



OPENING TALK

Uffe Schjødt (Religion, Cognition and Culture Research Unit, School of Culture and Society, Aarhus University)

Predictive Processing in Collective Religious Experience

Predictive processing is a promising theoretical framework for explaining basic perception and cognition. But is it also useful for understanding religious experience? In this presentation, I briefly present the predictive processing framework and its possible application in the study of religious experience. I propose a social functional account which uses predictive processing to analyze a wide range of features in rituals that appear to increase the probability of people reporting religious experiences and interpretations by modulating the relative weight of prior experience (top-down predictions) and incoming sensory information (bottom-up feedback). Recent empirical evidence is reviewed and discussed in light of alternative theories. One major challenge for this kind of research is to design experimental paradigms in which predictive processes can be studied in actual authentic religious practices. Early attempts that use Eye-tracking, Acoustic analysis, EEG, and fMRI seem promising, but the ambitious goal of explaining religious experience in predictive minds has not been achieved.

KEYNOTE SPEAKERS

Catherine Caldwell-Harris (Department of Psychology, Boston University, Boston, MA)

When Culture Fails: Examining the Evolutionary Mismatch Hypothesis

What happens when the human brain, which evolved when our ancestors lived in small groups on the African savanna, must develop in contemporary urban society? The evolutionary mismatch hypothesis is that the stresses of modern life, such as high rates of depression and anxiety, reflect our stone age brain reacting to evolutionarily unanticipated inputs. This hypothesis is reviewed with a focus on the arena of child-rearing, including recent changes in parenting norms. Ancestral parents needed to ensure survival to reproductive age, and emphasized quantity over quality. Due to high childhood survival rates, modern urban parents have the luxury of rearing 1-2 children, but must invest heavily to position offspring in a competitive ecosystem. To secure acceptance by high status peers, parents must signal the extent of their investment, involving close supervision, high cleanliness standards and purchase of consumer goods and activities. Other mismatches include sleep problems resulting from infants and toddlers being mostly separated from mother's body, the surfeit of calorie dense foods, children being reared indoors with low opportunities for self-directed exploration, and relying on commercial childcare rather than recruiting family members.

Is parenting actually more effortful today? The evolutionary mismatches make parenting challenging, but reproductive effort is reduced in modern societies (gestate and nurse 1-3 children instead of 5-12 with high death rate). How are cultures around the world adjusting to new realities of affluence and competition? Child anxiety and youth suicides appear to be influenced by insufficient exposure to manageable challenges and high parent expectations for success. Are cultural practices evolving to reduce the mismatches?



Karin Kukkonen (Department of Literature, Area Studies and European Languages, University of Oslo)

Sculpting Joint Attention and Metacognition: Social Cognition, Predictive Processing and the Novel

In *The Structural Transformation of the Public Sphere* (1962), Jürgen Habermas famously argued that the new mediated forms of the novel and the periodical created a “public sphere” in the eighteenth century where the bourgeois society could negotiate its values. I propose to revisit this argument. Is the novel a tool of social cognition? And if so, do Habermas’ claim, literary history and media studies provide new trajectories for cognitive studies?

My talk will discuss in particular three aspects of social cognition. (1) Joint attention has been featured in cognitive literary studies and cognitive narratology for a while (see Currie 2010; Herman 2013; Polvinen 2014; Tobin 2018), but very little attention has been paid to the medium-specific features of joint attention in the written form. (2) Metacognition is central to discussions of the socio-cognitive links between character or narrators and readers in terms of theory of mind (Zunshine 2008; 2012), as well as empathy and feeling for characters (Keen 2007; Vermeule 2010; Kidd and Castano 2013). Might there be a link between metacognition, the negotiation of values in the public sphere and states of literary “deep reading” (Wolf 2010)? (3) Predictive processing begins to be interested in cultural templates and habitus (Roepstorff, Niewöhner and Beck 2010; Kukkonen 2016), but these are only first steps. Here, we will continue the exploration, suggesting that the novel is more than just a means to coordinate predictions. Rather, it sculpts joint attention and metacognitive aspects of social cognition and thereby attains relevance in the public sphere well beyond its immediate literary context.

