The University of Edinburgh
School of Philosophy, Psychology & Language Sciences

Psychology Final Honours Projects
Suggested Topics 2014-15

Signing Up for Projects

This list is designed to help you match your interests with a potential supervisor. You do not need to register your project formally until Week 3 of semester 1 2014/15, but it is helpful to many students to have this list now, to enable them to talk to potential supervisors and agree on a project choice before the start of the next academic year. It is up to you to find a supervisor. Contact details of each supervisor are given to allow you to email or arrange meetings.

Students may work together in pairs on any project, and are encouraged to do so, but only in exceptional circumstances should this number be exceeded. In recent years, almost 40% of projects have been based on the student's own idea rather than a staff member. However, as with literature reviews, make sure you are choosing a topic which a staff member is willing to supervise. If the supervisor is outwith the department, e.g. a clinical or educational psychologist, then you must have a member of staff agreeing to act as internal supervisor when you register the project at the beginning of semester 1.

Dr Alexa Morcom
Psychology 4 Course Organiser
April 2014

Supervisors

<table>
<thead>
<tr>
<th>Dr Sharon Abrahams</th>
<th>Dr Wendy Johnson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Bonnie Auyeung</td>
<td>Dr Billy Lee</td>
</tr>
<tr>
<td>Professor Elizabeth Austin</td>
<td>Dr Stephen Loughan</td>
</tr>
<tr>
<td>Dr Thomas Bak</td>
<td>Dr Sarah MacPherson</td>
</tr>
<tr>
<td>Professor Tim Bates</td>
<td>Dr Adam Moore</td>
</tr>
<tr>
<td>Dr Tom Booth</td>
<td>Dr Candice Morey</td>
</tr>
<tr>
<td>Dr David Carmel</td>
<td>Dr Rene Mottus</td>
</tr>
<tr>
<td>Dr Nicolas Chevalier</td>
<td>Dr Mante Nieuwland</td>
</tr>
<tr>
<td>Dr Martin Corley</td>
<td>Dr Antje Nuthmann</td>
</tr>
<tr>
<td>Prof Sergio Della Sala</td>
<td>Prof Martin Pickering</td>
</tr>
<tr>
<td>Dr Morag Donaldson</td>
<td>Dr Hugh Rabagliati</td>
</tr>
<tr>
<td>Dr Alex Doumas</td>
<td>Dr Richard Shilcock</td>
</tr>
<tr>
<td>Dr Catharine Gale</td>
<td>Dr Jools Simner</td>
</tr>
<tr>
<td>Dr Elena Gherri</td>
<td>Dr Sue Widdicombe</td>
</tr>
</tbody>
</table>
Below are some suggested research topics for dissertation projects. I am willing to discuss other areas within my discipline of clinical neuropsychology with a particular focus on executive and memory functions and the effects of aging or neurodegenerative disease. The projects listed below investigate the effect of normal aging. Anyone wishing to undertake a patient group project would need to access this group (e.g. via voluntary centres) independently.

1. Aging and social cognition: The new Social Scenarios Test
A number of neurodegenerative diseases present with deficits in social cognition. However there is still the need for ecologically valid and sensitive tools to screen individuals in clinical settings. To date there is currently no social cognitive task that is specifically designed for neurodegenerative populations. This project will use a newly designed test: The Social Scenarios Test, and investigate the effect of aging on performance.


2. The Edinburgh Cognitive and Behavioural ALS Screen (ECAS)
This project will investigate a newly developed cognitive screening test for patients with motor neurone disease (MND). The screen is a brief 20 minute interview which assesses executive and language functions, fluency, memory and visuospatial functions. This project will further develop the screen by investigating the effects of age and education particularly on tasks which may be sensitive to these variables such as letter fluency.


**PROF ELIZABETH AUSTIN**
Email: elizabeth.austin@ed.ac.uk

1. Validation of a new scale assessing the use of strategies to change another person’s mood or emotional state
This scale has recently been developed, and some preliminary information about its factor structure and associations with personality (Five Factor and the Dark Triad) is available (Austin & O’Donnell, 2013; Austin, Saklofske, Smith, & Tohver, in press). The scale was designed to broaden the coverage of mood-changing strategies by including both mood-improving and mood-worsening behaviours, as most alternative scales focus on the former. Additional data will be collected in one or two projects which will further examine the associations of the scale’s subcomponents (e.g. with ability measures of emotional intelligence, theory of mind, emotion perception).

References:

2. Measurements and correlates of maximization
Maximization is the tendency to try to find optimal solutions to complex decision-making problems by means of an exhaustive examination of all the potential options. As originally characterised and measured (Maximization Scale, Schwartz et al., 2002), maximization was regarded as maladaptive and was expected to be negatively related to well-being.
Subsequent work has however suggested that maximization is actually multidimensional, e.g. factor analysis of the Schwartz scale indicated subcomponents of alternative search, decision difficulty and high standards, with the first two appearing to be maladaptive and the third adaptive. Some alternatives to the original Schwartz scale have also been devised. The project will examine the correlations of maximization subcomponents measured using several of the available scales with personality and with theoretically-related constructs such as coping, perfectionism and emotion regulation. For a similar study and a general overview of this area, see Giacopelli et al. (2014).

References:

3. Traits which are related to higher persistence and lower stress
There is a family of traits which are related to persistence and which appear to buffer against stress. Examples are grit (Duckworth & Quinn, 2009) and mental toughness (Guillen & Laborde, 2014). This project will examine the association of a selection of these persistence scales with theoretically-linked dispositional and behavioural measures and also investigate the incremental validity of persistence measures over personality, the extent to which different persistence measures overlap, and whether it is useful to extract a higher-order general factor from these measures.

