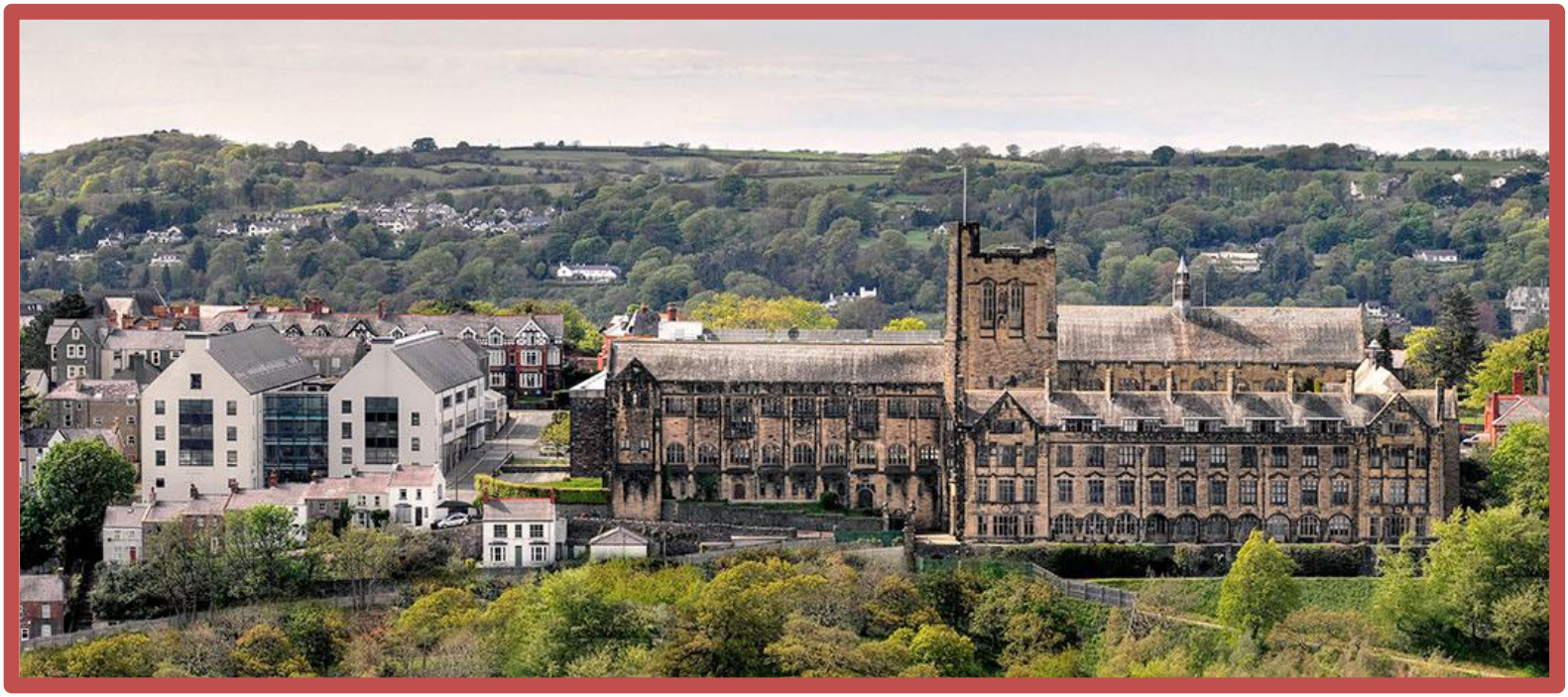
PRIFYSGOL BANGOR UNIVERSITY

Bangor Psychology PhD Student Conference



Programme and Abstracts

11th December 2014

SEICOLEG BANGOR PSYCHOLOGY Est 1963

Bangor Psychology
PhD Student Conference

Welcome to the first School of Psychology biannual PhD student conference.

This conference series will run in December and April each year, with first and second year students presenting in December, and third years following suit in April.

The aim of these events is to give students the opportunity to present their research to members of faculty outside of their supervisory committees, which in turn allows staff to hear about the variety of projects that are underway in the department, and to provide feedback to the students from perhaps a different perspective than that of their advisors.

