## Day 1. Thursday, June 12th
### Morning Session

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Thanks to
Tim Perfect, Tim Auburn and the School of Psychology; Sue Denham, Lucy Davies and the Cognition Institute; poster by Steven Feven-Parsons (@_stevenfeven), poster image credit to Eswar P.R. Iyer.
Music, Mind, and Affective States (the BCMI-MIdAS project)

Duncan Williams¹, Alexis Kirke¹, Eduardo Miranda¹, Ian Daly², James Weaver², Asad Malik², Etienne Roesch², Faustina Hwang², Slawomir Nasuto²
¹ Interdisciplinary Centre for Computer Music Research, Plymouth University
² Brain Embodiment Lab, School of Systems Engineering, University of Reading

Music is a powerful and near-universal vector for emotions. As listeners, we seem to be ‘hard-wired’ to respond intuitively and automatically to music, regardless of personal preferences and previous experience. BCMI-MIdAS* is a 4.5 year EPSRC-funded project which uses joint fMRI (functional magnetic resonance imaging) and EEG (electroencephalography) analysis techniques to study neural responses to music, and to subsequently control artificial intelligence processes for the real-time creation and performance of music which targets specific affective states in the listener. Applications include assistive technology for disabled patients, personalised composition tools, meditative and therapeutic music generation, and next-gen soundtrack creation for video games or film.

This talk outlines the nature of our emotional responses to sound and music, including a few well-known psychological correlates and cognitive effects, before demonstrating how a prototype MIdAS utilizes EEG readings to assess affective state and generate emotional music by means of an underlying matrix of musical features in an algorithmic composition system. The talk will finish with an informal and scientifically compromised Turing Test, allowing audience members to play ‘spot-the-difference’ with emotionally charged music composed by man and machine.

*BCMI-MIdAS stands for Brain-Computer Musical Interface for Monitoring and Inducing Affective States – see http://cmr.soc.plymouth.ac.uk/bcmi-midas/ for more details.
Dries Trippas, Simon Handley, Michael Verde and Kinga Morsanyi

Processing fluency is ubiquitous in theories of recognition memory, categorisation, and decision making. Recent work by Morsanyi and Handley (2012) suggests that the ease with which we process logical statements also plays an important role in logical reasoning. More specifically, logically valid problems result in higher judgements of liking compared to invalid problems. Recent work by Klauer and colleagues, however, has criticised these findings on methodological and statistical grounds. We present two studies which address these criticisms by demonstrating that the intuitive detection of logic influences liking judgements (Experiment 1) and psychophysical brightness judgements (Experiment 2). We discuss the implications for the influence of fluency on theories of logical reasoning and judgement.

G. Riley, W. A. Simpson, F. O. Bochud, J. Steel and G. Porter

The ideal observer is a theoretical observer widely used in visual research. This theoretical observer considers the task and the task relevant stimuli and using this information describes the computation that enables the ideal observer to perform in the optimal manner. The ideal observer thus sets the optimum performance standard for that task and can then be used as a benchmark against which visual systems can be compared. It can also be used as a baseline from which model observers, more closely reflecting the visual system being studied, can be developed.

In our study, we have used the ideal observer to determine the optimum strategy for detecting a signal in paired noise fields, a task akin to the viewing of paired mammogram images carried out by radiologists. We have compared this optimum strategy to that used by the human observer. We find that displaying the noise fields in the traditional mirror symmetric format does not facilitate the use of the optimum strategy, whereas, displaying the noise fields in a sequential 'animated' format, enables the observer to use a strategy much closer to the optimum.

Sue Denham

The ability of the auditory system to parse complex scenes into component objects in order to extract information from the environment is very robust, yet the processing principles underlying this ability are still not well understood. This study was designed to investigate the proposal that the auditory system constructs multiple interpretations of the acoustic scene in parallel, based on the finding that when listening to a long repetitive sequence listeners report switching between different perceptual organizations. Using the ‘ABA-’ auditory streaming paradigm we trained listeners until they could reliably recognise all possible embedded patterns of length four which could in principle be extracted from the sequence, and in a series of test sessions investigated their spontaneous reports of those patterns. Despite the apparent randomness of perceptual switching, we found individual switching patterns were idiosyncratic; i.e. the perceptual switching patterns of each participant were more similar to their own switching patterns in different sessions than to those of other participants. These individual differences were found to be preserved a year after the initial experiment. Perceptual multistability thus provides a means for characterizing both general mechanisms and individual differences in human perception.
Thursday, June 12th. Morning.

Vowel phonotactics: how they help infants to find word boundaries

Claire Delle Luche, Skoruppa, Laurence White and Caroline Floccia

Finding word boundaries in fluent speech is one of the most important and challenging tasks for infants during their first year of life. Numerous studies (for a review see Mattys, White & Melhorn 2005) have shown that language-specific phonological cues, such as word stress and consonant clusters, can help during this process. The present study investigates whether restrictions on vowel positioning can also be used for speech segmentation. Specifically, we investigate the use of the lax vowel constraint, i.e. the fact that typical English words do not end in a lax vowel (e.g. [*di:tU*]). With a headturn preference paradigm, we presented 9-month-old infants with pseudowords that were disyllabic (Experiment 1, n=24) or monosyllabic (Experiment 2, n=24). In both experiments, series of pseudowords were presented in lists where the final vowel was either lax (illegal contrast), or tense (typical vowel ending). In Experiments 1 and 2, infants listened longer to the illegal contrast, showing that they are already aware of the difference between the two stimulus types. We are currently testing CVC pseudowords where both tense and lax vowels are legal, to control for an overall lax preference.