References:

DR BONNIE AUYEUNG
Email: bonnie.auyeung@ed.ac.uk

The effects of oxytocin on social and non-social cognition in individuals with and without autism

Oxytocin is a neuropeptide, which is unique to mammals. A great deal of research has investigated the critical role this hormone plays in social behaviour in humans (Heinrichs, von Dawans, & Domes, 2009). Converging evidence suggests that irregularities in the processing of the hormone oxytocin may contribute to the behavioural abnormalities seen in individuals with autism (Carter, 2007). Autism is characterised by difficulties in social communication alongside repetitive behaviours and unusually narrow interests. A double-blind, placebo-controlled, within-subjects study was conducted to examine if the intranasal administration of 24IU oxytocin affects performance on a series of social and non-social cognitive tasks accompanied by eye tracking. This project will suit a pair of students working together to examine the behavioural and eye-tracking data collected as part of this study.

References:
1. Bilingualism, Brain and Cognition

Bilingualism is becoming a focus of growing scientific interest. Recent studies suggest benefits, but also costs of bilingualism in different cognitive domains, including not only language itself but also attention, executive functions and social cognition. However, many questions remain open such as the influence of the age of acquisition, pattern of language use, number of languages spoken, proficiency and the linguistic distance between the respective languages.

Reference:

2. Language in Schizophrenia

Traditionally, changes in language function observed in schizophrenia have been interpreted mainly as semantic, related to the meaning of the words. However, recent studies suggest that language of schizophrenic patients might also be different in terms of its syntax, use of different word classes and grammatical forms. This project can benefit from a large existing database of longitudinal interviews made with individuals with increased risk of schizophrenia. Some of them have developed a psychotic illness, other have not. This makes it possible to explore whether any language changes might be a predictor of the disease.

Reference:

PROF TIM BATES

Email: tim.bates@ed.ac.uk

1. Raising Capability: Can we teach IQ, with lasting results for achievement?

In this project we will conduct research on whether training can raise IQ scores. Dweck and others have suggested that simple manipulations of expectation can make lasting differences. This contrasts with very expensive studies which appeared to fail in this task. Why?

Here’s a gentle if somewhat dated introduction to this idea.

A quick look on Google will show many very recent references to this same topic. If you find the idea engaging, get in touch.

2. Is self-control hard work?

Since Aristotle and Galton, research has examined the role and origins of agency (e.g. Archontaki, Lewis and Bates, 2012) and willpower (for instance Baumeister 2012, Job, Dweck, & Walton, 2010). We will conduct experimental studies testing how internal resources enable our ability for self-control and the exertion of agency.

You might enjoy reading:
http://www.heckmanequation.org/heckman-equation-slideshow

3. I am also open to other interesting topics, including aesthetics – a collaboration with the art college or architecture school would be good – genetics: We have resources for a wide range of twin studies.
DR TOM BOOTH  
Email: tom.booth@ed.ac.uk  

Broad Topics:  
Personality, Individual Differences, Quantitative Methods.  
The Journal of Research in Personality has recently placed an emphasis on replication attempts of studies published in the journal over the last five years (see editorial comment here http://www.journals.elsevier.com/journal-of-research-in-personality/news/professor-richard-lucas-encouraging-replication-studies/). I would be interested in supervising replication attempts of published studies from this journal. Students, either individually or in pairs, should find a paper in the journal they believe to be interesting and write a brief statement explaining;  
a) Why they believe it to be interesting, and  
b) Why they believe it is a study that can be reasonably completed for their undergraduate project (think about timelines etc.).

DR DAVID CARMEL  
Email: dave.carmel@ed.ac.uk  

1. and 2. The involvement of high-level brain regions in visual awareness  
Our perceptual systems constantly try to comprehend sensory inputs. Bistable stimuli, which give rise to more than one possible percept, thus serve as invaluable tools for understanding the mechanisms underlying conscious perception: An unchanging stimulus leads to alternating percepts; as the only change happening is within the brain, understanding this process can shed light on the mechanisms that determine how the brain selects information for conscious awareness. Neuroimaging studies have shown that high-level brain regions – right parietal and frontal cortex – are involved in bistable perception. However, such correlational findings cannot establish what causal role (if any) these regions play. The next step, therefore, is to manipulate brain activity in these regions and measure the effects this has on bistable perception. Previous studies (Carmel et al, 2010; Kanai et al, 2011) have demonstrated that magnetic stimulation of parietal cortex can alter the rate of perceptual switches in binocular rivalry.  
This year I am offering two projects aimed at establishing the precise role these areas play in shaping visual awareness: In both, we will use tDCS (transcranial direct current stimulation) to facilitate activity in frontal and parietal cortex, and investigate these areas’ involvement in binocular rivalry. One project will investigate whether stimulation will affect the brain’s ability to predict which stimulus will come next and thus bias the outcome of rivalry (Denison et al, 2011); the second project will investigate whether brain stimulation can help stabilize binocular rivalry when the stimulus is switched off and then returned (Leopold et al, 2002). Each of these projects will require collaboration between two students.

References:  

3. Learning to pay attention: The effect of practice on perceptual load  
Do we perceive information that we don’t pay attention to? Recent research has shown that the answer to this question depends on how much perceptual load the task we’re doing exerts: If the task exhausts perceptual resources, irrelevant information will not be perceived;
however, if the perceptual load of the task is low, the remaining resources will ‘spill over’, and unattended information will be perceived and may affect behaviour.

Although a large number of studies has demonstrated this, we know very little about the effect of practice: As we become experienced at performing a task, it gets easier; would practice on a task thus change its perceptual load, leading to a change in how much irrelevant information can be perceived while doing it?

In this project we will have participants perform a standard perceptual load task that involves ignoring distractors; we will examine both whether the influence of such distractors increases with time under high perceptual load, and whether the ability to ignore them under low perceptual load changes with time.

**References:**

### 4. Perceptual asymmetries across the visual field

We normally assume that our vision is roughly the same across the visual field, with visual acuity being best at fixation and decreasing gradually but equally in all directions as the distance from fixation increases. This is not the case. Various asymmetries have been found, including better visual performance at similar distances from fixation on the horizontal than the vertical midline, and better performance in the lower than the upper half of the vertical midline (Abrams et al, 2012). Performance has so far been found to be similar across inter-cardinal locations (i.e., on the diagonals).

