

North West Visual Cognition Group Workshop (3)

University of Salford
Media city campus
M50 2HE
Media City 3.10

09.30-10.00	Arrival, tea and coffee
10.00-10.15	Welcome
10.15-10.45	Dr Catherine Thompson, Liverpool Hope University <i>The effects of low-level image features on restorative visual attention</i>
10.45-11.15	Dr Samantha Gregory, University of Salford <i>Can gaze cues influence person evaluation?</i>
11.15-11.45	Coffee and Research Discussion
11.45-12.30	INVITED KEYNOTE SPEAKER – Dr Emma Gowen, University of Manchester <i>Imitating and perceiving actions in autism</i>
12.30-13.30	Lunch and Research Discussion
13.30-14.00	Katherine Maw, Edge Hill University <i>Prosopagnosia is highly prevalent in people with developmental coordination disorder (DCD).</i>
14.00-14.30	Dr Mengsi Wang, University of Central Lancashire <i>Exposure Frequency Effects in Learning and Scanning.</i>
14.30-15.00	Coffee and Research Discussion
15.00-15.30	Dr Andrew Mackenzie, Nottingham Trent University <i>Peak Occipital Alpha Frequency Mediates Sporting Expertise and Multiple Object Tracking Performance</i>
15.30-16.00	Dr Damien Litchfield, Edge Hill University <i>“I think they see this much”: Visual span estimations of other people</i>
16.00-16.45	INVITED KEYNOTE SPEAKER – Dr Greg Davis, University of Cambridge <i>The conscious attention ‘spotlight’: A method for estimating its size, position and guidance</i>
16.45-17.00	Concluding Remarks
17.30-18.30	Pub
18.30+	Restaurant

The effects of low-level image features on restorative visual attention

Catherine Thompson¹, David Beevers²

1. Liverpool Hope University
2. University of Salford

Views of nature have been found to improve wellbeing, increase positive affect, and restore cognitive processes. One explanation for these restorative effects is that natural stimuli have features that are processed in a different way to man-made stimuli. Attention Restoration Theory argues that features in nature environments encourage bottom-up processing, allowing top-down processes to restore. Perceptual Fluency Theory suggests that natural stimuli are easier to process so put less pressure on cognitive resources. However, it is unclear what characteristics cause natural features to be processed automatically, or more fluently. Across two experiments the effect of spatial frequency, one low-level feature that impacts processing, was investigated. In the first experiment participants viewed nature and urban images in their original state, or with mid-to-high, or low spatial frequencies removed. Participants made fewer fixations and longer fixations when viewing nature scenes compared to urban scenes, but only when mid-to-high spatial frequencies were intact. Saccade length was also significantly greater when looking at urban scenes, but only when low spatial frequencies were retained. The second experiment measured whether these differences in visual search led to differences in restoration. Participants completed an attentional network task (ANT), then viewed a set of images (nature or urban, and original, mid-to-high, or low spatial frequency), and then completed the ANT a second time. A comparison of performance pre and post-image viewing will show whether low-level features contribute towards the restoration effect. The findings will also show whether visual search can be used as a measure of restoration.

Can gaze cues influence person evaluation?

Samantha Gregory¹, Vilma Pullinen², Margaret Jackson²

1. University of Salford
2. University of Aberdeen

Eye gaze is an important social signal and people generally cannot help but follow the eye gaze of others. Using a simple gaze cuing task, it is found that gaze cues can change the way that cued items are processed. For example, gaze cues speed processing of items, influence memory for them, and even affect appraisal, with gaze cued items being liked more. This influence of appraisal indicates that gaze conveys some sort of value-based information. This has therefore led to the question of whether gaze cuing can also affect how people judge others. Indeed, is it possible that if we see someone regularly attended to by other people will we consider them to be a better person than someone who is frequently ignored? This talk will provide an overview of a series of attempts to see if there is any effect of eye gaze on social value judgements. Results suggest limited evidence for gaze affecting person judgment in the same way that gaze affects object judgement.

KEYNOTE 1.