We hope this conference series will be useful for both staff and students; please provide us with feedback if you have any suggestions for future sessions.

Leah Johnstone and Pippa Beston *(Conference Organisers)*

Programme

Talk Session 1 – Wheldon 2

1300 – 1305 Richard Ramsey
Welcome introduction

1305 – 1320 Margiad Williams *(Supervisor: Judy Hutchings)*
Evaluating the Enhancing Parenting Skills programme

1320 – 1335 Cameron Downing *(Supervisor: Marketa Caravolas)*
Investigating the nature of writing difficulties in co-occurring developmental disorders: Understanding handwriting and spelling processes in dyslexia and developmental coordination disorder

1335 – 1350 Shelby De Meulenaere *(Supervisor: Dusana Dorjee)*
The investigation of mindfulness-based interventions as potential preventive tools for dementia

Poster Session – Wheldon Seminar Room

1350 – 1440 Tea and Coffee provided

Talk Session 2 – Wheldon 2

1440 – 1455 Paul Carter *(Supervisor: John Parkinson)*
Exercise with control: Learning to feel good

1455 – 1510 Josh Payne *(Supervisor: Marie-Josephe Tainturier)*
Language rehabilitation and transcranial direct current stimulation in Welsh-English bilingual aphasia

1510 – 1525 Dawn Owen *(Supervisor: Judy Hutchings)*
Designing and evaluating an online parenting intervention

1525 – 1540 Tim Davies *(Supervisor: Robert Rogers)*
Preferences for risky decision making when reward is uncertain

1540 – 1555 Elena Neofytou *(Supervisor: Debbie Mills)*
How do bilinguals segment and categorise their world?

1555 – 1600 John Parkinson *(Head of School)*
Closing Remarks

Cheese and wine – Wheldon Seminar Room

Talks

Margiad Williams – Evaluating the Enhancing Parenting Skills 2014 programme

Supervised by Judy Hutchings

This presentation will introduce a PhD project evaluating the Enhancing Parenting Skills (EPaS) 2014 programme delivered by health visitors on a one-to-one basis to parents of young children displaying behaviour problems. A brief overview of background literature will be introduced followed by the design of the main evaluation study – a randomised controlled trial.

Cameron Downing – Investigating the nature of writing difficulties in co-occurring developmental disorders: Understanding handwriting and spelling processes in dyslexia and developmental coordination disorder

Supervised by Marketa Caravolas

Handwriting and spelling difficulties manifest in children with developmental dyslexia and developmental coordination disorder (DCD). Co-occurrence between these disorders is highly frequent (up to 50%). Despite this, the nature of writing difficulties in these children remains largely unexplored. This systematic programme of research investigates the nature of handwriting and spelling deficits in children with dyslexia, DCD, and co-occurring difficulties. Online (eye and pen) measurements combined with standard assessments will examine the locus and characteristics of disorder-specific deficits. Understanding the nature of deficits that present in these common developmental disorders will lead to effective interventions ameliorating poor writing skills.

Shelby De Meulenaere – The investigation of mindfulness-based interventions as potential preventive tools for dementia

Supervised by Dusana Dorjee

As population ageing occurs, scholars postulate that dementia will become one of the leading health issues encountered worldwide. Considering that preventive methods for dementia remain undetermined, it is critical to investigate methods that may offset the progression of this syndrome. In recent years, mindfulness-based approaches have been identified as promising interventions for dementia. However, few studies have investigated the efficacy of these approaches, and how they may prevent dementia. This presentation will discuss whether mindfulness could be a viable preventive tool for dementia. Furthermore, the aims of future research on mindfulness and dementia will be covered.

