants in both film conditions performed better on one facet of open-mindedness, cognitive flexibility, compared to the control group, but no significant differences were found between film conditions. No other between-group differences were found on other measures of open-mindedness. We consider whether these results may be due to features of the film used in the study (e.g., the lead character displays close-mindedness) or whether they call into question the effects of defamiliarization.

Fuzzy feelings? Relationships between depressive symptoms, goal vividness and goal-related emotions.

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Depression is associated with difficulties in goal pursuit which may reflect deficits in emotional anticipation of different goal scenarios (i.e., success/failure). The reported study examined both positive and negative goal-related emotions in a student sample (n = 120) varying in depressive symptom levels. Participants inputted six personal goals, balanced for approach/avoidance motivation, into an online survey before rating specific anticipated (future) and anticipatory (present) emotions in counterbalanced blocks. Emotion items (0-100) were happiness and satisfaction relating to goal success (positive); and disappointment and frustration relating to failure (negative). Goals were also rated on several cognitive and motivational characteristics (Gamble et al., 2021; Anderson et al., 2023). Pre-registered multilevel analyses showed no main effects of depressive symptoms on emotion variables; yet a significant interaction for satisfaction ratings (depressive symptoms × emotion type, t[1314] = -2.83, p = .005) indicated that more depressed individuals experienced less present-moment satisfaction when imagining goal success. Additionally, goal vividness was predicted by depressive symptoms (t[211.0] = -3.14, p = .002) and correlated with positive/negative emotions (rs ≥ .22, ps < .001). Exploratory mediation analysis suggested that depressive symptoms may reduce anticipatory satisfaction, and other goal-related emotions, indirectly through suppressing one’s ability to vividly imagine goal success.


Measuring trust with the Wayfinding Task: Validation of immersive and desktop virtual reality versions across remote and in-person test environments.

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Trust is key to social relationships. Common measures of trust, questionnaires and economic games, lack ecological validity. Hence, we sought to validate an immersive, virtual reality (VR) measure for the behavioral assessment of trust across remote and in-person settings, building on the maze task of Hale et al. (2018, QJEP). Our ‘wayfinding task’ consists of an interconnected urban environment for participants to navigate on the advice of two characters of differing trustworthiness. We present four studies validating our task in remote and in-person testing and comparing performance across head-mounted display (HMD)-based and desktop VR. First, the trustworthiness of two virtual characters was manipulated, through either a ‘fact sheet’ or behavioural task termed the Door Game (Van der Biest et al., 2020, Amst). Participants then completed the wayfinding task. We found that behaviour in the wayfinding task reflected the trustworthiness of our characters; the trustworthy characters’ advice was followed more often, and they were approached more for advice. Remote testing successfully achieved these effects, and there was a stronger effect of trustworthiness for HMD than desktop VR. These results have implications for the measurement of trust in behavioural settings and the use of remote and VR testing in social experiments.

Sport metacognition: How do basketball players use the visual cue to assess the outcome of their free throws?

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Although most studies on metacognition have focused on the perceptual and memory domains, the motor domain has seen a recent surge of interest. Many athletes believe that they do not need visual feedback to predict the outcome of their sports performance. In this study, we investigated the impact of the amount of visual information on forty-two basketball players' ability to monitor their sport performance on a free throw task. Participants shot a total of 100 free throws in which a visual occlusion was triggered either immediately after the ball left the player's hands or 200, 400, 600, or 800ms later. Participants were then asked to predict whether the ball was in the basket and to indicate how confident they were in their answer (on a four-point scale).
The results indicate that the more visual information players have about their shot, the more appropriately they adjust their confidence to their prediction (i.e., to say that one is confident when the prediction is correct and to say that one is not confident when the prediction is incorrect). This effect was observed for successful throws but not for failed throws. We discuss these results with reference to metacognitive and movement models.

The impact of distraction during response inhibition in young and older adults.

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Response inhibition requires the integration of attentional, working memory and motor control resources, all of which are typically altered in older age. According to the Inhibitory Deficit Hypothesis older adults are less able to filter out irrelevant information in the environment and are, therefore, more prone to distraction. However, evidence for this hypothesis is inconsistent. This study tested whether irrelevant information impacts cognitive performance resulting in poorer accuracy and response time. One hundred twenty-four older (M= 66.1 years) and one hundred fourteen younger adults (M= 27.7) performed a Go-No-Go task where the number of distractors (0-3) was randomly varied across trials. Significant age differences were found on Go and No-go trials. Younger, compared to older adults demonstrated higher accuracy for Go trials. Whereas the older group demonstrated significantly higher accuracy on standard No-go and Distractor No-go trials. The effect was larger between the groups during standard No-go trials, however, there was a lack of effect when two or more distractors were presented. Older adults demonstrated significantly higher reaction times on both correct Go and incorrect No-go trials. Although more studies are necessary, our findings call into question the hypothesis of general inhibition deficit in older people.