Peter Vuust (Center for Music in the Brain, Department of Clinical Medicine, Aarhus University)

Groove on the brain: rhythmic complexity and predictive coding

Musical rhythm has a remarkable capacity to move our minds and bodies. I will describe how the theory of predictive coding can be used as a framework for understanding how rhythm and rhythmic complexity are processed in the brain. This theory posits a hierarchical organization of brain responses reflecting fundamental, survival-related mechanisms associated with predicting future events. I review empirical studies of the neural and behavioral effects of syncopation, polyrhythm and groove, and propose how these studies can be seen as special cases of the PC theory. Overall, musical rhythm exploits the brain’s general principles of prediction and that the pleasure and desire for sensorimotor synchronization from musical rhythm could be a result of such mechanisms.



Lisa Zunshine (Department of English, University of Kentucky, Lexington, KY)

Visible Minds

To quote Webb Keane, an anthropologist who writes on religion and ethics, while “theory of mind and intention-seeking are common to all humans,” they are “elaborated in some communities [and] suppressed in others” (Ethical Life, 131). As a literary scholar working with theory of mind and fiction, I am interested in historical contexts that encourage or discourage certain types of mindreading associated with fictional characters, their authors, and their audiences. In my talk, I present a series of case studies (from Renaissance Europe, mid-twentieth-century Russia, late medieval China, and the twenty-first century U.S.) to speculate how implied values of different communities may foster or suppress particular patterns of mindreading in literature, theater, and visual art.

Jacob Wamberg (Department of Art History, School of Communication and Culture, Aarhus University)

Visualizing the macro-incubator: Art as a Symptom of Evolutionary Worlding

How extensively is perception connected to the surroundings that humans inhabit? With the evolution of art as a central symptom, this lecture will demonstrate that perception is interlaced with ideas of how the large-scale world is constructed and how the human subject is positioned within this cosmological home.

With a point of departure in philosophical anthropology (Arnold Gehlen, Peter Sloterdijk), I assume that humans are unfinished animals, *Mängelwesen*, that are born in a radically immature state and never leave their naked infantile condition. Displacing macro-anatomical evolution of the brain with micro-anatomical massaging of a genetically stable brain, learning, humans therefore have to construct a protective macro-incubator, a semiotic-technological *Umwelt*, in order to exist. Moreover, as is witnessed by visual art, this macro-incubator undergoes a surprisingly regular evolutionary spiral, in which steadily more autonomized human subjects rise out of correspondingly expanding world, human autonomy finding support in a spiritual heaven that rises above and masters a material earth. If we combine observations by the German art historian Wilhelm Worringer with an elaboration of Hegel’s *Aesthetics* and Piaget’s evolutionary scheme of children’s spatial representation, we will see how the overall rise of complexity in cultural evolution has been oscillating between concentration in individual subjects (witnessed in naturalist paradigms: the Upper Paleolithic, Axial cultures, Modern cultures) and more enmeshed states, in which humans outsource agency to the expanding surroundings, with which they now temporarily intra-act in Karen Barad’s sense (paradigms of abstraction: Lower Paleolithic, Neolithic, Middle Ages, Postmodernity).



SPEAKERS

SESSION 1: Religion

Olympia Panagiotidou (The Study of Religion at Aristotle University of Thessaloniki and the Department of Mediterranean Studies of the University of the Aegean)

Ancient Greek Divination: Cognitive and Cultural Heuristics of Predictive Brain

We continuously collect information from our surroundings in order to perceive our current experiences, to make decisions and choices, and to perform our actions. Our inherent cognitive capacities enable us to process the collected information, to find or build connections and cause-effect relationships between our percepts, and to predict the outcomes of our actions and external events. When the perceived information is not enough to make predictions, we experience the 'fear of the unknown' and 'intolerance of uncertainty' that may be accompanied by different degrees of emotional (e.g., anxiety), cognitive (e.g., worry, disorganization) and behavioural reactions (e.g., inaction). We have developed various cognitive heuristics that we use in everyday decision making to dissolve uncertainty and the accompanied aversive emotions. However, our world – and especially our social world – is more complex than we can handle with the intrinsic capacities of our minds alone. Therefore, we develop cultural heuristics that provide valuable conceptual tools and enhance our cognitive capacities to deal with the unknowns and the perceived uncertainty.