Perceptual learning is the improvement in performing a perceptual task that results from practice. In vision, perceptual learning is often highly specific to the trained locations in the visual field, indicating an early (retinotopic) cortical locus of the plasticity underlying the learning. But the way the specificity of perceptual learning is usually tested is problematic: observers are trained with stimuli that appear in one location, and improve at doing the perceptual task; then, they are tested with stimuli that appear at a different location, and are usually found to be worse. But to draw from this the conclusion that perceptual learning was location-specific, you must assume the two locations were similar to begin with.

The most widely used task in perceptual learning studies is Karni & Sagi's (1991) texture discrimination task (TDT). In almost all studies to date, a location in the top left of the visual field was trained, and then a location in the bottom right was tested. In this project we will test whether performance on the TDT is the same in different locations (spoiler: I've already done some work showing that it isn't, but we need to substantiate it with further experiments).

**References**
DR NICOLAS CHEVALIER
Email: nicolas.chevalier@ed.ac.uk

I am prepared to supervise projects investigating how children regulate their thoughts and actions. Potential subjects include (but are not limited to) processing of environmental information to decide what to do; decision on how to best control thoughts and actions based on task demands and available means; influence of the social context. I’ll be happy to discuss related topics with motivated students.

References:

DR MARTIN CORLEY
Email: martin.corley@ed.ac.uk

1. Comprehension of disfluent speech
It’s been known for a while that when speakers hesitate, for example saying “um”, “er”, or “like”, listeners’ comprehension processes are affected: They seem to change their predictions of what will be said, and they are more likely to remember hearing words that follow disfluencies. However, to date, our understanding of exactly how disfluencies affect both the processing and the eventual comprehension of messages is incomplete. I’m interested in supervising projects on a range of topics to do with this area, including:

- The ways in which disfluencies affect attention, using techniques based on phonetic discrimination tasks;

- What exactly constitutes a “disfluency”, using eyetracking or other methodologies;
  - What listeners think of disfluent speakers, using experimental “games”.

2. The “Little Voice Inside Your Head”
We all experience an inner voice, but what is its relationship to overt speech? One set of studies suggests that our inner voice is like an “underspecified version” of our overt speech, which lacks in phonetic detail. I’m not sure that’s true; but showing that it isn’t is a tricky proposition! If you fancy a challenge, this is for you: It will probably involve fiendishly complicated tongue-twisters.

**PROF SERGIO DELLA SALA**
Email: sergio@ed.ac.uk

**Students’ own ideas**
In addition to the following topics, I will be happy to discuss students’ own ideas for projects related to cognitive or experimental neuropsychology.

1. **Context dependency and material specificity in retroactive interference**
Interfering effect of later processing on recall is known as retroactive interference. Context dependency implies that material learned in one environment may be more difficult to recall in a different environment. The role of context dependency on retroactive interference has been little explored. Aim of this project is to find out whether or not the environment plays any role in minimising retroactive interference effect, whether interference is greater with material similar to that to be recalled, and whether either of these variables interact with delay.

**References:**

2. **Where do we sit at the movie, or on an airplane? Exploring pseudoneglect in real world**
Normal people tend to analyse the right side of space better than the left. We all seem to prefer the right hemi-space to the left as a result of a different distribution of spatial attention in our brain. This project is aimed at finding out whether or not this bias applies to everyday tasks, like choosing a seat at the movie, or on an airplane.

**References:**

3. **Short-term memory binding**
Humans use temporary binding skills to comply with a number of requirements in everyday life, for instance when trying to keep track of whether we have just taken the blue round pill or the green oval pill. In experimental setting, this ability to remember colour and shape combinations is compared with the ability to remember sets of individual features, like sets of colours or sets of shapes. Unlike associative memory tests that are often used in clinical assessment there is no learning involved; the integrated combinations of colours and shapes have to be remembered for only a few seconds, and then they are changed on the next trial.
Short-term memory binding tasks proved exempt from an effect of healthy ageing but showed a clear and specific effect in some forms of dementia, like Alzheimer’s disease. This makes them a suitable cognitive marker for pathological ageing. This project aims at exploring the cognitive underpinnings of short-term memory binding.

References:

4. Mirror writing in pre-school and children or in children with learning difficulties
Mirror writing occurs when individual letters and whole word strings are produced in reverse direction. The phenomenon has been reported in patients following brain damage as well as in normal left-handers and in pre-school children. Different hypotheses have been put forward to interpret mirror writing. Geniuses, like Leonardo or L. Carroll, mirror wrote. However, mirror writing has been associated with low performance in children learning difficulties. Aim of this project is to study mirror writing in different groups.

References:

DR MORAG DONALDSON
Email: morag.donaldson@ed.ac.uk

I am interested in two main areas: (a) children’s linguistic and cognitive development, (b) the development of university students’ study skills. Some specific topics within these areas are outlined below but I would also be happy to discuss with students their own ideas for projects on related topics.

1. Children’s causal explanations of emotional experiences
How does children’s ability to explain and understand their own and other people’s emotional experiences develop? Previous research has indicated that verbal interactions play a key role in the development of emotional understanding (e.g., Tenenbaum et al., 2008). This raises the question of how to support the development of emotional understanding in children whose linguistic abilities are limited. This project could investigate the extent to which visually supportive cues can be used to enhance children’s ability to produce and/or understand explanations of emotional experiences.

References:
2. How do children learn emotion words?

Children's use and understanding of words for emotions (e.g. happy, scared, disgusted, disappointed) is generally regarded as being an important aspect of their ability to understand and regulate their own and other people's emotions. This project will investigate how children's understanding of the meanings of emotion words develops in different contexts. For example, what is the nature of the interplay amongst visual, vocal and linguistic cues?

