

North-West Visual Cognition Group Workshop (4)

Edge Hill University

Business School Room B001

June 21st 2023

09.30-10.00 Arrival, tea and coffee

10.00-10.15 Welcome

10.15-10.45 Donna Gill - UCLan

10.45-11.15 Andrea Piovesan – Edge Hill University

11.15-11.45 Coffee and Research Discussion

11.45-12.30 INVITED KEYNOTE SPEAKER – Tim Smith, Birkbeck University.
The Attentional Theory of Cinematic Continuity.

12.30-13.30 Lunch and Research Discussion (inc. poster displays)

13.30-14.00 Edwin Burns – Edge Hill University

14.00-14.30 Heida Maria Sigurdardottir – University of Iceland

14.30-15.00 Coffee and Research Discussion

15.00-15.30 Dan Clark – Liverpool Hope University

15.30-16.00 Rachel Hagan – Liverpool John Moores University

16.00-16.45 INVITED KEYNOTE SPEAKER – Karla Evans, University of York.
What We Perceive in Half a Second from Real World Scenes to Radiographs

16.45-17.00 Concluding Remarks

Social

17.00-18.00 Pub - Cricketers

18.00-20.00 Evening Meal – Fat Italian <https://fatitalianormskirk.co.uk/>

ABSTRACTS (SPOKEN PRESENTATIONS)

Return Sweeps During Multiline Reading: The Influence of Text Justification and Column Setting

Donna Gill¹, Mengsi Wang^{1,2}, Chuanli Zang^{1,2} Simon P. Liversedge¹ and Jeannie Judge¹

1. University of Central Lancashire

2. Tianjin Normal University

Abstract

Return sweeps are essential when reading multiline texts, yet we still lack a comprehensive understanding of this behaviour. Presentation format may impact reading behaviour by placing demands on our oculomotor system. We examined the effect of text alignment and column number on global/local reading measures and return sweeps. Native English readers read multiline passages of text presented in left-aligned or fully justified format, and one or two columns. Global and local measures revealed longer fixation durations and greater fixation counts for two columns relative to one column and for left-aligned text compared to fully justified text. Return sweep analyses showed that participants fixated the line-beginning and line-end regions for longer in two columns than one column; however, there was a tendency to undershoot the target following a long than short saccade. Our results offer a nuanced account of return sweeps based on textual presentations with implications for optimal reading efficiency.

The effect of font spacing and weight on the eye movements of people with and without dyslexia.

Andrea Piovesan¹, Katie Groves², Tobiasz Trawinski², Lorna Bourke², Letizia Palumbo²

1. Edge Hill University
2. Liverpool Hope University

Abstract

It is well-established that the reading speed and performance are largely influenced by the font used. Multiple studies have therefore investigated which fonts are more readable, aiming to provide support to people with dyslexia, who normally struggle reading. However, only few studies investigated the effect of physical properties of the fonts on readability, despite they could lead to wider applications. The aim of the present study was to test whether spacing (i.e., condensed, roman or expanded) and weight (regular or light, the opposite of **bold**) could influence the eye movements of participants and their ratings of clarity and pleasantness of the text. To do so, we asked individuals with and without dyslexia to read twelve extracts presented in different fonts. Findings suggested that the eye movements did not differ between people with and without dyslexia, but they were significantly influenced by the spacing and weight of the font.

Keynote Talk:

The Attentional Theory of Cinematic Continuity.

Tim Smith
Birkbeck University

Abstract

Creators of film, TV and videos tell stories by selecting and emphasizing key details of an audiovisual scene through editing, cinematography and sound design. Such edited film sequences instantaneously transport the viewer through space and time in ways that are physically impossible and, due to their divergence from reality should pose problems for viewer comprehension. However, filmmakers have at their disposal a suite of cinematic techniques that can minimize viewer awareness of the cuts, create the perception of a continuous scene across sequences of shots and maximize comprehension. In this presentation I will cover the empirical evidence of the impact of these techniques on viewers and outline the *Attentional Theory of Cinematic Continuity (AToCC)*, a theoretical framework that uses empirical evidence of how we attend to, perceive and comprehend real-world audiovisual scenes to explain how filmmakers have co-opted these natural processes when crafting cinematic stories.