Mental Imagery in Choreography

Jon May

We studied choreographer Wayne McGregor’s approach to movement creation through tasking, in which he asks dancers to create movement in response to task instructions that require a great deal of mental imagery and decision making. We used experience sampling methods (self-report scales and reports about the current focus of thought) with the full company of Wayne McGregor | Random Dance to describe what the dancers report thinking about while creating movement, how the dancers vary one from another, and to establish how their experiences change as a function of different task conditions. We then used refined versions of the tools with a larger group of student dancers. While creating movement, the dancers’ awareness was focused more than anticipated upon conceptual rather than physical or bodily aspects. The study showed that the very act of reflecting on, and categorising, their experiences provided the dancers with insights about their mental habits during innovative movement creation. Such insights provide conditions under which habits can be recognised and then altered to adopt alternative points in mental space from which to create movement material.
Thursday, June 12th. Afternoon.

A mixed methods service evaluation looking at unproductive referrals made to psychotherapeutic groups for people with learning disabilities

Cheryl Bullion and Gemma Farandon

The service evaluation was conducted to identify why there has been a lack of appropriate referrals for psychotherapeutic groups that have been developed for people with a learning disability (PWLD). Data was collated in East and West Cornwall and used; group timeline comparison, MDT questionnaires, psychology department focus group and structured interviews with service users, thematic analysis was then used to analyse the qualitative data.

Thematic analysis reviled two overarching themes, Top down process and perceived barriers. The theme of top down process identified the way in which the organisation of power can lead a service user having little control over what is offered, and seldom asked if they want to be referred to groups. It was also identified that there is an assumption of knowledge around group demand. The theme of perceived barriers was identified through continuing references from participants regarding the rural locations across Cornwall, along with a lack of transport links and limited funding for support workers to attend groups with service users. Descriptive data from the MDT questionnaire revealed that 83% (n=24) had never referred clients to groups. Recommendations following the findings included: involving service users in development of groups and introduce waiting lists for groups.

Role Aspects of Police-Black Relations: A test of conditional processes in Allport’s (1954) contact hypothesis

Jaysan J. Charlesford and Becky L. Choma

Allport’s (1954) contact hypothesis states that positive contact between antipathetic groups reduces prejudice. Although generally supported through 60 years of research, the situation-level moderators of these contact effects are not well-understood. The present study applied Allport’s (1954) theoretical framework to understanding Black people’s attitudes toward Police in the UK. Consistent with existing theory, we hypothesised that perceptions of goal interdependence and status inequality would predict attitudes toward Police (Pettigrew, 1998), and that these effects would be mediated by willingness to cooperate (Viki et al., 2006) and intergroup anxiety (Stephan et al., 1998). Novel to the literature, we also hypothesised that the extent to which contact with Police typically occurred within the context of service delivery (as opposed to law enforcement) would moderate the above proposed model. The survey data of Black respondents (n = 200) were analysed using multigroup analysis (MGA) and regression-based path analysis. Results were consistent with a model of first-step moderated parallel mediation, with respondents who reported more service delivery contact showing a greater relationship between positive contact and warmer attitudes toward Police, via more willingness to cooperate and less anxiety. Implications for reducing Police-Black conflict, and for a more nuanced understanding of contact theory are discussed.

Sex differences in the relationship between sensation seeking, trait emotional intelligence and delinquent behaviour

Alison M. Bacon, Hannah Burak and James Rann

Levels of sensation seeking peak in adolescence and there is a well-documented association with delinquency and other risk taking behaviours. The present study investigated whether this relationship was moderated by levels of trait emotional intelligence (EI). Trait EI encompasses high levels of emotion regulation and empathy and is associated with positive outcomes and wellbeing. 96 young adults (48 female; 48 male) completed measures of sensation seeking, trait EI and self-reported delinquent behaviours since age 12. Results indicated that sensation seeking and frequency of delinquent behaviours were positively associated, but this effect was moderated by trait EI for male participants, such that those with lower trait EI showed a greater increase in delinquency in line with a rise in sensation seeking. No moderation effect was observed for females, and females with higher levels of trait EI reported more delinquent behaviours.
Thursday, June 12th. Afternoon.

(cont.)

The results are discussed in terms of the protective role of trait EI in supporting self-regulation and affective coping and also whether, for some females, high levels of EI might predispose to interpersonal antisocial behaviours such as bullying.

Creating cravings for healthy activities

Jackie Andrade

Elaborated Intrusion theory (Kavanagh, Andrade & May, 2005) explains drug and food cravings as cognitive-emotional states in which external or internal cues trigger seemingly spontaneous intrusive thoughts (*I need a cigarette*) that are then elaborated. Elaboration involves generating sensory images of the desired outcome. These images are rich in sensory detail (*the appearance, smell and taste of smoking*), simulating the desired experience and conveying the pleasure or relief of the real thing. People tend to give into cravings despite goals to abstain because the pleasure or relief offered by consumption is easier to imagine vividly than the long-term benefit of better health. I shall present some initial data on our attempts to strengthen imagery associated with healthy goals.

Conflict detection in moral judgments

Michał Białecki

When making decisions people tend to intuitively detect the conflict between normative systems and their intuitions also, when making biased choices (De Neys, 2006, 2013). A dual-process model of moral judgments is discussed (Haidt, 2007). Deontic decisions (“always follow the rules”) are claimed to be intuitive (type 1 processing) in contrary to utilitarian decisions (“maximize the utility of actions”), which are seen as reflexive (Type 2 processing).