References:

3. Can children's production of complex sentences be primed?

There is evidence from syntactic priming experiments that young children's use of particular syntactic constructions (e.g. active vs passive sentences) in single clause sentences is influenced by the constructions they hear an interlocutor using. The aim of this project will be to investigate whether priming effects are also obtained when children are producing sentences consisting of more than one clause. For example, can children be primed to produce sentences containing verb-phrase anaphora (e.g., John is eating an ice-cream and so is Mary) rather than repeating the full verb-phrase in the second clause (e.g., John is eating an ice-cream and Mary is eating an ice-cream)? This question is important both theoretically (e.g., in terms of the nature of children's mental representations of complex sentences) and practically (e.g., in terms of how children might be encouraged to produce more cohesive discourse).

References:

4. How do university students' essay writing skills develop?

Psychology students' conceptions of how to write a good psychology essay have been found to develop during their first year of study (McCune, 2004). In particular, students become increasingly aware of how to structure their arguments, to use evidence to support their arguments and to draw conclusions. This project could either investigate how students' conceptions of essay writing develop further in later years of study or could evaluate the effectiveness of instruction strategies designed to improve students' ability to construct written arguments (see Butler and Britt, 2011).

References:
My research is focused on answering the questions: How do humans represent information, and how do we learn these representations? Specifically, I am interested in how humans learn relational concepts (like above, chases, or ameliorates) from real world examples, how we represent these concepts, and how we use these concepts in the service of solving problems. Understanding how humans represent and reason using relations is important because relational thinking—thinking that is constrained by the relational roles that objects play rather than simply the features of those objects—is a fundamental component of human cognition (e.g., Gentner, 2003; Holyoak, 2012). In fact, the ability to learn and reason about relations might be the primary difference between human and non-human animal cognition (Penn et al., 2008). Because relational thinking is ubiquitous in human cognition, my research has important implications within the broad field of cognitive science, as well as psychology, and education. In addition (as elaborated below), my work employs formal computational approaches and thus also has important implications for domains like information and computer science.

I have three ongoing projects that students may become involved with. I am especially excited to work with students interested in conducting developmental experiments with children. These experiments do, however, take some time to complete, so do get in contact with me as soon as possible if you are interested in doing a developmental project.

1. Two very important domains that require relational thinking are logic and mathematics. One current line of research involves using a computational architecture that learns relational concepts from real-world examples (DORA; Doumas et al., 2008) to drive developing learning programs that can help children and adults learn logical rules and mathematical operations. Specifically, we use a kind of learning called progressive alignment (wherein training starts with highly similar inter-category comparisons and moves toward progressively more distant comparisons) to train children to reason about fractions and adults to reason using conditional syllogisms.

2. A second line of research concerns understanding how cognitive capacities like working memory affect our ability to make analogies. With both children and adults I am exploring how performing distracting tasks that require working memory make analogies more difficult, and what kinds of analogies are most affected.

3. One of the DORA (Doumas et al., 2008) model’s more counterintuitive predictions is that mapping co-occurring sets of single-place predicates should produce relations composed of those single-place predicate sets, even if the sets in question represent odd pairings. For example, if DORA compares bouncing (ball1) and spinning (triangle1) to bouncing (block1) and spinning (star1), then it will form an odd relation composed of these single-place predicates (e.g., bouncing-spinning (block1, star1)). I am currently testing this prediction in experiments with both adults and children.

Finally, I am happy to supervise students on other projects related to learning relational concepts and using relational concepts to solve problems. Please contact me if you have a project in mind.

References:


DR CATHARINE GALE
Email: cgale@staffmail.ed.ac.uk

My areas of expertise are cognitive and life course epidemiology. A major focus of my research is how cognitive ability influences health and wellbeing through the life course. I am also interested in how personality traits and wellbeing affect health outcomes.

Below are two suggested research topics for dissertation projects. Both involve secondary analysis of data obtained from the UK Data Archive. This means that students would not have to collect their own data. Secondary data analysis saves time, but also has the advantage that the datasets are often much larger and of far higher quality than an individual researcher could assemble on their own. There are many useful research skills to be gained from secondary data analysis, including management of large datasets.

Students interested in embarking on these projects will need to be competent in the use of regression analysis.

1. Childhood intelligence and drinking behaviour at age 50 years

There is evidence that people who score higher on tests of intelligence in youth tend to behave in a healthier fashion as adults as regards exercise, diet and smoking. Drinking behaviour may perhaps be an exception to this pattern but the evidence on this is sparse. Studies in two UK cohorts found that men and women who had a higher IQ in childhood drank alcohol more frequently, had a higher weekly alcohol intake, and were more likely to have an alcohol problem. In one of these studies, these relationships were stronger in women than in men. The aim of this project is to examine the relationship between intelligence in childhood and drinking behaviour in men and women from a large national birth cohort at age 50 years and to explore factors that might help to explain any associations. There would also be scope to examine whether any associations between childhood IQ and adult drinking behaviour varied according to personality. The project will use data from the National Child Development Survey (the 1958 birth cohort).

References:

2. Mental wellbeing and later physical health

In recent years there has been growing evidence to suggest that maintaining a strong sense of mental wellbeing may be a potential resource for generally ageing well. Longitudinal studies have found that older people with greater wellbeing are less likely to develop problems with mobility or other activities of daily life, make a better recovery after a stroke, are less likely to become physically frail, and tend to live longer. In all these studies, the protective effect of mental wellbeing persisted after adjustment for negative affect, and so was not due merely to the absence of symptoms of depression. In younger people too, higher levels of mental wellbeing have been linked with a reduced risk of death, but whether
wellbeing has other potential benefits for physical health at younger ages is unclear. The aim of this project is to examine the relationship between mental wellbeing and several later physical health outcomes in a nationally-representative sample of people aged 16 and over and to explore factors that may explain any associations. The project will use data from Understanding Society, also known as the United Kingdom Household Longitudinal Study.  