Imitating and perceiving actions in autism

Dr Emma Gowen, Body, Eye and Movement (BEAM) Lab, The University of Manchester

<https://www.research.manchester.ac.uk/portal/emma.gowen.html>

<https://blogs.manchester.ac.uk/beamlab/>

<http://www.autism.manchester.ac.uk/>

In this talk, I will present a series of experiments examining aspects of imitation and action perception in autistic adults. Voluntary imitation, the ability to purposefully copy another person's actions is essential for learning new actions from others and facilitating interpersonal interactions. Imitation relies on the integrity of the imitator's motor system, as well as attention to the observed movement. Due to the link between imitation and social behaviours, imitation has been studied in autistic individuals who have difficulties with social interaction.



Accumulating evidence shows reduced accuracy of imitation in autistic children and adults: although autistic individuals are able to imitate the goal of an observed action they are less accurate at imitating its style (e.g. speed, size). Here, I will provide an overview of this previous work as well as new research where we have investigated whether (1) reduced visual attention to the observed action might account for altered imitation in autistic adults (2) other functions that rely on action observation such as action prediction are altered in autistic adults.

Biography

I am a Senior Lecturer in the Faculty of Biology, Medicine and Health within the Division of Psychology, Communication and Human Neuroscience. I co-direct the Body Eyes and Movement (BEAM) lab, researching sensory motor control and imitation with a particular focus on autism in adulthood. Much of my research benefits from the direct involvement of the autistic community (autistic adults and parents of autistic children), facilitated by the network Autism@Manchester which I chair.

I qualified as an Orthoptist from The University of Liverpool in 1998, following which I worked at the Manchester Royal Eye Hospital and undertook an MSc in Investigative Ophthalmology and Vision Sciences at The University of Manchester. I completed my PhD at University Manchester Institute of Science and Technology, followed by a Post-doctorate position at the Department of Psychology, Birmingham University. In September 2006, I took up a Lectureship at The University of Manchester was promoted to Senior Lecturer in 2014.

Prosopagnosia is highly prevalent in people with developmental coordination disorder (DCD).

Katherine Maw, Edge Hill University

Our findings identify the prevalence of prosopagnosia (a neurodevelopmental disorder associated with difficulties recognising familiar faces, e.g., friends/family) in people with developmental coordination disorder (DCD). DCD creates lifelong movement difficulties which significantly affect daily life. Previous research indicated that children with DCD also experience problems recognising faces. Such challenges are prevalent in other commonly comorbid neurodevelopmental conditions, e.g., autism spectrum disorder (ASD) and dyslexia. We therefore explored the prevalence of prosopagnosia in DCD adults using a battery of online movement questionnaires (child and adulthood difficulties) and facial identity processing tasks. Participants (DCD, $n = 27$, Control $n = 37$) were recruited through social media. Scores were analysed using t-tests and re-run controlling for ASD and dyslexia. People with DCD exhibited significantly greater problems at both the initial perception stage of face processing and subsequent unfamiliar and familiar face memory recall. 56% of DCD participants met diagnostic cut-offs for prosopagnosia.

Exposure Frequency Effects in Learning and Scanning.

Mengsi Wang^{1,2}, Hazel I Blythe³, Simon P Liversedge¹

1. University of Central Lancashire, Preston, UK
2. Tianjin Normal University, Tianjin, China
3. Northumbria University, Newcastle, UK

Most alphabetic languages are presented with inter-word spaces (e.g., English), however, there are some languages without inter-word spaces (e.g., Chinese). It is widely evidenced that the removal of word spacing in normally spaced languages disrupts word identification and saccadic targeting, and reduces reading efficiency more generally (e.g., Rayner et al., 1998). However, adding inter-word spaces to unspaced Chinese does not facilitate or inhibit reading behaviour in Chinese adults (e.g., Bai et al., 2008). Despite the clarity that exists regarding frequency effects in the literature, it remains controversial as to whether frequency effects exist for visual search in text. Here, I will present three experiments which examined how exposure frequency of novel stimuli (Landolt-C clusters in Experiment 1 vs. pseudowords in Experiments 2 & 3) affected the rate of learning, and whether simulated exposure frequency influenced eye movements during scanning of longer strings under different demarcation presentations (spaced vs. unspaced shaded vs. unspaced). Common findings were as follows: Learning rates were modulated by exposure frequency, but exposure frequency did not influence eye movements during scanning. Robust spacing effects occurred. Spacing facilitated target identification and saccadic targeting. Interestingly, the pattern of learning curves and the degree to which shading facilitated scanning varied across the three experiments. I will discuss these findings in relation to the complexity of the stimuli and variance across writing systems in relation to our participants' native language (Chinese vs. English).