Presented here set of 2 studies shows, that both types of decisions can be intuitive and in conflict. In the Study 1 individuals who made deontic decisions were less confident, required longer time to react and remembered more details when solving classical moral dilemmas (can one kill one in order to save 5 people?) compared to no-conflict tasks (can one kill 5 in order to save one?). Study 2 shows, that this pattern is observed also under low cognitive load and high cognitive load.

A tri-process model of moral decision is presented, which consists of moral intuition (Type 1), utilitarian analysis (Type 1) and abstract moral reflection (Type 2).

I know what you will do. Observers implicitly predict future actions from past behaviour patterns

Kimberley Schenke, Natalie Wyer and Patric Bach

Three studies investigated whether observers form implicit associations in the form of intentional relations between characters, situations, and their typical behavioural patterns, which drive predictions of their future actions and perceived preferences. The task was to report whether the characters interacted or turned away from each object. Trials were manipulated so that one actor typically interacted with one object and turned away from the other object e.g., John mostly kicked the ball and turned away from the computer whilst Claire did the reverse. Results demonstrated both faster reaction times for expected than unexpected actions towards objects and increased liking for these objects i.e., faster reaction times and increased liking for the object that the actor usually interacted with. This suggests that participants associated the characters with the object they tended to interact with, and used these associations in future encounters and for making judgments on attitudes towards the objects. Crucially, these participants were not aware of these associations even when asked to search for the pattern within the stimuli, pointing to a highly implicit mechanism. These studies provide the working paradigm for investigating whether this knowledge for preference of actions and objects becomes embodied.
I feel what you are doing: differential effects of observed and predicted touches

Toby Nicholson, Linda Solbrig, Matt Hudson, Patric Bach and Steve Tipper

Previous research has provided evidence that action observation is influenced by processes involved in action production. What is debated are the relative contributions of bottom up information and top down expectancies on these processes. Here, we tease both aspects apart by investigating the influence of action observation on tactile perception. In two experiments, participants watched hands reaching for objects or into empty space (mimed reaches), with the action either fully visible or obscured by an occluder, while having to detect stimulation on their own fingers. Experiment one measured the speed with which tactile stimulation was detected, and found that detection was facilitated by object presence, irrespective of occlusion. Experiment two used a signal detection paradigm to further investigate these processes. The data revealed that facilitated detection in the occluded and non-occluded conditions is driven by dissociable underlying processes, with one affecting tactile sensitivity and the other response bias. Together these findings reveal that both visual information and prior expectations concerning object-directed action alter tactile perception. More importantly, they show that both processes have different effects on the resulting action simulations.

I expect you to do as I say! Prior intentional attributions bias the perceived kinematics of other’s actions.

Matthew Hudson, Toby Nicholson and Patric Bach

Prior expectations regarding action and perception influence perception by minimising the processing of correctly predicted stimuli and highlighting unexpected stimuli (prediction errors). Using a Representational Momentum paradigm (RM), we investigated the effect of top-down expectations regarding the goals and movements of the actor on the prediction of other people’s actions. Participants observed a hand move toward or away from an object, which was safe or painful to grasp. Before action onset, participants said a word creating the expectation of an approach or withdrawal. The action and expectation were therefore congruent or incongruent. A static probe stimulus of the action was presented, either in the same position as the final frame, one frame forward or one frame backward of the final position. Participants judged if the probe was in the same or different position as the final position of the action. Accuracy was higher for backward probes than forward probes (RM effect), suggesting an anticipatory response. Importantly, RM was larger for actions congruent with the expectation than incongruent. This was evident for low-level movement (Forward) and high-level goal (Take It) expectancies, and movement expectancies alone independent of object type. These results support a top-down influence of prior expectations on action prediction.
Neural correlates of Theory-of-Mind predict intertemporal preferences

Garret O’Connell, Anastasia Christakou and Bhismadev Chakrabarti

One route to inferring the thoughts and feelings of others is by putting one’s self in their shoes and seeing the world from their perspective; an empathic process called simulation. It has been proposed that when choosing between a reward now or one that will not affect us until after some time (known as intertemporal choices), we assign subjective value to the delayed reward by simulating how much our future self will enjoy it. Here we formally test the relationship between simulating others and future selves by relating functional and structural indices of simulation to preferences in intertemporal choices (as measured by the temporal discounting task). Neural responses from 33 participants were measured using fMRI during a Theory-of-Mind task which activates the rTPJ (an area implicated in simulation abilities). We also obtained DTI data of the integrity of white matter in a fronto-parietal tract projecting to the rTPJ thought to be involved in simulation processes. The results indicate that both simulation measures - the magnitude of neural responses in the rTPJ and the integrity of its connecting fronto-parietal white matter tract - were positively related to individual preferences for delayed reward. These findings supports the view that similar simulation processes underlie predictions about the minds of others and the anticipated value of future rewards.

Decision-Making and Rate of Reward

Valerio Biscione and Chris Harris

It is widely accepted that human reaction times (RT) can reveal important information about the way we make decisions. It is commonly accepted that for simple decision a response is made when the accumulation of information reaches a threshold. In the present work we analyze the frequency distributions of the RT in order to understand how responses are made and, in particular, if responses are mediated by a decision mechanism whose purpose is to maximize the reward. We suggest that the important element that human beings are trying to maximize is not the reward per se, but the rate of reward, that is the reward per unit time. We conducted an experiment where we varied the intensity of the stimulus and the foreperiod time (which is the time between the start of the trial to the occurrence of the stimulus). We compared our result with other decision-making models and we showed how our experimental results are easy to understand within the framework of a reward-rate maximization mechanism and how this can provide new insight in the decision-making field for human beings.