Paul Carter – Exercise with control: Learning to feel good

Supervised by John Parkinson

Contingency learning is a process fundamental to adaptive goal-directed behaviour. By repeatedly observing actions and outcomes we derive over time an estimate of their causal relationship, or contingency. By interacting with our environment and observing the outcomes we can similarly determine our own contingency in situations, and hence gain a sense of control. Studies have shown that our perceived contingency depends not only on the statistical relationship between action and outcome, but also on the *frequency* of action: those individuals who respond more report a greater sense of control (Alloy & Abramson, 1979). In addition, a greater sense of control has been shown to positively correlate with feelings of wellbeing (Lachman & Weaver, 1998). Cognitive behavioural therapy (CBT), for example, has demonstrated effectiveness in the treatment of depression through development of an individual's sense of control. This research will aim initially to replicate previous findings on the relationship between perceived contingency and response rate and then use novel methods, such as nudge techniques, to increase response rate. A novel stimuli set with an exercise theme will lay foundations for practical application of the research in exercise uptake. The neural correlates of the demonstrated relationship will then be explored using fMRI methods. Based on the findings, it is expected that behavioural interventions and neurofeedback methods may then be used in combination to develop a greater sense of control in exercise participation and hence a greater sense of wellbeing.

Josh Payne – Language rehabilitation and transcranial direct current stimulation in Welsh-English bilingual aphasia

Supervised by Marie-Josephe Tainturier

In recent years transcranial direct current stimulation has been increasingly applied to the study of language and rehabilitation of post-stroke aphasia. To date this research has been conducted with monolingual participants. My research aims to explore the effects of tDCS on bilingual language processing to inform the application of the technique to bilingual aphasia treatment, with a specific focus on cross-linguistic generalisation. The broad aim is to elucidate the mechanisms of recovery in bilingual aphasia and begin to develop treatment strategies that may reduce the time and intensity of traditional behavioural rehabilitation methods or encourage better maintenance of behavioural gains.

Dawn Owen – Designing and evaluating an online parenting intervention

Supervised by Judy Hutchings

General behaviour problems are the most common reasons why children are referred to Children's Mental Health Services. Pre-school children in particular are referred to Health Visitors, which can be a costly and time-consuming process for the Health Service. Previous studies have suggested that between 7-20% of children meet the diagnostic criteria for conduct disorder. Intervention strategies for behaviour problems are now focusing on changing the behavioural patterns of the parents in order to improve child behaviour. This is possible by teaching parents which behaviours to ignore and which to reinforce. This study aims to develop and evaluate an online parenting intervention, which will teach parents core behavioural principles.

Tim Davies – Preferences for risky decision making when reward is uncertain

Supervised by Robert Rogers

Foraging theory suggests that animals are sensitive to risky decision making. Specifically, animals tend to show risk seeking behaviours towards uncertain delay to reward. Delay discounting reflects how drastically a reward loses its subjective value based on the temporal period before receiving it. These concepts will form the basis of my PhD. My first study will implement a task where different choices result in a fixed (safe) or variable (risky) delay to uncertain food reward. It will look at preferences for risky decisions, and whether any biases are associated with BMI, operant learning, and certain cognitive and affective factors.

Elena Neofytou – How do bilinguals segment and categorise their world?

Supervised by Debbie Mills

Recent research suggests that the development of language, perceptual, and cognitive processes differs in monolinguals and bilinguals. I aim to study the influence of learning two languages on a variety of perceptual and cognitive processes. In a series of experiments, I will investigate: speech segmentation with ERPs in 7- and 10-month old infants, and category development (perceptual and semantic) with eye-tracking and ERPs in adults and children. The goal is to examine not only the manifestation of potential differences in bilinguals, but also to uncover the mechanisms underlying them.

Posters

Louise Allen-Walker – A role of the cerebellum in semantic integration?

Supervised by Martyn Bracewell, Paloma Mari-Beffa and Guillaume Thierry

The cerebellum has historically been associated with motor function (Bastian et al., 1999; Courchesne & Allen, 1997; Ito, 1984; Marr, 1969; Thach et al., 1992) but it may also be involved in emotion processing (Duggal, 2005; Habel et al., 2005; Liotti et al., 2000; Wiech et al., 2005), working memory (Schmahmann & Sherman, 1998; Stoodley & Schmahmann, 2009) and language (Desmond & Fiez, 1998; Fulbright et al., 1999). Recent research suggests that the cerebellum may even play a role in language-based prediction (Lesage et al., 2012). This study aims to use continuous theta-burst stimulation (cTBS) over the right lateral cerebellum to disrupt such hypothetical predictive function and monitor changes indexed by the N400 wave of event-related potentials. Cerebellar stimulation will be administered to one side in a first session and, one week later, to the other side. Before and after stimulation in each session, participants will read 40 congruent and 40 incongruent sentences, in which the final word is semantically expected or unexpected in the sentence context. Considering that the cerebellum contralateral to the language network may facilitate semantic integration, we predict that N400 amplitude will be reduced after right cerebellar cTBS relative to baseline (i.e., before stimulation) and that this difference will not be found in the case of left cerebellar cTBS. Such a result would provide tangible evidence that the cerebellum generically contributes to prediction in language processing and provide new insights into the interaction of this function with other language mechanisms in the brain.