References:
Buck N, McFall S. Understanding Society: design overview. Longitudinal and Life Course Studies 2012; 3:5–17

DR ELENA GHERRI
Email: elena.gherri@ed.ac.uk

1. Perceptual load in a tactile flanker task
In the tactile modality, the presence of tactile distractors can impair the detection and discrimination of tactile targets presented simultaneously (e.g. Evans & Craig, 1992; Soto-Faraco, Ronald, & Spence, 2004). In these studies, tactile stimuli (both target and distractors) were presented to both hands simultaneously. However, the mechanisms underlying within-hand and between-hand tactile selection might be different, given that a different pattern of tactile ERP modulations is obtained when the attentional selection is performed between the hands (c.f. Eimer & Forster, 2003a) or within the same hand (c.f. Eimer & Forster, 2003b). Aim of the present project is to investigate whether an analogous interference effect would emerge when target and distractors are presented to fingers of the same hand, establishing a within-hand tactile equivalent of the flanker task (Eriksen & Eriksen, 1974). Crucially, by manipulating the physical difference between the target and the distractors (high and low perceptual load conditions) it will be possible to evaluate whether the interference of incompatible distractors is reduced under high perceptual load condition, as postulated by the load theory of selective attention (Lavie, Hirst, de Fockert & Viding, 2004).

References:

2. Conflict monitoring across sensory modalities
The cognitive adaptation phenomenon can be observed in conflict tasks (Flanker task, Simon task, Stroop task) when the sequential analysis of trials is carried out (that is when the compatibility of both current and preceding trials are considered). Typically, the compatibility effect is reduced after the consecutive presentation of two incompatible trials (e.g. Gratton, Coles, and Donchin, 1992). According to the response conflict monitoring hypothesis
(Botvinick, Braver, Barch, Carter, and Cohen, 2001), the response conflict in the preceding trial elicit a stronger top-down control that improve performance in subsequent trials. The aim of this project is to test whether the mechanisms responsible for conflict monitoring operate in a supra-modal fashion; that is whether these conflict-adaptation effects will still be observed when stimuli of different sensory modalities are presented on successive trials.

References:

3. Space coding in touch
How do we code the location of a tactile stimulus that is presented to our body? While the primary somatosensory cortex encodes the location of a tactile stimulus on the skin surface independently of body location, higher level brain areas integrate this information with the location of the body in external space. Recent studies on tactile perception have shown that tactile stimuli are remapped from somatotopic to external space before they can be consciously perceived (Azanon & Soto-Faraco, 2008). However, little is known about the strength and characteristics of these reference frames. In this project, we will use the Simon task as a tool (Simon, 1969; for a recent review, see Hommel, 2010) to investigate the reference frames employed to encode tactile stimuli presented to our hands.

References:

4. The effects of gaze and covert attention on tactile processing
When we direct our gaze to one of our hands (even when vision of the hand is prevented), the processing of tactile stimuli presented to the gazed hand is enhanced (Forster & Eimer, 2005). The effect of gaze on tactile processing is very similar to the ERP modulations of tactile stimuli that are usually found when participants covertly attend one of their hands while maintaining their gaze on a central fixation point. Furthermore, responses to tactile stimuli presented to the gazed hand are faster than those to the same tactile stimuli when presented to the other non gazed hand (c.f. Driver & Grossenbacher, 1996; Honoré, Bourdeaud'hui & Sparrow, 1989). The aim of this project is to systematically investigate the nature of this gaze effect and its links with covert tactile attention. Is the effect of gaze on tactile processing independent from endogenous attention? What happens when gaze and attention are simultaneously directed to different hands? Is the effect of gaze dependent on the availability of visual information (what happens when the hand are not visible?).

References:
DR WENDY JOHNSON  
Email: wjohnson@staffmail.ed.ac.uk

I am prepared to supervise Final Honours projects investigating individual differences in intelligence, achievement, personality, and health developmental processes throughout the lifespan. Prior students have completed projects involving academic achievement motivation, narcissism, music preferences, intelligence, socioeconomic status, tuition fees, and other topics in a variety of samples. Interested students should contact me to discuss project ideas and design. I can be especially helpful in suggesting methodology.

For conceptual background reading, see:

Reference:  

DR BILLY LEE  
Email: b.lee@ed.ac.uk

Exploring Lived Experience  

I am interested in phenomenological psychology and use experience-near qualitative methods to explore and understand people’s lived experiences. I welcome project proposals on any area of lived experience that holds interest or significance for the student. As part of your dissertation you will receive training in experience-near interviewing and analysis following the method of Interpretative Phenomenological Analysis (IPA). This is a relatively new psychological technique that has been used to understand personal experiences around health, sexuality, gender, and identity. IPA is inductive rather than hypothesis driven. You will learn how to bracket your preconceptions in order to attempt to get an "insider perspective" of your participants' experiences. As part of your project you will identify, recruit and interview up to six participants; transcribe the audio recordings; analyze the transcripts; and contextualise your findings. Your data should enable you to critique existing psychological knowledge using the experiential accounts of your participants. Access to a special participant group, perhaps via contacts with a charity or other organisation, is a distinct advantage. I prefer to supervise students who are able to work as a pair.

References:  

DR STEPHEN LOUGHAN (TBA)
My research interests are frontal lobe functions such as memory, executive abilities and social cognition and how they are affected by healthy adult ageing and brain damage. I am happy to discuss the supervision of other potential projects related to my research, in addition to the dissertation projects outlined below.

1. Task-set switching in healthy ageing
The frontal executive hypothesis of ageing proposes that age-related decline in the performance on frontal executive tasks is due to deterioration of the prefrontal cortex. Older adults are reported to perform poorly on tests assessing frontal executive abilities such as the Wisconsin Card-Sorting test, Trail Making Test and Brixton Spatial Anticipation test, all of which require participants to switch from one ‘task-set’ to another. However, task-set switching relies on several different prefrontal processes (e.g., energisation, monitoring, task setting). The aim of this project is to use a task-set switching paradigm adopted by Shallice et al. (2008) to determine whether certain prefrontal processes are selectively disrupted by healthy adult aging.

References:

2. Emotional processing and healthy adult ageing
Studies of emotional processing have shown that older adults are impaired in their ability to identify emotions from unimodal presentation of faces, voices or body posture compared to younger adults. However, understanding emotions in the real world involves the integration of sensory information from multiple sensory modalities. My initial work has shown that age differences in the ability to recognise emotions are not found when the emotions are presented through faces and voices. This project will investigate younger and older adults’ ability to recognise emotions through the presentation of multimodal social cues.