Neuroscience of reasoning

Matt Roser, Jonathan Evans, Nicholas McNair, Giorgio Fuggetta and Dries Trippas

We used individual differences in intelligence and thinking disposition to investigate conditional reasoning with functional magnetic resonance imaging (fMRI). Participants engaged in conditional reasoning with statements which were either believable or unbelievable. A tendency to endorse believable statements as logically valid was observed and this was modulated by intelligence and disposition towards engaging in effortful thinking. Brain functional data were modelled separately for the presentation of the major premise and for the presentation of the entire argument. Lateral inferior-frontal and anterior cingulate areas were differentially active according to the believability of the major premise, consistent with the involvement of inhibitory mechanisms at an early stage of the trial. Individual differences in the degree of belief bias correlated strongly with functional activation in dorsolateral prefrontal and parietal cortices at the later stage of the trial. Together these results suggest that inhibitory processes are invoked by the presentation of belief-laden material when participants are instructed to reason deductively, assuming the premises are true, but that individual differences in the degree of belief bias are affected by later processes of premise-rule integration which draw heavily on working memory. These results are consistent with dual-process accounts of reasoning.
Beta Rhythm in the Control of Movement?

Stephen Hall

Beta frequency (15-30Hz) electrical rhythms or ‘oscillations’ are observed in EEG/MEG/ECoG recordings of the human motor cortex. Changes in the power of this rhythm appear to coincide with the various stages of movement planning, execution and recovery. These observations are the basis for the theory that the beta rhythm is a mechanism by which movement is generated.

Here, I will summarise the physiological basis of the beta rhythm and describe some experimental evidence supporting the proposed involvement of this rhythm in human motor function. I will discuss some recent experimental data that explores the role of the beta rhythm in specific aspects of movement control. Finally, I will examine the limitations of the theory that the beta rhythm is a mechanism for movement generation and discuss some alternate hypotheses based upon the relationship between physiology and function.

Early-onset dementia: Understanding and learning from the experiences of family carers

N.L. Wheeler, M. Taylor and C. Hennessy

Whilst dementia is generally perceived as a disease of old age, early-onset dementia (EOD) is comparatively rare, but its prevalence is increasing (Knapp & Prince, 2007). The West Midlands’ EOD QIPPP workshop (2010) reported on the "significant" and "unsustainable" cost of EOD services, yet “additional resources should be allocated” to this client group and their families/carers (Arai et al, 2007).

This research addresses a gap in the evidence base concerning EOD i.e. the needs of people with EOD and their families/carers along the dementia journey, and how these can be met by health, Social Care, and third sector/voluntary services. Recognising "there is a requirement for a better understanding of the dementia process from ... a carer’s ... perspective" (Williams, Keady & Nolan, 1995), this research utilised ethnographic interviews with ten family carers of people with EOD to collect rich/detailed first-hand information. It offers a better understanding of carers’ unique caring experiences; exploring issues relating to diagnosis, and adjustments to caring roles. Thematic analysis focused on key events along the dementia journey and the emotions these evoked (Denzin, 1989) to explore carers’ inner feelings, perspectives and experiences; generalising the similarities in their experiences.

The construction of ‘delicate’ matters in a community justice court problem-solving meeting

Tim Auburn and Gisella Hanley Santos

Community justice courts developed with various goals in mind, including helping offenders address their underlying issues through the use of problem-solving so as to aid their desistance from crime. As part of a larger-scale research project into the Plymouth community justice court, we are making a detailed examination of the way that this model of problem solving works. Twenty-two problem-solving meetings have been audio recorded and observed. Through Conversation Analysis, we aim to analyse the social organisation of the problem solving meetings; in particular how professional and voluntary sector organisation participants collaborate, in what ways offenders themselves are involved in the meetings and how the mode of participation impacts on offenders’ commitment to the meeting decisions or recommendations. For this presentation, we focus on the interpersonal management of ‘delicate’ matters (cf. Silverman, 1997) which emerge over the course of the meeting. Participants’ orientation to matters as delicate or not are consequential for the progression of the meetings, revealing situations fraught with ambiguous and difficult negotiations over identity which can be highly consequential for the offender and disposal by the criminal justice system.
Different Motives in Prejudice in British & Indian Communities

Karandeep Dhami

This is the first in depth study focusing on motives in prejudice within the Indian community, living in the UK, compared with native British, concentrating on differences in values of education. Previous research focused on intergroup relations in India between religious groups and across ethnicities. We collected quantitative data, along with qualitative data. Participants completed a questionnaire which focused on education, gender amongst identifying their group and rival groups, alongside a demographics questionnaire, and an IAT, to gain a measure of implicit prejudice, using pictures of occupations requiring different qualifications, followed by two questionnaires of explicit prejudice, involving thoughts on those of a different gender and lower educational level. We found that the Indian group were significantly more implicit prejudice against those of lower education whilst there were no differences in their explicit prejudice. Additionally, qualitative analysis revealed that Indian participants also mention themes of education more, supporting their implicit bias. We suggest that the emotional and implicit difference stems from cultural pressure branching from the caste system whilst the lack of difference in explicit scores could be explained by the political and social culture of the UK.
Do sub-optimal learning conditions increase the prevalence of overall similarity classification?