The effects of bilateral versus unilateral anterior temporal lobe damage on face processing and semantic memory.

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The anterior temporal lobes (ATLs) are important for face recognition, as well as for supporting general semantic memory. We explored the effects of bilateral versus unilateral ATL damage on face processing, person knowledge and semantic memory. Sixteen people with bilateral ATL atrophy caused by semantic dementia (SD), 17 people with unilateral ATL resection for temporal lobe epilepsy (left TLE=10, right TLE=7), and 14 controls were recruited. Participants completed tasks of general semantic processing and person knowledge, plus a face matching task that required matching photographs of either famous or unfamiliar faces with different photos of the same face. Participants also underwent a structural MRI scan. People with SD were impaired on all semantic tasks, including person knowledge. Unilateral ATL resection caused mild impairments. This unilateral-bilateral difference emerged even when patients were matched for total ATL volume. Face matching accuracy was preserved but slightly reduced in severe
SD and right TLE. Increased accuracy and reduced RTs were found when matching famous compared to unfamiliar faces, however the RT benefit was reduced in SD and right TLE. These findings reveal a degradation of semantic memory following bilateral ATL damage. Unilateral damage causes mild deficits, with right ATL resection yielding impaired face matching.

A composite effect for vertically divided faces.

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The composite face effect (CFE) is a phenomenon in which recognition of a target face half is more difficult when it is aligned with a complementary face half than when misaligned. This has been interpreted as evidence for holistic processing of faces. Although this effect is well-established for ‘horizontal’ composites created from upper and lower face halves, it is not clear whether ‘vertical’ composites created from left and right face halves also combine holistically. We addressed this question using vertical and horizontal composites created from a familiar face half and an unfamiliar face half. Across four experiments, participants viewed both composites in aligned and misaligned configurations and made task-dependent familiarity judgements. In Experiment 1 (n=58), participants indicated which face half was familiar. We found a CFE for vertical, but not horizontal composites. This finding was replicated in Experiment 2 (n=64). In Experiment 3 (n=64), participants made familiarity judgments on a given face half. Here, we found a CFE for vertical and horizontal composites. This finding was replicated in experiment 4 (n=64), in which participants were primed for the familiar faces. Our results demonstrate the existence of a vertical CFE which appears to be more reliably elicited than the horizontal CFE.

The role of motivational in the relationship between resource scarcity and self-regulation: An exploratory study.

Louisa Butler, Julia Vogt and Rachel MCcloy
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Recent influential theories posit that a scarcity mindset reduces an individual’s cognitive capacity for self-regulation. However, findings supporting this capacity proposition have failed to replicated and little attention has been given to alternate models of self-regulation. This present exploratory study aimed to determine the relationship between resource scarcity and motivational processes of self-regulation. 120 university students self-reported their scarcity on the perceived scarcity scale (PSS). Participants then indicated their current goals and rated each goal on three motivation constructs: success expectancy, importance and perceived completion. Finally, participants reported their perceived goal relations by indicating the conflict and facilitation they perceived between goal domains. Overall, our results suggested that higher perceived resource scarcity is associated with altered goal setting and significantly lower success expectancy, importance, and perceived completion for all goals. Moreover, as PSS score increased perceived conflict between goal domains increased. These findings support the idea that motivational processes of self-regulation are altered within resource scarcity.
Security surveillance and vulnerability to attentional failures.

Helen Hodgetts¹, Cindy Chamberland², Serge Pelletier², François Vachon² and Sébastien Tremblay²
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Inattentional blindness is the failure to notice seemingly obvious events or objects within the environment and can have serious consequences in safety-critical contexts. Urban security surveillance requires the timely detection of criminal activity to maintain public safety and security. We assess whether this type of monitoring task may be subject to the same attentional limitations known to contribute to inattentional blindness. Using a city centre simulation comprising eight camera feeds and six display screens, more than two-thirds of incidents remained undetected. We find evidence of inattentional blindness whereby a proportion of incidents were fixated but not reported, as insufficient attentional resources were available for the incidents to reach conscious awareness. Pupillometry showed that fixated but undetected incidents did undergo a certain degree of processing despite them remaining unreported. Results are discussed in relation to the NSEEV model of attention which suggests why CCTV operations may be particularly vulnerable to attentional failure.