References:

3. Social cognition in later life
In everyday social interactions, individuals must be able to accurately process, respond to, and remember social cues. Yet, research has shown that older adults often demonstrate difficulty recognising social and emotional cues (Isaacowitz et al., 2007; Ruffman et al., 2008; see also Ebner and Johnson, 2010). It has been suggested that older adult might perform more poorly than younger adults because they have a smaller social circles and experience fewer social interactions than younger adults. In this project, you will examine the influence of social relationships and healthy adult ageing on tests of social cognition.


4. Context effects on recognition memory in healthy adult ageing
Individuals show a decline in source memory abilities with advancing age. However, there remains a debate in the literature whether older adults still benefit from the re-establishment
of the context (i.e., semantic, perceptual) associated with encoding the target items in memory, despite their source memory difficulties. This project will investigate this context effect further in healthy ageing and the role that strategic retrieval processes might play when explicitly assessing memory for original versus rearranged target-context pairs.

References:

DR ADAM MOORE
Email: amoore23@staffmail.ed.ac.uk

1. The Role of Intelligence and Personality in the Foundations of Moral Intuition.
This project examines whether or not individual differences in moral intuition, measured by the Moral Foundations Questionnaire, are predicted in theoretically meaningful ways from a combination of fluid intelligence, personality, and resistance to intuitive illusions.

Sample citations:

2. Working Memory Capacity and Fluency Effects: Is Subjective Difficulty Calibrated by Ability?
This project will investigate whether or not individual differences in working memory capacity predict susceptibility to fluency effects – the finding that making a task seem subjectively more difficult causes people to switch from System 1 to System 2 thinking, and conversely, that subjective feelings of ease lure people into using System 1 thinking to solve problems.

Sample citations:

3. The Morality of Meat: Do reminders of animal suffering decrease appetite for meat?
This study follows up on recent work showing that people reduce the negative affect they feel in response to animal suffering by denying that animals that are traditional sources of food
have minds. We will investigate if overt and subtle cues/reminders of the mental abilities of animals will impact people’s preference for meat as a food.

**Sample reading list:**

**DR CANDICE MOREY**  
Email: cmorey@staffmail.ed.ac.uk

I study working memory and attention, particularly how, when, and why verbal and visual representations interfere with each other. I am prepared to supervise projects investigating interference between verbal and visual memories or projects investigating how verbal and visual features (such as a name and a face) can become associated with each other. Possible methods include analysis of accuracy and response time on memory tasks, and analysis of eye movements. It is possible for your project to have a developmental component, comparing memory performance of young adults with memory performance in either healthy elderly or child populations. I would be happy to talk with prospective students about various options.

**References:**

**DR MANTE NIEUWLAND**  
Email: m.nieuwland@ed.ac.uk

I am prepared to supervise Final Honours projects investigating various aspects of sentence comprehension using behavioural methods and possibly electroencephalography (EEG/ERP). In addition to the project proposals below, I am happy to supervise any other projects in the area of language comprehension, as long as I agree that the project is feasible.

1. The role of temporal terms (‘before’, ‘after’) in sentence comprehension. Temporal terms allow people to describe events in a non-chronological order, but does this come at a cost?

*Reference:*  

2. What is the role of sentence truth-value during online processing?

*Reference:*  
3. How do we know to whom or what words refer?

References:

DR RENE MOTTUS
Email: rene.mottus@ed.ac.uk

1. Validation of culture-level mean personality scores
Mean levels of Big Five personality traits are sometimes compared across national/cultural groups to describe and possibly understand cross-national/cultural differences in behaviour and various outcomes. The extent to which trait-levels are in fact be comparable across groups is a matter of debate: some findings suggest that they may not be. One way to tackle this issue is to see if rankings of nations/cultures on personality trait scores are meaningfully correlated with rankings on possible criterion variables (e.g., prevalence of health-related outcomes): if they are, this may bolster the validity of mean trait-scores. This project would involve working on existing cross-cultural personality datasets.

References:

2. The associations between Conscientiousness and religiosity in different cultures and religions
It has been shown that in many cultural contexts the Big Five personality trait of Conscientiousness correlates positively with religiosity. An existing but hitherto unused (for this purpose) dataset contains information on Conscientiousness and religiosity of nearly 3,000 people from various cultural backgrounds (Western, Asian, African; 20 nations in total) and religions. Using this dataset, a project could compare the religiousness-Conscientiousness association across cultures religions.

Reference:

3. Measurement independence of personality trait-outcome associations
Personality traits are often correlated with various outcome variables for either explaining the outcomes (e.g., low Conscientiousness is one of the factors causing obesity) or substantiating the traits as such. Arguably, the plausibility of any causal explanation for the associations between particular traits and outcomes hinges on the assumption that the observed correlations do not systematically depend on the particular ways of measuring the trait (measurement independence). For example, if the observed correlations are driven by one or a few items or facets of a trait scale, they are likely to pertain to the specific variance of these few items or facets and not to the traits as such. Curiously, this assumption has not received much attention in personality trait-outcome research. This project would test this assumption based on any outcome preferred by the students involved, given that relevant data exists and can be obtained.

For an interesting example of how the measurement independence assumption apparently does not hold, see: Terracciano, A., Sutin, A. R., McCrae, R. R., Deiana, B., Ferrucci, L,
4. Within-person variability of personality in relation to situational variables
When it comes to personality-related variables, people may differ from themselves (from moment to moment) as much as they differ from other people. Part of such within-person variability may be caused by or lead to measurable situational variables. This project would attempt to a) work out hypotheses as to which kind of situational variables are related to which kind of personality variables and b) test these hypotheses using time-series data, whereby (a modest number of) people are followed over a number of measurement occasions.