Angus Inkster, Andy Wills and Fraser Milton

We present a replication and extension of Kemler Nelson (1984), seeking to reinterpret the original results. In the original study a Non-Criterial Attribute model of categorisation learning was dismissed in favour of an Overall Similarity model. This dismissal is challenged over three studies, one replicating Experiment 1 of Kemler Nelson (1984), one using a similar method with extended training and a modified stimulus set and one replicating Experiment 1 of Smith and Shapiro (1989). Participants were undergraduate psychology students at University of Plymouth volunteering for course credit. Analysis of the results indicates almost exclusive use of two models of categorisation learning between conditions, the Criterial Attribute and Non-Criterial Attribute models, with the Overall Similarity model being used rarely. The implications of this research for models of category learning are discussed within.

Pavlovian-Pavlovian Transfer

Tina Seabrooke and Chris Mitchell

Pavlovian-Instrumental Transfer (PIT) paradigms have demonstrated that reward-predictive stimuli can enhance responses that have been paired with a shared outcome. This interaction between associative learning processes is typically explained with a link mechanism, where the presentation of the stimulus (S) triggers a memory of the outcome (O), which then automatically triggers any response (R) that has previously led to that outcome via an S-O-R link. Here, we describe a novel type of PIT task, termed Pavlovian-Pavlovian Transfer (PPT). Participants were first trained to associate two cues with chocolate and another two with crisps. In a subsequent test phase, participants were primed with a chocolate or crisps cue and were then required to choose between another chocolate or crisps cue from the training phase. Participants demonstrated a clear behavioural bias towards the cue that shared the same outcome as the prime stimulus. While this effect is consistent with the logic of the S-O-R account of PIT, it is difficult to explain with an associative link mechanism because an instrumental contingency is never trained. We argue that this provides evidence for a goal-directed model of PIT, where cue choice is governed by perceived reward availability.

Rules and similarity in people and pigeons

A.J. Wills, S.E.G. Lea and A.B. Inkster

It is often claimed that adult humans are particularly likely to use rules to classify objects, while children and non-humans are more likely to use overall similarity. However, much of the data in this area confounds rule use with selective attention. In the current studies we examine adult human and pigeon behaviour in a pair of closely matched studies that eliminate selective attention explanations. Adult humans are found to indeed be more likely than pigeons to use rules in this procedure.
Recognition memory, familiarity, and recollection: the effects of aging and speeding

Laura König, Marina C Wimmer and Tim J Perfect

Memory performance increases as a function of age throughout childhood (Raj & Bell, 2010). Dominant memory theories argue two qualitatively different processes underlie recognition memory, recollection (slow and associated with contextual details) and familiarity (fast and automatic). The aim of the current study was to investigate how recollection and familiarity change as memory develops. In four experiments we used an adapted version of the process dissociation paradigm (Jacoby, 1991) to measure memory states in 5-, 7-, 11-year-olds and adults. In two experiments we show increases in both, recollection and familiarity throughout childhood. In two further experiments, limiting response time during recognition decreased recollection, but not familiarity. This suggests that recollection and familiarity are two qualitatively different memory states which are both already present at age 5. Implications for developmental theories of recognition memory are discussed.

The effect of visual distraction on recall

Pamela J L Rae and Prof Tim Perfect

Glenberg, Schroeder and Robertson (1998) reported that episodic memory is impaired by visual distraction and explain this effect in terms of embodied memory and finite cognitive resources. However, their demonstration that visual distraction impairs memory for lists used 15 consecutive word lists, with analysis only of mid-list items, and has never been replicated. Experiment 1 replicated their methodology and found the same pattern of impairment for mid-list recall only. Experiment 2 explored whether this pattern arises because the mid-list items are poorly encoded (by manipulating presentation rate) or because of interference. Experiment 3 also looked at the role of interference whilst controlling for potential item effects. Neither study replicated the pattern seen in Experiment 1, despite reliable effects of presentation rate (Experiment 2) and interference (Experiments 2 and 3). Experiment 2 found no effect of distraction for mid-list items, but distraction did increase both correct and incorrect recall of all items suggestive of a shift in willingness to report. Experiment 3 found no effects of distraction whatsoever. Thus, there is no clear evidence that distraction consistently impairs retrieval of items from lists and therefore no consistent evidence to support the embodied cognition account used to explain the original finding.

Fishing words from the speech stream

Laurence White

Speech overheard in an unfamiliar language often seems very fast, with the words running into one another. By contrast, experience with our mother tongue induces a perceptual slowing of speech. Furthermore, we hear familiar words as though separated by clear breaks – like spaces between written words – but in fact pauses between spoken words are rare.

Speakers do, however, provide a range of subtle cues which guide listeners to the structure of the speech stream. Here we consider the role of speech rhythm and timing. It is already known that speakers reliably slow their rate of talking towards the ends of phrases, and that the consequent lengthening of vowels is used by listeners to anticipate upcoming boundaries.

Consonants are also lengthened at the starts of words and phrases – consistently across languages – but the perceptual significance of consonant lengthening has not been clearly demonstrated. We created artificial languages in which we manipulated the duration of both vowels and consonants, to discover how English, Hungarian and Italian listeners use these timing cues to identify the boundaries between unfamiliar words. Results suggest that consonant lengthening and vowel lengthening are interpreted differently with respect to word boundaries, a perceptual effect that is common across languages.
Children’s use of Different Intrapersonal Emotion Regulation Strategies

Belén López-Pérez, Ellie Wilson, Giulia Dellaria, Gary Smith and Michaela Gummerum

Most research on Emotion Regulation (ER) in childhood has been conducted in the absence of a comprehensive theoretical framework. In addition, most previous studies have focused on emotion regulation as a whole without differentiating between distinct concrete emotion regulation strategies. The present research relied on the Process Model of Emotion Regulation (Gross, 2006) to investigate children’s abilities to regulate their emotions and to assess how different concrete emotion regulation strategies are used in children of different ages. One-hundred and eighty parents of children aged between 3- and 8- years old (3-4, 5-6, 7-8 year olds; N=60 in each group) reported about a situation where their child had been able to change what s/he was feeling. Results showed age differences in children's emotion regulation abilities and the strategies they use. As expected, the use of strategies such as ‘situation selection’ and ‘cognitive change’ increased with age, and the use of strategies such as ‘situation modification’, ‘attention deployment’, and ‘response modulation’ decreased with age. The present research contributes to the existing body of literature on emotion regulation by adding more information about the developmental patterns for each specific emotion regulation strategy.