Dace Apšvalka – Watch and learn: Motor sequence learning by observation

Supervised by Emily Cross and Richard Ramsey

Learning by observation is a fundamental way humans acquire new behaviours and problem solving skills. A large body of research suggests that physical and observational learning share a similar cognitive and neurobiological basis. When we perceive another person's actions similar representations are activated in our brain, just like if we were performing the action ourselves. However, it remains poorly understood how observational learning impacts cognitive and neural action representations, and why some people are better at learning by observation than others. In a behavioural study, we use a sequence learning paradigm to investigate the assumption that particular personality traits, and motor and cognitive abilities help explain individual differences in the efficacy of observational compared to physical learning. We hypothesise that working memory and perceptual speed as well as personality traits may positively correlate with the learning rates both for physical and observational practice conditions. Data in progress will be presented on this experiment. In addition, a neuroimaging study will be proposed that aims to explore whether observational practice develops specialized, sequence-specific, neuronal circuits in the brain, similar to those found in a previous physical practice study. Together, we hope to provide a deeper understanding of individual differences and neuronal specificity of observational learning.

Catherine Atherton – Bridging the gap between memory for faces and objects

Supervised by Stephan Boehm

It has been shown that recognition of different stimuli (e.g. familiar faces and common objects) elicit distinct behavioural and neural effects. In order to determine whether particular features of the stimuli could be responsible for these variations, investigations into other familiar stimuli (e.g. brands) that have different signatures or share commonalities, are required. Based on established recognition models (e.g. Bruce & Young, 1986), a brand recognition model was created with the aim of validating key areas of the model with targeted experiments. Experiment one used a familiarity judgement in a study-test design to look at whether priming brands is similar to objects or faces. To account for any effects of response learning- the first primed study block used the same responses as the test phase and the second study block used a reversed response. Results showed no significant effect of response learning, but the effects of perceptually-driven priming led to a reduction of response times (f (2, 94) = 24.36, p <.001) and an increase in accuracy (f (2,94) = 28.36, p <.001). These results suggest that primed brands show patterns that mirror those of objects and of faces. Experiment two (in progress) uses a familiarity judgement with a continuous recognition design (Boehm, Klostermann & Paller, 2006) and Electroencephalography (EEG). It is anticipated that we will find Event-Related Potential (ERP) components of priming such as, the early repetition effect (N250r) and the late repetition effect (N400). Further studies will look at between and within modality Old/New effects in episodic memory.

Pippa Beston – Name and shame: The power of social punishment

Supervised by Erin Heerey

Cooperation in the social world is a puzzle. It is not economically rational to cooperate with strangers, yet, this phenomenon is observed in much behaviour recorded within the lab. One factor, which seems to maintain cooperation, involves the facility to punish uncooperative individuals. In this experiment, participants played an economic game requiring them to make an investment in a 'public resource'. Previous research has used computerised paradigms to capture economic behaviour in these situations. However, contrary to this popular methodology, here, we allowed participants to interact as they would in the natural social world, with four players present in the same room. Punishment featured heavily in the game. Players were assigned to one of three different punishment conditions. The Monetary punishment condition involved halving the economic 'return' gleaned from the group investment. The recipient of this punishment remained anonymous here. However, in the Social punishment condition, the lowest contributor was 'named and shamed' in front of the group. Lastly, in the Monetary + Social punishment condition, both punishments were applied simultaneously. Due to the potential potency of the Social punishment, we predicted that this punishment type would maintain cooperation more effectively than the Monetary punishment. Results did indeed indicate that the Social punishment had a larger effect on future investment behaviour than did the Monetary condition. These findings therefore have incredible relevance to the function of modern society, and implications concerning how those who attempt to cheat the system could be encouraged to reform their behaviour in the future.