Reference:

DR ANTJE NUTHMANN
Email: Antje.Nuthmann@ed.ac.uk

My current research interests include perceptual, oculomotor and cognitive control in everyday visual-cognitive tasks like scene perception, object-in-scene search, and reading. Because human visual perception involves active information seeking via eye movements, I use eye tracking as my primary behavioural method. For more details, including demos, see www.nuthmann.de/antje.

The following list provides some project examples. As the proposed projects involve eye tracking, students will receive training and supervision on how to collect and analyse eye-tracking data.

1. Pseudoneglect during scene viewing (2 projects)
*When and where* people move their eyes when exploring real-world scenes can be investigated by presenting pictures of natural scenes to participants on a computer screen while their eye movements are recorded. In such experiments, observers initially fixate (look at) at the centre of the screen, from which they could, in theory, move their eyes anywhere. However, when memorizing scenes or when searching for a particular object in the scene, the first few eye movements more often go to the left than to the right side of the image (Nuthmann & Matthias, 2014; see also Ossandón, Onat, & König, 2014). This leftward bias is referred to as pseudoneglect. Strikingly, in a scene search task this initial leftward bias was also present when the search object was located in the right hemispace. The aim of the first project is to replicate these findings with a different set of scenes and including a control condition in which scenes are mirrored horizontally. The second project investigates whether an initial glimpse of the scene (250 ms preview) modulates the pseudoneglect observed in a scene memorization task.

References:

2. Gaze control during scene viewing: How long do we look?
Recent research in scene viewing has shown that when a scene is made more difficult to process by decreasing its luminance, fixation durations show an immediate increase (Henderson, Nuthmann, & Luke, 2013). However, when processing of the scene is made easier, by increasing the luminance, we do not see a complimentary decrease to fixation durations (Walshe & Nuthmann, in press). An unresolved question that we will address in this project is how fixation durations change over time in response to such a change in luminance. For instance, while a decrease in luminance may result in an *immediate*
increase to fixation durations, perhaps an increase in luminance results in a "delayed" decrease in fixation durations. By using eye-tracking methodology we will design an experiment to test this hypothesis by measuring the duration of fixation that occur after the luminance of a scene has been modified.

References:


3. How are saccades programmed in naturalistic scene viewing tasks?
Saccades are very high velocity eye-movements that serve to reorient gaze from one part of the visual environment to another. One characterizing feature of saccades is that they are ballistic movements. This means that the saccadic eye-movement is prepared while the eye is stationary and once the saccade is initiated it can no longer be halted or modified. An important question within the cognitive sciences is what mechanisms support the programming and execution of these eye-movements. In this project we will study the programming of saccades in naturalistic scene viewing by presenting a target to a participant while they are memorizing a scene for later recall. The participants will be required to make a saccade to the target as quickly as possible. Critically, we will be using an eye-tracker to measure the amount of time that it takes the participant to start the saccade towards the target, this is known as “saccade latency”. Additionally, we will investigate whether saccade latency depends on how much time has elapsed between the start of a fixation and the presentation of the target.

Reference:

PROF MARTIN PICKERING
Email: [martin.pickering@ed.ac.uk](mailto:martin.pickering@ed.ac.uk)

1. Cross-linguistic structural priming and bilingualism
Bilinguals might store their two languages separately. However, they might find it economical to share information where possible. Recent structural priming studies suggest that some grammatical information can be shared, at least when the two languages form a particular grammatical structure in a similar way (Hartsuiker et al., 2004). In this project, you would investigate this issue by testing structural priming between any pair of languages (with one normally being English). At least one student should have good knowledge of the languages to be studied, and you would also need access to 20-30 participants.

Reference:

2. Exploring the shared Stroop effect
When two people "share" certain tasks, their performance interferes with each other, in a way suggesting that they co-represent the task (Sebanz et al., 2003). Our pilot studies have shown similar effects in language, using a shared Stroop task. Two participants sit side-by-side and respond to different colours, and we show that their assumptions about each other's potential responses affects their own responses.
This project would apply this technique to explore the mechanisms underlying the social nature of language use.

References:

3. Language as joint action
To be successful at a joint activity (such as playing a duet or using a two-handed saw), both participants need to coordinate their behaviours. Dialogue is a form of joint activity using language and interlocutors are remarkably good at it. We would investigate joint language use by "splitting" tasks between two participants. For example, one participant might describe the first part of an event (e.g., "the boy") and the other participant might complete it (e.g., "is kicking the ball"). By comparing joint and individual language use, we expect to determine the extent to which speakers represent what they think their partner is likely to say, and thus create a kind of “shared reality” for language use. For some background see:

Reference:

4. Social manipulations of audience design
Speakers clearly produce their utterances with particular addressees in mind, for example using simpler language when addressing non-experts than experts in a particular domain (Isaacs & Clark, 1987). But can they be non-consciously primed to be more or less helpful? In this study we apply techniques from social psychology to this aspect of the psychology of language.

References

DR HUGH RABAGLIATI
Email: hugh.rabagliati@ed.ac.uk

My lab works on how children learn language, with a particular focus on meaning: How children learn the meanings of words, and how they learn the procedures for mapping complex thoughts to structured sentences. More broadly, I am interested in conceptual development (which can interact with language development, and pose fun questions about linguistic relativity) and cognitive development. Typically we assess questions about these domains by recording children's explicit responses to questions while also monitoring eye movements as a more implicit measure of understanding.

While a lot of our research involves testing children, we also ask questions that are easier to answer by testing adults, for example, the role of conscious awareness in understanding language.

I am only likely to supervise a few projects this year. Some example projects are below, but I'm always happy to chat with motivated students who want to design their own project. Developmental work is typically arduous: Recruiting and testing children takes a lot of time. Project students will therefore be expected to muck in in the lab, helping everyone in recruitment, testing and data processing. This means starting research early, i.e., get in touch as soon as you can. If you haven't read any of my papers, you can find them on our lab website: http://www.psy.ed.ac.uk/homepages/the-rab-lab/
Language development
1. Language comprehension
How do children learn to understand sentences? One possibility is that they learn via prediction: They constantly make guesses about what they will hear next, and then revise their internal grammars whenever there is a mismatch. In this project, we would use eye tracking to examine whether young (3 - 5 year old) children really make predictions about upcoming words, and if so, what sort of predictions they make? For instance, do they predict the sounds of upcoming words? This work is potentially important for understanding why some children have difficulty acquiring language.