Peak Occipital Alpha Frequency Mediates Sporting Expertise and Multiple Object Tracking Performance

Andrew K. Mackenzie, Joshua Baker, Rosie C. Daly, & Christina J. Howard

Multiple Object Tracking (MOT) is often used as a lab-based paradigm for investigating goal-driven attention as an indicator for “real-world” attention in tasks such as sport. When exploring MOT performance in the context of sporting expertise, we typically observe that individuals with sporting expertise outperform non-sporting individuals. There are a number of general explanations for performance differences such as cognitive transfer effects, however, the potential neurophysiological mechanisms explaining the relationship between sporting expertise and performance differences in MOT are not clear. Based on the role occipital alpha (posterior oscillations usually around 8-12Hz) has been shown to have in visuospatial attention, the aim in this study was to examine whether individual differences in occipital peak alpha frequency (IPAF) mediates the relationship between sporting expertise and MOT performance. Using electroencephalography, participants, who either played sport competitively or did not, had their IPAF measured at rest (eyes closed) across a two-minute window. They also completed a standard MOT task. There were positive correlations between all variables where those who engaged in sport performed better in the MOT task and had faster IPAF. Faster IPAF predicted superior MOT performance. The mediation analysis revealed that sporting individuals had significantly faster IPAF and this in turn related to superior MOT performance. Suggesting that IPAF is a possible neurophysiological mediating mechanism as to why sporting individuals have superior MOT performance. Explanations and implications are discussed and unanswered questions are proposed.

“I think they see this much”: Visual span estimations of other people

Damien Litchfield, Edge Hill University: damien.litchfield@edgehill.ac.uk

Adam Qureshi, Edge Hill University, qureshia@edgehill.ac.uk

From an early age, humans are very good at estimating where other people are looking based on their eye-gaze and interpreting another’s gaze is an important part of social cognition. What it is much less clear is to what extent people consider the wider range of another person’s vision aside from the focal point of attention. This talk introduces our Estimated Visual Span (EVS) task, where participants are shown a static image of where an observer was fixating during a particular task (as represented by a small circle) and asked to estimate how much they think the person could see by increasing/decreasing a window tied to that fixation location. To examine if participants consider the task that observers were engaged in when making visual span estimates, fixations were overlaid with either a blank screen, a reading task, a simple visual search task (find Qs from Os) or complex visual search task (Where’s Wally). Initial window sizes were randomly set to either 100, 250 or 500 pixels and therefore participants had to increase or decrease the window until it matched their estimation of the person’s visual span at each fixation. Our preliminary results suggest that participants ascribed smaller visual spans to the blank condition (~230 pixels) compared to the other tasks (~400 pixels) and the implications of this novel method are discussed.

KEYNOTE 2

The conscious attention ‘spotlight’: A method for estimating its size, position and guidance

Dr Greg Davis, University of Cambridge

When we view a scene, a face or even a simple shape, our conscious percept has a clear focus that is always in flux. It is often supposed that this ‘spotlight’ of conscious attention may fundamentally change the nature of object processing within its span and a huge research effort over the last fifty years has explored this, often using visual search tasks. That standard search paradigm is limited, however; it does not explicitly address attention and suffers from stimulus confounds. Here, I discuss a new procedure designed to estimate the conscious attention spotlight’s properties (position, effective breadth, parallel guidance) during search. Its outputs are not yet well calibrated, but it seems to offer a framework for distinguishing serial from parallel, and attention-independent from attention-dependent contributions to search – distinctions that have eluded research using the standard paradigm.