What's wrong with cognitive research and how can it be improved? Lessons from developmental prosopagnosia

Edwin Burns
Edge Hill University

Abstract

Psychologists assume experimental tests are reflective of cognitive processes utilised in daily life. Moreover, they will often reject self-reported data as subjective and unreliable. These assumptions have formed the basis of how a condition called prosopagnosia, characterised by difficulties recognising faces, is diagnosed and researched. However, up to 85% of those who believe they have prosopagnosia will not score poorly enough on cognitive tasks to acquire a diagnosis, despite reporting highly abnormal real-world behaviours (e.g., failing to recognise their children or their boss). In this talk I argue that prosopagnosia cases' self-reports are more reflective of their experiences in daily life, revealing serious issues in our cognitive tests' ecological validity. These disparities are not just confined to prosopagnosia, but extend out into other neurodevelopmental disorders. Given these issues, I argue we should incorporate more self-reports in our studies to identify, and correct, deficiencies in our cognitive tests.

Individual differences in face and object discrimination

Heida Maria Sigurdardottir
University of Iceland

Abstract

What are the organizational principles of visual object perception as evidenced by individual differences in behavior? What specific abilities and disabilities in object discrimination go together? In this preregistered study (<https://osf.io/q5ne8>), we collected data from a large (N=511) heterogeneous sample to amplify individual differences in visual discrimination abilities. We primarily targeted people with self-declared face recognition abilities on opposite sides of the spectrum, ranging from poor to excellent face recognizers. We then administered a visual foraging task where people had to discriminate between various faces, other familiar objects, and novel objects. Each image had a known location in object space, which was defined based on activation patterns in a convolutional neural network trained on object classification. Object space captures the main diagnostic dimensions across various objects. Distance between two images in object space can be calculated, where greater distance indicates that the images are visually different from one another on dimensions that are diagnostic for telling apart different objects. Our results suggest that people who struggle with telling apart different faces also have some difficulties with visual processing of objects that share visual qualities with faces as measured by their location in object space. Face discrimination may therefore not rely on completely domain-specific abilities but may tap into mechanisms that support other object discrimination. I discuss how these results may or may not provide support for the existence of an object space in human high-level vision.

An exploration of the influence of animal and object categories on recall of item location following an incidental learning task

Dr Dan Clark and Professor Nick Donnelly
Liverpool Hope University

Abstract

The current study explores the role of attention in location memory for animals and objects. Participants completed an incidental learning task where they either rated animals and objects with regards to either their ease of collection to win a scavenger hunt (Experiment 1a and b) or their distance from the centre of the computer screen (Experiment 2). The images of animals and objects were pseudo-randomly positioned on the screen in both experiments. After completing the incidental learning task (and a reverse counting distractor task), participants were then given a surprise location memory recall task. In the location memory recall task, items were shown in the centre of the screen and participants used the mouse to indicate the position the item had been shown during the incidental encoding task. The results of both experiments show location memory for objects was more accurate than for animals. While we cannot definitively identify the mechanism responsible for the difference in the location memory of objects and animals, we propose that differences in the influence of object-based attention at encoding affect location memory when tested at recall.

Odour Mixtures – does analytical visual processing provide an advantage in olfactory processing.

R Hagan¹, R Pawling¹, F McGlone^{1, 2} & S C. Walker^{1*}

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Abstract

Background: Most familiar odours are complex mixtures of volatile molecules, which the olfactory system synthesizes into a perceptual whole (Thomas-Danguin et al, 2014). However, odours are rarely encountered in isolation (Van-Der-Hallen, 2015) and thus, the brain must also separate distinct odour objects from complex backgrounds (Wilson, 2009). To date, little attention has been paid to the cognitive processes underlying this olfactory ability, whilst in vision, individual differences in scene analysis have been widely reported (Neufeld et al, 2019). **Aim:** To determine whether visual cognitive style predicts olfactory cognitive style. **Methods:** 59 participants ($f=39$), aged 16-55 ($M=26.07$, $SD=8.48$), completed the Navon and Block Design tasks, two visual perception tasks, and an odour-mixture task to test participants' ability to identify food-related blended fragrances, individually and combined within binary/ternary mixtures. **Results:** On the NAVON, faster reaction times and lower accuracy on global-incongruent trials, suggestive of local interference, was significantly predictive of binary mixture performance. **Conclusion:** These results provide insight into the cognitive processes required for olfactory scene analysis.

References

- Thomas-Danguin T, Sinding C, Romagny S, El Mountassir F, Atanasova B, Le Berre E, Le Bon AM, Coureaud G. 2014. The perception of odor objects in everyday life: a review on the processing of odor mixtures. *Front Psychol.* 5:504.
- Van der Hallen, R., Evers, K., Brewaeys, K., Van den Noortgate, W., & Wagemans, J. (2015). Global processing takes time: A meta-analysis on local-global visual processing in ASD. *Psychological bulletin*, 141(3), 549–573. <https://doi.org/10.1037/bul0000004>
- Wilson DA. 2009. Pattern separation and completion in olfaction. *Ann NY Acad Sci.* 1170:306–312.