References:

2. Language production
A critical component of carrying on a conversation is ensuring that you speak in a clear and understandable way. For instance, if you were planning to meet a friend, you wouldn't tell them to meet you outside the coffee shop, because Edinburgh is full of coffee shops. Rather, you'd need to specify the exact shop. Children learning to talk need to master this task and, as anyone has ever had a conversation with a young child can attest, they do not always succeed. We are interested in studying why children have difficulty monitoring the comprehensibility of their speech.


3. Linguistic and conceptual development (incl. relativity)
Language provides a code for teaching complex thoughts. How do children take advantage of this code? Studies in this area can examine a) what types of explanations children like to listen to, and b) whether learning about the structure of a language can help teach children something about the world.

References:

4. Language processing in adults
What role(s) does conscious awareness play in how we understand language? In this project, students will use techniques like masked priming and continuous flash suppression to test whether information that is recovered from unconsciously presented words is combined together to create sentence level meanings.

Reference:
1. Eye-tracking a class of students (One individual project available only)
The student will use a relatively novel technique to assess where people are looking during a lecture. A Y1 Psychology lecture will be presented on film. At certain points in the film, a grid of letters and numbers (e.g. j1, j2, j3, ...) will flash onto the whole screen for 120 msec. The members of the audience will be required to write down the item on the grid that they could see (thus capturing where they were looking at that instant). The student will gather in the record of all the items seen by each audience member during the film, along with details of where each person was sitting, plus other questionnaire data. The student, together with the supervisor, will work out the points in the lecture at which the grid appears, so as to test hypotheses about how an audience responds to particular aspects of the lecture and the lecturer’s behaviour. The student will be required to supervise production of the film, decide on the points at which to record fixations, hand-in a lot of data from response sheets, represent the data graphically, and analyse the data using inferential statistics. The student will be required to read up on the issues surrounding audience attention.

2. Characterizing the work of a clinical psychology practice (Two individual projects available only)
The student will work with a clinical psychologist in a private practice in Edinburgh to carry out a piece of research that characterizes the individual therapy being carried out in the practice. Three previous projects there have all looked at different aspects of clients’ involvement, using closed-case files (and a questionnaire study in one project) and asking questions such as how clients manage their own involvement with the practice, periodicity of appointments and length of treatment, and conduct of EMDR (Eye Movement Desensitization and Reprocessing therapy). The precise topics will be agreed in discussion between the therapist, the student and the internal supervisor (RCS). (All three previous projects are in the process of being written up for a journal.) The student will gain an insight into the workings of a practice, and may make a contribution in terms of published research. The student will probably be required to assess closed case files, input data, carry out some descriptive and inferential statistics, and read up on the literature surrounding a particular issue in therapy (to be determined).

3. Modelling eye-movements in reading (One place available only)
The student requires a working knowledge of the Perl programming language. The student will take the 3000-line program written as an implementation of the SERIF model of eye-movements in reading (McDonald, Carpenter & Shillcock, 2005) and adapt it for binocular viewing of text. Further, depending on the progress of the project, a number of new variables will be added into the model, and a front-end will be constructed for release to the eye-tracking community. The goals of the project are (a) to produce a working model of binocular-SERIF, and (b) for the new version of the model to accurately represent new data on binocular viewing by means of a number of simulations.

4. Scene searching and the cortical hemispheres (One individual project available only)
The student will use a new technique for exploring visual scene searching and the processing preferences of the cortical hemispheres. The student will learn to use the Eyelink-1000 eye tracker. A certain amount of routine work involving labelling stimulus materials will be required. The student will discuss with the supervisor the nature of the hemisphere-specific processing that will be investigated. The student will run the experiment on a number of people (to be decided), and will be responsible for organizing the data and testing the hypothesis decided upon regarding hemispheric preferences in scene viewing.
Sensory integration and Cross-modality

Research Area:
All people share preferences for the mapping of stimuli across the senses. For example, most people agree that high pitch sounds ‘fit better’ with lighter rather than darker colours. This type of sensory mapping is experienced explicitly in synaesthetes (e.g., sounds may be seen in colour, smells may be felt as shapes). Synaesthesia is an inherited condition, and brain imaging provides direct evidence of increased structural connectivity in the brains of synaesthetes. It is likely that synaesthetes and non-synaesthetes experience cross-modality via qualitatively similar, but quantitatively different mechanisms. This project will explore issues in cross-sensory integration IN THE GENERAL POPULATION seeking to better understand the types of mappings made across the senses.

Sample Topics:
How does multisensory integration change with age?
What cognitive advantages/disadvantages can multisensory strategies endow?
How do we process sensory language?
How does multi-sensory integration develop in children?

References:

DR SUE WIDDICOMBE
Email: s.widdicombe@ed.ac.uk

1. Redefining debt?
Drawing on interviews with students, a Y4 project this year found that they dismissed student loans as a debt, and drew a distinction between good and bad debts. Other research, too, has found that young people describe debt as a solution rather than (as previous generations) shameful and to be avoided (Livingston & Lunt, 1991). This discursive psychological study will extend this research by looking at how student loans and other forms of debt (e.g. bank overdraft) are presented to students (e.g. by universities, schools, online advice, talks). (How) does the presentation of student loans and other forms of borrowing contribute to the redefinition of some debt as not debt?

References:

2. Constructing young people’s national identity and citizenship in the run up to the referendum on Scottish independence.
This study will examine how national identity is ascribed to young people, taken up (or resisted) and how rights, obligations and responsibilities may be bound to national identity in the context of campaigns to encourage young people to vote in the forthcoming referendum on independence in Scotland.
References:

I would also be happy to supervise a project on developing a sense of community among online support groups (e.g. local mums, environmentalists). Email for references, if interested.