Susan Clarkson – KiVa Anti-bullying programme: A randomised controlled trial in Wales

Supervised by Judy Hutchings

KiVa is a Finnish school based anti-bullying programme that draws on research that demonstrates that bullying is a group phenomenon. Participant role research has indicated that bystanders act as "reinforcers" and assist the bully, contributing to the persistence of bullying behaviour. By changing the behaviour of the bystander, the bully's motivation is lowered and the rewards are reduced. The comprehensive KiVa programme has two components: preventive (universal) and targeted (indicated) actions. Universal actions include: class lessons, virtual learning, parent's guide, high-visibility playground vests, and posters. The indicated actions involve structured discussion for tackling reported bullying incidents. Research, conducted in Finland, has established a large and robust evidence base for the programme. Randomised and quasi-experimental trials along with a large-scale dissemination trial, which examined the roll-out of the programme in 888 schools, have demonstrated significant reductions in both self- and peer-reported bullying and victimisation. The Welsh pilot evaluation in 17 primary schools achieved positive results indicating that a more rigorous trial was justified. The randomised controlled trial funded by the BIG Lottery is providing an opportunity to examine the effectiveness and acceptability of the programme in Wales, and demonstrate the potential generalisability of the Finnish findings to a different culture and educational system.

Ceri Ellis – Investigating the interaction between language, emotion and culture in Welsh-English bilinguals

Supervised by Manon Jones

The Linguistic relativity hypothesis describes how language-specific characteristics influence the thoughts of its speakers. Despite being strongly challenged in the mid-1960s and 70s, the theory has enjoyed a recent revival, with electrophysiological evidence of linguistic relativity being shown in the lexical-semantic classifications of colours and objects. In the current studies, we are examining the evidence for linguistic relativity in higher-level semantic representations by testing Welsh-English bilinguals using ERPs.
Thus far, we have found evidence that Welsh-English bilinguals are better able to integrate high-level semantic information when the culture-content of the sentence, and language of presentation are aligned.

Therese Gilligan – Potential therapeutic application of prism adaptation for patients with left hemisphere lesions: Effects on associative word priming

Supervised by Bob Rafal

Prism adaptation (PA), a perceptual distortion technique forcing realignment between ocular- and arm- proprioceptive reference frames, has shown promise as a therapeutic intervention for a surprising range of functional disturbances related to right hemisphere lesions. The current study sought to explore the potential application of PA therapy in patients with left hemisphere lesions. Semantic priming (SP) in a lexical decision task, which has been shown to be reduced in left but not right hemisphere lesioned patients (Henik et al, 1993), was measured before and after adaptation to both right and left refracting prism (in separate sessions) in 12 patients with left hemisphere lesions. PA effectiveness was confirmed with open loop pointing tasks before, post and late following PA. Whereas there was no change in SP after PA in a group of healthy controls, a significant increase in semantic priming, compared to sham PA, was observed after PA in the patient group. These preliminary data also suggest that the increase in SP might be greater after adaptation to right than to left refracting prisms. PA may modulate mental processes mediated by the left hemisphere, and could potentially have therapeutic application.

Inez Greven – Linking person perception and person knowledge in the human brain

Supervised by Richard Ramsey

To date, neuroscience research has examined separately how we detect human agents in the environment (person perception) and how we reason about their thoughts, traits or intentions (person knowledge). Occipitotemporal cortices and fusiform gyri have been associated with person perception, whereas medial prefrontal cortex, temporoparietal junction and temporal poles have been associated with person knowledge. However, it remains unknown how multiple features of a person (e.g., thin and kind) are linked to form a holistic understanding of identity. In the current fMRI experiment, we investigated the hypothesis that when encountering another person, specialised circuits for person perception would be functionally coupled with those involved in person knowledge. In a factorial design, we paired bodies or names with traits or neutral statements and independent localiser scans identified networks associated with body perception and mental state reasoning. When observing a body paired with a trait-implying statement, person perception and person knowledge networks were preferentially engaged. In addition, functional connectivity analyses demonstrated that a region of right fusiform gyrus was functionally coupled with bilateral TPJ and right temporal pole. These results demonstrate that brain circuits for representing another person's physical appearance, such as body shape and posture, are linked to brain circuits that are engaged when reasoning about another person's trait-based character, such as whether they are friendly, helpful or generous. These data support the view that a "who" system for social cognition spans perceptual and inferential mechanisms and that these mechanisms communicate to each other when forming a representation of another's identity.