Keynote Talk:

What We Perceive in Half a Second from Real World Scenes to Radiographs

Karla K. Evans
University of York

Abstract

Visual awareness of everyday complex environments involves both the individuation and recognition of objects and rapid extraction of global image properties of the scene. Humans have rapid access to global structural and statistical regularities which allows them the extraction of the “gist” or meaning of an image, central to the efficient assessment and orienting in complex environments. This ability is based on our extensive experience with the regularities of the natural world. Radiological images can be thought of as a specialized class of scenes and radiologists are experts who have learned to tune their visual system to regularities in these unusual scenes. Consequently, we have found that the gist of the abnormal in radiographs, viewed only for 500 milliseconds, allows radiologists to detect the presence of disease independent of the locus of any lesion and up to 3 years before the onset of cancer. I will address the nature of the gist signal in natural and radiological images and what affords humans the ability to detect it. I will address how this expertise can be trained as well as ways to refine the screening of medical images and inform and enhance the capabilities of computer-based detection systems to save lives.

ABSTRACTS (POSTER PRESENTATIONS)

Alexithymia modulates the effects of facial attractiveness on social cognitive decision making

Nicola J van Rijsbergen¹, Ralph Pawling², Felicity Wolohan¹

1. Edge Hill University
2. Liverpool John Moores

Abstract

Alexithymia is partly conceptualised as a deficit in explicitly recognising and describing internal emotional experience. Our data suggest Alexithymics are less influenced by their implicit responses to the affective value (attractiveness) of facial stimuli in social cognitive tasks, even when explicit recognition of affective value i.e. (facial attractiveness), is apparently identical to neurotypicals. 106 participants completed the Toronto Alexithymia Scale, Empathy Quotient, Systemizing Quotient, the Emotion Regulation Questionnaire, and an online experiment. Stimuli were 16 black and white eye region images, with pupils expanding, and contracting. Participants judged their attractiveness, and performed an investment task, and truth judgment task on the same stimuli in separate blocks. Data were analysed with linear mixed effect models, with TAS, EQ, SQ and Gender & Dilation as predictors. Participants attractiveness rating of each identity was added as a predictor in models of the investment and truth tasks. The only significant predictor of Attractiveness scores was Gender, $BGENDER = 4.0$, $t_{143} = 1.98$, $p = 0.049$. Models of the truth and investment tasks found a main effect of attractiveness ($p < 0.0001$). The only significant interactions were between attractiveness and TAS scores in both truth ($BTAS * ATT = -4.314$, $t = -2.10$, $p = 0.036$ and investment tasks ($BTAS * ATT = -1.38$, $t = -2.51$, $p = 0.0120$). Higher TAS scores significantly reduced the effect of attractiveness on decisions in both tasks, suggesting that Alexithymics are not utilizing the internal affective signal.

Individual differences in social cognition: Does loneliness affect our ability to identify and utilise non-verbal social cues? A psychophysiological study

Eleanor Clarke¹, Damien Litchfield¹, Ralph Pawling², Nicola van Rijsbergen¹,
Felicity Wolohan¹

1. Edge Hill University
2. Liverpool John Moores

Abstract

Psychological models of human responses to loneliness address how we identify loneliness, restore connections, and why some fail to do so. This study investigates how types of loneliness influence facial mimicry. Using EMG and a novel retrospective loneliness measure to distinguish chronic and temporary loneliness, we seek to answer the question: does loneliness affect spontaneous facial mimicry? The model of belonging regulation (Gardner et al., 2000) outlines a system for how people identify and recover from loneliness. 3 stages are proposed: self-monitoring, hypersensitivity to social cues, and restoration of belonging through utilisation of social cues. In this model, feelings of loneliness trigger a social monitoring system where lonely people are hyper aware of social information. The information aids re-affiliation by guiding the individual's own social cues and decision-making. A breakdown of the system may lead to chronic loneliness, linked with mental and physical consequences. The present study investigates all 3 stages. Self-monitoring is measured using a novel graph of self-reported feelings over a participants lifespan, and questionnaires to distinguish between chronic and temporary loneliness. Hypersensitivity is investigated using facial EMG to monitor spontaneous and predictive mimicry in response to frowns, polite smiles and Duchenne smiles. Learning and utilisation is assessed using a social preference task: participants see pairs of faces with neural expressions and are asked who they would prefer to work with, followed by an explicit recall task. Planned sample size ~100, results will be analysed using mixed effects modelling. Predictions for the outcome include increased hypersensitivity and increased utilisation of social cues for temporarily lonely individuals, in line with the model. For chronically lonely individuals, we suggest that the model may break down, causing a reduction in sensitivity and utilisation of cues.