Structural Illusion from Embodied Motion

Diego S. Maranan

We illustrate how technology has influenced creative, embodied practices in urban dance styles by analyzing how technological metaphors underlie conceptual representations of the body, space, and movement in three related styles of urban dance: liquid, digitiz, and finger tutting. Following an exploratory netnography of movement practitioners, we claim that unlike most dancers of traditional genres or other urban dance styles, dancers of these three styles frequently employ representations of the body and of space that are geometrical, mathematical, mechanical, or digital. To explain how viewers perceive and understand these metaphors, we extend the perceptual theory of structure from motion in order to apply dance performance reception theory to a model we call ‘Structural Illusion from Embodied Motion’ (SIEM). Our analysis of performance techniques of these styles suggests that during performance, dancers leverage SIEM to represent two types of ‘illusions’ to viewers: a) the dancer’s body has a reconfigurable structure; and b) the dancer is immersed in a virtual environment that contains invisible, mutable objects and structures that are revealed only through the dancer’s movement. The three dance styles exemplify a trend in popular dance in which body, space, and time are understood in the language of technology.

The Effect of Varying Distractor Task Timing within a Memory Retention Interval

Tara Zaksaite, Denis McKeown and Stephen Westerman

The existence of different types of memory impairments, including age-related impairments, dementias, amnesias and stress-related memory difficulties, highlight the need to study the underlying properties and processes of memory. Previous studies found that a difficult task performed at the start of the memory retention interval was particularly detrimental to performance. A recent study however, demonstrated that the end of the interval was still important. The previous studies used verbal items and because of the differences and dissociations between visual and verbal memories, in order to extend these findings to the visual domain and to begin to explore some of these contradictions, the present study used abstract visual patterns. Using a secondary distractor task paradigm, with a variety of conditions, it was found that once the initial period of the retention interval was unoccupied, a difficult task at the latter part of the interval was associated with significantly poorer performance than a difficult task at the initial part of the interval. These findings parallel those in the verbal domain with their focus on importance of the initial period, restricting this period to the initial four seconds and suggest that once it is unoccupied, the latter part of the retention interval becomes important for performance.
Moral Emotion Attribution in Children: The Role of Response Format

Giulia Dellaria, Ellie Wilson, Gary Smith, Belen Lopez-Perez and Michaela Gummerum

The Happy Victimizer paradigm has been used to study the development of moral emotion attribution in children. Overall, preschool children tend to attribute positive emotions to a wrongdoing, while older elementary-school children tend to attribute negative emotions. We wanted to know whether young children attribute more negative emotions in response formats that support the inhibition of a dominant response.

Ninety-three children aged between 4- and 7-year old were told three short stories in which a violator stole a chocolate bar, did not share pencils with others, or pushed another child from the swing. After each story participants were asked how the norm violator would feel and how they would feel if they were the norm violator. Children were randomly assigned to three different conditions. In the normal condition, participants pointed with a finger to one of five feeling faces that described how the wrongdoer/themselves as wrongdoer would feel; in the wait condition participants answered these questions after a balloon touched the ground, and in the arrow condition, participants used a toy arrow to point to one of the five feeling faces.

Children in the normal condition tended to attribute more positive emotions to the victimizer than children in the wait and arrow conditions. Further, participants in the normal condition tended to attribute more positive emotions to themselves as victimizer than children in the wait and arrow condition (except for the pushing story).

These findings highlight the importance of cognitive abilities, such as inhibition, for the development of moral emotion attribution.

Production and perception of Smiling Voice

Ilaria Torre

This study investigates phonetic aspects in the production and perception of Smiling Voice, i.e. speech accompanied by smiling. A new corpus of spontaneous conversations is recorded to compare the formant frequencies of Smiling Voice (SV) and Non-Smiling Voice (NSV); the hypothesis that smiling raises formant frequencies is proven to be valid also on spontaneous speech, after previous research found this hypothesis to be true for scripted speech. Then, two perception experiments are carried out to test the hypothesis that listeners can recognize instances of SV extracted from the corpus of spontaneous data and instances of NSV obtained from read speech. Once the hypothesis is confirmed, a second perception experiment is performed to attempt to locate the point, in an artificial continuum from SV to NSV, where such perception happens.

Creative Group Dynamic

Klara Łucznik and Mikołaj Biesaga

To understand complexity of group creativity, we captured the creative process of an unstructured group and investigated how group processes interact with creation. An unstructured group of visual artists excelling in different fields of art, had to work together without previous experience of collaboration with one another to produce a science fiction film. We analysed how they create new cultural meaning and how they cooperated with each other. Based on text network analysis of meeting transcriptions and brief summaries of each meeting we track a phase of both creative and group process. The interaction of group and creative processes were investigated. Emerging conflict caused iteration of the incubation and generation of ideas creative process phases. Additionally, each stage of the creative and the group process is characterized by different type of discussion measured by content network properties. In incubation stage density and centralization where significantly lover (\(D =0.09 - 0.16; C=107-185\)) then in generation idea phase (\(D=0.15 -0.18; C=267; 494\)). The research shows usability of text network analysis in order to identify the main concepts of discussion and follow the development of creative ideas.
The influence of space on simple mathematical expressions depending on participants’ ages

Mihaela Taranu

The present paper aims to investigate the way in which the spacing of simple mathematical equations influences the students’ responses when solving a series of trials.