Rebekah Kaunhoven – Neurocognitive evaluation of mindfulness training in primary schools

Supervised by Dusana Dorjee

Mindfulness has been found to reduce anxiety, improve executive functions, and emotional resilience in primary school aged children. Although those findings are encouraging, there is currently a limited understanding of the mechanisms underlying the effects of mindfulness in developmental populations. The aim of this project is to evaluate the impact of mindfulness on attention control and emotional reactivity in primary school aged children using self report measures behavioural tasks and event-related potential measures. Four primary schools in North Wales, two training schools and two wait list control schools, will participate in this project. A mindfulness curriculum, 'paws.b', will be delivered over 12 weeks to pupils in the training schools by their school teachers. Sixty children aged between 7 and 11 years of age, 30 from the training schools and 30 from the comparison schools, will be assessed over three time points; pre-test, post-test and at a six month follow up. Improvements in accuracy rates on an auditory oddball task and modulations of the N2, P3a and P3b ERP components are expected after mindfulness training, indicating an increase in attention control. Improvements in accuracy rates are also expected on an emotional oddball task along with modulations of the P3b after mindfulness training, reflecting a decrease in emotional reactivity. This project will build upon previous research in this area through measuring the efficacy of mindfulness from a neurodevelopmental perspective.

Philip Nelson – The Sharing Game: An initial exploration of choice behaviour

Supervised by Carl Hughes

Fairness - or lack thereof - is a concern that runs throughout our society. How we perceive fairness is influenced, in part, by normative influences. Whilst our perception fairness influences all aspects of our lives one poignant area is that of money and it's distribution. Economic decision-making has been explored and discussed for many years but there are lingering questions that require exploration; one question this experiment sought to explore was how group identity could affect such distributions. Using the Sharing Game paradigm developed by Fantino and Kennelly (2007, 2009) Participants, faced with a series of decisions had to distribute set sums of money between themselves and an unseen participant. Participants could distribute relatively more to themselves than their opponent but not maximise their overall possible return, or they could distribute relatively less to themselves but maximise their overall return, and finally they could choose to distribute equally maximising neither their own nor the other players return, but achieving a numerical equality. Participants were faced with four blocks; the first served as a baseline, the following three explored the influence of group membership and identity. A fake personality test was used to create in-group and out-group conditions for each participant. Of interest was whether the sharing strategies of individual participants changed depending on the group identity of the 'partner' that they were playing the game with. The results suggest participants were insensitive to the group identity intervention though did distribute slightly more to player 2 across all the trials.

Zoe Oliver – The time-course of 3D object recognition in mono and stereo viewing conditions

Supervised by Charles Leek

Image classification can occur as quickly as 120ms post-stimulus onset (Thorpe et al., 1996), however the time course of different perceptual processes underlying object recognition is unclear, including the role of stereo information. We investigated these issues using event-related potentials (ERPs). Participants completed an object recognition task in which they had to make recognition judgments about 3D surface rendered multi-part novel objects after learning a subset of these in training sessions. One group of subjects learned the objects and were tested in mono, and another in stereo. We are interested to see if there is some modulation in the recognition index (the earliest point in the ERPs where there is a reliable difference between the target and non-target stimuli) for mono vs. stereo viewing, either in amplitude or a shift in latency.