The effectiveness of virtual reality distraction intervention for reduction of anxiety and post-traumatic stress symptoms associated with chemotherapy in cancer patients: Internal pilot study.

Haifa Bin Haamed
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Post-traumatic stress disorder and acute traumatic stress symptoms have been found to be prevalent amongst people suffering from chronic medical conditions (Abbey et al., 2015). Being diagnosed with a life-threatening disease such as cancer may differ from many kinds of traumatic events in that the threat is ongoing and anchored in the present and future, rather than in the past. Distraction therapy technique via Virtual reality is a powerful CBT technique available to a therapist for the reduction of stress, and anxiety (Clark & Beck, 2011). Using distraction during stressing experience is considered effective in reducing intensity of stress, provide an initial feeling of relief (Kennerley. 2016). Aim; the aim of this pilot study is to assess acceptability, effectiveness and feasibility of the VR intervention before proceeding to the main RCT. The study will assess the effect of using distraction through immersive VR in alleviating chemotherapy-related distress in a cohort of patients, compared to a control group who will attend their chemotherapy session following routine hospital procedure. Study Design; the proposed study is an internal pilot randomised controlled trial. Expected result includes Distraction during the chemotherapy session via the VR platform will decrease traumatic stress and anxiety symptoms following chemotherapy.
21\textsuperscript{st} Mid-Career Prize Lecture

will be delivered by

Professor Gareth Gaskell

University of York

Plasticity in language processing, 24/7.

5.45pm, Thursday 13\textsuperscript{th} July 2023

Glyndwr D Lecture Theatre

\textit{No registration is required to attend in person.}
2023 EPS/BSA Undergraduate Prize Talk

will be delivered by

Lottie Shipp

University of Oxford

Developing an understanding of the relationship between dissociation and panic symptoms in adolescents.

3.30pm, Wednesday 12th July 2023

Glyndwr D Lecture Theatre

No registration is required to attend in person.
EPS President’s Address

will be delivered by

Professor Kathy Rastle

Royal Holloway, University of London

Making a difference with Experimental Psychology: Lessons from the ‘Reading Wars’.

4.30pm, Wednesday 12th July 2023

Glyndwr D Lecture Theatre

No registration is required to attend in person.
To apply for membership to the Experimental Psychology Society please go to the EPS website: https://eps.ac.uk/applying-for-membership/ and fill in the form, ensuring all boxes are completed (Entries should be made in clear black type) before signing and returning to the EPS Administrator: exppsychsoc@kent.ac.uk or sending to:

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

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

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

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

Applicants must be nominated by one EPS Ordinary Member. These forms should be returned by 1st March or 1st September. See Criteria and Procedures on following page.
CRITERIA AND PROCEDURES TO JOIN

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

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

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

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

Below is a selection of Plymouth hotels, which are close to the venue.

There are no on-campus (Singleton campus) accommodation options available for EPS Swansea, but we recommend that attendees and speakers look into accommodation options as soon as possible.

PLEASE NOTE these are not recommendations, and you should check the website and prices before making your booking:

The Mumbles area is slightly further away from the meeting compared to options within Swansea:

Tides Reach  
Oyster House  
Norton House

Options in town include:

City Centre or Waterside Premier Inns  
Mariott Hotel (Marina – Delta Hotels)  
Morgans  
Travelodge
Travel

Swansea is well served by transport links and there are many public transport options for during the meeting, including local Bike Hire.

https://www.nextbike.co.uk/en/swansea-university/
https://www.swansea.ac.uk/travel/public-transport/
https://myunijourney.traveline.cymru/swansea-university/

Swansea University, Singleton Campus Map
Map of Swansea

Information about parking at Swansea University.
Conference Dinner

The conference dinner will be held on Thursday 13th July at 7:00pm at La Braseria, which is a 40-minute walk or 20-minute bus journey from the meeting. The restaurant address is 28-30 Wind Street, Swansea, SA1 1DZ.

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

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

There is a choice of starter, main course and dessert, as listed below.