Based on literature, we will confront the traditional perspective of symbolic thought with the new research paradigm of embodied cognition. Considered to be the classic example of the domain which seems to involve purely symbolic reasoning (principles and rules being regarded as the most important), mathematics, especially Arithmetic, is reconsidered. The interpretations that are guided by a formal convention of precedence order (multiplication and division precedes addition and subtraction) are also supported in the current practice by a spatial convention. This new approach on mathematics is called embodied mathematics. We will hereby discuss a series of studies which support this approach and which have shown that the physical space in formal equations as a significant impact on the successful evaluation of equations. Thus, symbols placed physically closer to one another tend to be evaluated as synthetically bound and solved firstly, even if this practice is an error from the perspective of formal mathematical rules.

On the basis of this research, we will describe an exploratory study with the interest of observing the data when the participants are children at various ages (3rd, 6th and 9th graders). We will then describe how we performed the study, namely what changes have been made to the experiment on which we built our study. In final part, we will discuss the results, implications and limitations of the study, as well as some future research directions.

Attachment & Chronic Pain: Support Seeking on Maternal Network Sites

Movita Chapman-Moyle, Jacqui Stedmon, Rudi Dallos and Craig Newman

Objective – To explore how mothers with two aetiologically distinct chronic pain conditions (rheumatoid arthritis (RA) and fibromyalgia (FMS), talk about their illness and motherhood using an attachment perspective.

Methodology – A pilot, qualitative, ethnomethodological thematic-analysis.

Method – Threads from 4 parenting social network sites with corresponding RA & FMS sub-groups were analysed.

Results – Talk revolved around three over-arching themes; 1-pain condition, 2-family life 3-coping. Pain was described in different ways; RA groups used more succinct pain-descriptions, FMS groups used more emotion-laden pain-language. For both groups familial support was discussed with few reflections on how their condition affected their children. RA sufferers tended to exhibit ‘stoic’ coping styles; FMS mothers tended to display anxious coping styles.

Conclusions – Previous research concluded coping success was linked to meaning-making ability. This study suggests meaning-making success is associated with perceived familial support. Familial support may be indicative of underlying attachment strategies & facilitative of providing intragroup support to others. Lack of support & preoccupation with condition leaves few resources to attend to the child. It is hypothesised difficulties in differentiating body/emotional pain may be linked to a subset of type-A attachment strategies. In turn, parenting responses may shape offspring to inhibit affect & express emotion through somatisation.
Memory for actions: a two-way mirror?

Nicholas Lange, Timothy J. Perfect and Patric Bach

After alternating performing and watching simple actions, participants misremember some of the observed actions as having been self-performed (Lindner, Echterhoff, Davidson & Brand, 2010). In the present study 36 participants working in pairs were shown 15 familiar shape cues and instructed to alternate generating 3 versions of each shape with any part of their body or any combination of body parts. The next day half the participants were asked to re-perform their own actions, and 21% of the movements they recreated were originally partner-actions, replicating Linder et al. (2010). However the remaining participants were asked to re-perform actions they had only observed. These participants also misattributed 21% of the actions by misattributing their own actions to their partners. Source confusions of action events appear to show the bidirectional pattern of errors consistent with recent work on unconscious plagiarism.

Consequently, we propose that rather than discussing how observation uniquely contributes to misattributions towards the self via mirror network activation or enactment contributes to better memory for own actions (Engelkamp, 1998), source memory for action events can be addressed within the source monitoring framework (Johnson, Hashtroudi, & Lindsay, 1993) in its entirety, subsuming unidirectional effects.

Prosodic features of read and spontaneous speech

Rosie Morris Haynes

This study aims to investigate the prosodic differences between speech read aloud and speech produced spontaneously, and how these prosodic cues are used by listeners to determine speech style. Listeners are able to tell apart the same sentence spoken spontaneously and read aloud at a level above chance. However, the differences between prosodic features of read and spontaneous speech which must enable this distinction are found to vary greatly across speakers, and whilst certain features are more often associated with one style or the other, no single feature has been found to allow listeners to reliably distinguish between the speech styles. An initial investigation of listeners’ ability to correctly identify read from spontaneous speech found listeners more likely to identify utterances as spontaneous when they featured a rising final intonation when compared to utterances with a falling final intonation, which were more often identified as read. This may be due to a number of factors, and was the only feature of those investigated which significantly influenced perception of style. However, a large degree of speaker variation is likely to complicate this task for listeners, and the potential influence of this variation is currently being addressed in the ongoing study.