Catherine Sharp – Increasing pre-school children's consumption of fruit and vegetables: A streamlined modelling and rewards intervention

Supervised by Mihela Erjavec

Four nursery schools participated in a controlled evaluation of a modelling and rewards intervention designed to increase fruit and vegetable (F&V) consumption in 3-4 year old children. The nurseries matched by number of children were randomly allocated to either intervention or control condition. During a 4-d baseline, all participants (N=180) received a standardised portion of target F&V, a different pair each day. Over the next 20-d (Intensive phase), in the Intervention nurseries only, the target foods continued to be presented on a 4-d cycle. The children watched a Food Dudes video showing four characters eating F&V and getting "special energy"; then received small-customised rewards if they ate the provided target foods. After the Intensive phase, a 4-d follow-up was conducted in all nurseries under baseline conditions. Then for three-months, the intervention children brought F&V into nursery once-a-week for "rainbow picnics", and received rewards for their consumption. A final follow-up was conducted in all nurseries, 3-months after the Intensive phase. Children's consumption of target foods was measured by visual inspection on a five-point scale (0%; 25%; 50%; 75%; 100%), and double blind-coded. Consumption of F&V increased significantly in both conditions from baseline to 3-months follow-up, however, the Intervention condition increased significantly more than the Control condition (p=.001, r=-.25; and p<.0001, r=-.34, respectively). The Food Dudes intervention made the largest and lasting increases in F&V consumption. Greater monitoring of control nurseries is required in future.

Leanne Simpson – Neurocognitive processes underpinning different aspects of mental resilience in British military personnel

Supervised by Paul Downing

A multidisciplinary approach to understanding Mental Resilience (MR); combining a psychometric approach to understand the multiple dimensions of MR, and to measure individual differences in these dimensions. In addition the research will utilise a functional neuroimaging approach to reveal the brain networks that underpin MR. The overall rationale of the research is that a neurocognitive model of the different dimensions of MR will produce a deeper understanding of the underpinnings of MR behaviour. This, in combination with psychometric measures, will support better forecasting of the performance and mental well being of military personnel. The specific goals of the research are to: 1) extend the conceptualisation of MR to include performance and emotional dimensions; 2) understand the neural underpinnings of these different aspects of MR, and 3) examine how psychometric profiles, combined with individual fMRI measures of brain activity, predict performance and mental well-being in military operational contexts. The research is divided into three studies: study 1 uses a cross sectional survey-based design to develop a psychometrically robust measure of MR. Study 2 develops experimental tasks that are suitable for fMRI, Virtual Battle Space (VBS) programmes are planned to be uterlised to provide realistic battlefield simulations. Study 3, fMRI will enable us to identify core brain networks involved in performing the tasks developed in Study 2. Individual differences in their patterns of neural activity may relate to individual differences and informant rated differences in MR. Such an approach offers the possibility of informing military recruitment and training procedures for the benefit of those personnel.

Laura-Jean Stokes – Food-seeking behaviours in obesity: Validating an experimental model

Supervised by Robert Rogers

Evolutionary accounts of obesity posit a mismatch between inherited food-seeking strategies that involve the rapid consumption of high energy but scarce foods and today's obeso-genic environment in which such foods are readily available. However, there has been little experimental research to validate this perspective. Typically, animals are risk-seeking when confronted with options to secure food quickly, even at the risk of much longer delays to the next feeding opportunity. Using a novel snacking task, we investigated how 60 young female adults chose to schedule the consumption of favoured snacks. Participants were asked to fast for 2 hours following breakfast or lunch and then invited to make a series of choices between actions linked to fixed delays of 15s before the delivery of edible treats or variable delays of either 0s or 30s. Increasing BMI was associated with preference for choices that delivered treats following either variable delays; while disposition to limit food intake (measured with scales of cognitive restraint) was associated with preference for fixed delays to food, possibly reflecting preferences for paced consumption. Obesity may be linked to rapid discounting of delayed rewards. These results suggest that weight and cognitive restraint exert opposing influences upon peoples' food-seeking behaviours, and may be expressed in divergent food-foraging strategies.

Dilini Sumanapala – Development of differentiated action representations for physical and observational learning

Supervised by Emily Cross

The acquisition of new motor skills is often facilitated by both observation as well as physical practice. Previous literature has demonstrated that both physical practice and observation of a model is associated with common regions of premotor and parietal activation. However, the degree of differentiation between action representations acquired through physical versus observational training has yet to be systematically assessed. The current study uses a whole body dance training paradigm to examine whether individuals can explicitly discriminate between whole body actions that have been **physically practiced** from actions that have only been **observed** over the course of multiple days of training. Participants successfully discriminated between physically trained, observed, and untrained actions, indicating that training modality may affect the exact nature of how action representations are processed in the brain.