Starters:
- Chicken Skewers
- Calamares
- Deep Fried Brie
- Stuffed Mushrooms

Mains: All main meals are served with a jacket potato or chips (GF).
- Chicken breast in a cheese and asparagus sauce
- Baked Salmon
- Stuffed Peppers/Aubergines
- 10oz rump steak and pepper sauce

Dessert:
- Panna Cotta
- Tiramisu
- Chocolate cake
- Cheesecake

If there are any special dietary requirements these will be accommodated.

This payment portal closes at 11.59pm on 3rd July 2023.
Cafes on Campus

Food will be available on campus during the meeting, please see here for more information.

Places to Visit

Be a trail taker in Swansea – a city with many different faces and one big heart. Discover green parks, blue sea and a colourful culture.

Enjoy a stroll around some of Swansea’s cultural highlights, including the Glynn Vivian Art Gallery and the Dylan Thomas Centre, plus Swansea Museum and the National Waterfront Museum. All are within easy walking distance and free to enter – so you can spoil yourself with a spot of lunch too!

Swansea Culture Trail

Explore acres of wide-open space at Swansea’s Singleton Park and if you wander off the beaten track and explore the woodland, don’t forget to keep your eyes peeled for crows, robins, wrens and even long tailed tits – there are so many birds that make Singleton Park their home.

Swansea Spring Trail

With #DylanDay on the horizon (14 May), take a Dylan Thomas themed trail through the Maritime Quarter, you may even meet Captain Cat! And if that leaves you wanting to find out more about the poet, take a tour of Dylan’s birthplace in the Uplands area of the city.

Dylan Thomas Trail

We’ve got many more #SwanseaBayTrails for you to take - discover nature, ancient and modern history, new places to eat and drink, and exceptionally beautiful walking and cycling routes on your next visit.

#SwanseaBayTrails
**Business Meeting**

A Business Meeting will be held on Thursday 13th July 2023 between 12:30pm and 1:00pm in the Glyndwr B Lecture Theatre at Swansea University, Singleton Campus, Swansea, SA2 8PP.

**AGENDA**

23/23  Minutes of the Business Meeting, held at University of Plymouth on Thursday 20th April 2023

*See Attachment 1.*

23/24  Matters Arising

23/25  Secretary’s Report

   23/25.1  Annual Report of the Society

23/26  Treasurer’s Report

   23/26.1  Treasurer’s Report

23/27  QJEP Editor's Report

   23/27.1  Editor’s Report

23/28  Arrangements for Future Meetings

23/29  Any Other Business

23/30  Date, Time and Place of Next Meeting

**Arrangements for Future Meetings**

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

The previous Business Meeting was held on Thursday 20th April 2023 between 12:30pm and 1:00pm in the Plymouth Lecture Theatre at the School of Psychology, Portland Square, University of Plymouth, Drake Circus, Plymouth, PL4 8AA. Around 30 members were in attendance.

MINUTES

23/15 Minutes of the Annual General Meeting, held at University College London on Friday 6th January 2023

Approved without change.

23/16 Matters Arising

N/A

23/17 Secretary’s Report

23/17.1 Annual Report of the Society

The Hon. Secretary updated the membership on the new portal opening and lottery system used for submissions to the Plymouth meeting, stating that it had worked well and would be used again for EPS Swansea. An update on fees was given, the increase in fees has gone ahead and now stands at £30 or £12. The committee will introduce a new ‘Exceptional Travel Scheme’, in order to help ordinary members to attend EPS meetings. The committee plan to introduce new voluntary registration fee going forward.

23/18 Treasurer’s Report

23/18.1 Treasurer’s Report

A summary of funding liability due to extended/delayed grants during COVID was provided. The committee are hoping to recover these liabilities over the next year. A summary of declining QJEP income in recent/coming years was also outlined.

23/19 QJEP Editor's Report

23/19.1 Editor’s Report

All running smoothly. Special issues are currently advertised on the EPS webpages and social media.
23/20 Arrangements for Future Meetings

Update on upcoming meetings, including overview of Swansea and portal opening. Call for expressions of interest for 2026 to come in Summer with 1st September deadline.

23/21 Any Other Business

There was no AoB.

23/22 Date, Time and Place of Next Meeting

The next Business Meeting will be held on Thursday 13th July 2023 between 12:30pm and 1:00pm in the Glyndwr B Lecture Theatre at Swansea University, Singleton Campus, Swansea, SA2 8PP.
Next Meeting: University College London. January 2024.

This meeting will include the 22nd EPS Mid-Career Award Lecture by Geoffrey Bird (with an accompanying symposium organised by Caroline Catmur).

Local Organiser: Jo Taylor