Electrophysiological Investigation of Bidirectional Motor-Language Effects

Simone Rossi and Jeremy Goslin

Embodied language theories suggest that language comprehension is closely integrated with motor processes. This EEG study aims to investigate the bidirectional cross-talk between the language and motor systems. To test this, we varied the temporal gap between action word onset and the required motoric response (0 to 500ms). There were two test conditions: motor-linguistic congruency (e.g. hand response – grab) and motor-linguistic incongruency (e.g. foot response – grab). Additionally, abstract verbs that did not trigger body motor effectors were used as the control condition (e.g., hand – look). A correlation model was applied to measure these effects alongside the motor-language temporal variance. At the closest motor linguistic temporal point, action word retrieval was assisted by the congruent body part response (more positive N400 erp) compared to baseline. It arises that language-related motor activity contributed to modulate language processes. Conversely, when we measured the effects of language on motor action, congruent action verbs inhibited motor regions compared to the baseline. This suggests that motor regions were simultaneously activated either by the motor effectors embedded in action words and motor response, causing overloaded activity and inhibition. Together, these results strongly suggest that cortical motor-language representations are shared between motor and language systems.
I feel what you are doing: differential effects of observed and predicted touches

Toby Nicholson, Linda Solbrig, Matt Hudson, Patric Bach and Steve Tipper

Previous research has provided evidence that action observation is influenced by processes involved in action production. What is debated are the relative contributions of bottom up information and top down expectancies on these processes. Here, we tease both aspects apart by investigating the influence of action observation on tactile perception. In two experiments, participants watched hands reaching for objects or into empty space (mimed reaches), with the action either fully visible or obscured by an occluder, while having to detect stimulation on their own fingers. Experiment one measured the speed with which tactile stimulation was detected, and found that detection was facilitated by object presence, irrespective of occlusion. Experiment two used a signal detection paradigm to further investigate these processes. The data revealed that facilitated detection in the occluded and non-occluded conditions is driven by dissociable underlying processes, with one affecting tactile sensitivity and the other response bias. Together these findings reveal that both visual information and prior expectations concerning object-directed action alter tactile perception. More importantly, they show that both processes have different effects on the resulting action simulations.

Social interaction consequences of automatic affective responses to group perception

Alice Stephanie Barr and Dr. Guglielmo Calvini

Social perception involves the activation, among other features, of the several social categories to which a perceived person belongs. If these categories have a strong affective connotation, person perception will induce an affective response that may influence the perceiver’s social behaviour. More specifically, if the perceived social category is threatening, it will provoke an anxiety response that will make people avoid further social interaction. In the present experiment, participants are exposed to either a threatening group or a neutral individual during an unrelated speeded task on the computer. At the same time, their skin conductance is recorded as a measure of their general level of arousal. Subsequently, participants are also asked to take part in a collaborative task whereby their chosen interpersonal distance is measured. It is expected that perception of an individual associated with a threatening group will produce higher general arousal, which in turn will correspond to greater social avoidance. Participants’ appraisal of their state of arousal is also measured with a state anxiety questionnaire to assess to what extent their conscious emotions may also influence social avoidance behaviour.

Can five-month-old infants discriminate languages within a “rhythm class”?

Claire Delle Luche, Laurence White, Jodie McLoughlin, Paul Ratnage and Caroline Floccia

Phonologists have long proposed that natural languages can be classified according to their rhythmic properties: English and German for example are both stress-timed, whereas French and Spanish are syllable-timed. Previous research suggests that infants and adults have the capacity to discriminate between rhythm classes of languages, but not within classes. However, recent evidence showed that adults could discriminate within a rhythm class, when segmental information was removed and only timing was available as a cue. These results suggest that patterns of language discrimination may be based on gradient variation along prosodic dimensions, rather than on discrete categories. In order to investigate this in infants, a head-turn preference paradigm was used to measure whether English five-month-olds displayed the ability to discriminate between French and Spanish, two syllable-timed languages with distinctive distribution and realisation of strong syllables. Following familiarisation to one of the two languages for at least 80 seconds, infants heard samples of new speakers, either from the same language or a previously unheard language. Infants reliably showed differential patterns of looks to new and unfamiliar languages, suggesting they perceived a difference. This indicates that infants’ perceptual behaviour is not influenced by intrinsic sensitivity to discrete classes, but may reflect perception of functionally significant, but gradient, differences in prosody, such as the distribution and phonetic marking of lexical stress.
Learned predictiveness bias in attitude formation and change

Valeria Panina and Dr. Guglielmo Calvini

The aim of the study is to compare whether learning that a social group is predictive of neutral outcomes affects the modification of attitudes towards the group as well as their formation. It has been shown that consistently witnessing group membership in conjunction with a variety of neutral events biases the later formation of group evaluations to be more extreme (Le Pelley et al., 2010). We tested whether experiencing group membership as predictive after having already formed an evaluation of such a group moderates people’s judgements of that group. In a two-stage experiment, one group of participants learned that membership in a number of social groups was predictive of clothing colour before forming a positive or negative evaluation of those groups. In contrast, another group of participants first formed group evaluations and then experienced whether the groups were predictive of clothing colour. Results confirmed that group predictiveness biases group evaluations when experienced before attitude formation. However, when it is experienced after forming group evaluations, group predictiveness does not affect people’s judgements of the group. These results reveal how resistant attitudes are to indirect change and suggest that learned group predictiveness modifies social attitudes by affecting the formation of evaluative association.

Eureka

Frank Loesche

While most research provides an insight into some specific area, CogNovo project #16 aims to improve the understanding of insight itself. As a part of the project – titled Unconscious creativity: The Eureka moment – divergent processes of creative thought in the context of unconscious problem solving will be examined. Gathered understandings will eventually result in modelling a spiking neuron model as an extension to an existing model of instructed Stimulus–Response associative learning. The long term research goal is to understand and engineer environments that supports unblocking impasses and therefore provides additional performance in solving creative problems requiring illumination.

The Generation and Aha Effect with Picture Puzzles

Joana Galvao Gomes Da Silva

The core of this study was to standardize and test a paradigm for inducing aha experiences with pictorial stimuli called Mooney images. This paradigm was used to investigate whether there is an impact of generation (solving the images on their own) and insight on memory as well as whether there is a positive feeling associated with these experiences.