In this paper, I suggest that ancient Greek divination comprised such a cultural heuristic that used the ideas and concepts available in the wider cultural context of Greek antiquity and provided useful conceptual tools to enhance people's desire for predictability and controllability of the perceived world. My argument is based on the findings of neurocognitive research on predictive processing and intends to show how our brain enculturation in different historical contexts may drive, update, and enhance our inherent cognitive abilities.

Short bio

Olympia Panagiotidou is a post-doc researcher for the Study of Religion at Aristotle University of Thessaloniki and a fellow lecturer at the Department of Mediterranean Studies of the University of the Aegean. During her PhD research, conducted at the Aristotle University in Greece and Aarhus University in Denmark, she applied a cognitive approach to the Asclepius Cult exploring the possibility of healing at the Asclepieia as a result of placebo effects. She holds a MA in Cognitive Science and the Study of Religion from Aristotle University and Aarhus University. She also holds a BA in History and Archaeology from Aristotle University. She is currently working on the application of cognitive theories to ancient Greek divination. For this research, she has received a two year scholarship and support from the State Scholarships Foundation of Greece (IKY).

Lilith Apostel (Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, Halle, Germany)

Death is Sleep: Instances of a Conceptual Metaphor in Ancient Egypt and Mesopotamia

The increasing prevalence of automated decision-making by intelligent and autonomous computer systems raises serious ethical and legal issues. When an intelligent computer system acts automatically, the stakeholders of the system might suspect that its behavior is not aligned with their intentions, e.g. when doctors suspect that an automated medical diagnostics system is making unsound inferences. Alternatively, the people affected by automated decisions might dispute the legitimacy of the system's decision-making authority, e.g. if they suspect that a system is



discriminating against a minority group. While human decision-makers can be interrogated to provide reasons and justifications for their decisions, few intelligent computer systems provide similar services, and systems using neural networks in particular are known to be opaque in this sense. To make sense of death is among the most difficult challenges for the human mind and a driving force in many religions. It is the ultimate event where all means of prediction fail. People of the second millennium BC tackled this problem by equating death with sleep: beds and other sleeping equipment are a common grave good, and ritual and literary texts regularly mention a netherworld that coincides with the world of dreams. Yet, we are dealing here not simply with an analogy, in which sleep is equated with death, but with a conceptual metaphor (a concept gleaned from cognitive linguistics), in which elements from a source domain are projected onto an initially unrelated target domain. Thereby, characteristics of an experientially well-understood phenomenon, in this case sleep, can be employed to form a mental concept of another phenomenon that is more complex or abstract or even, in the case of death, of a nature that is intrinsically impossible to understand experientially. A holistic, transdisciplinary approach between history, archaeology and the natural sciences shows that, while a belief in life after death itself is not shared by all humans, the underlying mental structures facilitating such beliefs are universal and reach far beyond the obvious similarity between sleep and death, i.e. the outward unresponsiveness of body and mind. Rather, the simulated world that is experienced in dreams is not random but possesses certain characteristics, and Mesopotamian and Egyptian beliefs about the netherworld can be related to universal human experience, such as the feeling of downward movement while falling asleep, to a large extent. Dreams are therefore a prime example in which to observe the three interlocking dimensions of religion, namely experience, belief, and practice, as well as the mental, bodily, and social aspects of the topic.

Short bio

Lilith Apostel finished her doctorate in Prehistory with an emphasis on History of Religion with the grade magna cum laude in 2017. Her thesis *Falling into Other Realms. The Universal, Embodied Experience of Sleep and Dreaming and Its Relation to Concepts of Death and the Netherworld before 1500 BC* was written at the Universität zum Köln, Germany and at the Sleep/Wake Research Centre at Massey University, Wellington, New Zealand. Before, she studied the Scientific Study of Religion, Prehistory as well as Social and Cultural Anthropology at the Freie Universität Berlin, Germany. Since 2018, she has been working as a graduate trainee at Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt, Halle, Germany.

Ronit Nikolsky (Culture and Cognition, University of Groningen)

The Predictive Brain, the Exogram, and Cultural Evolution

This lecture argues that cultural evolution happens when the predictive brain recognizes a difference between the prediction and the actuality, and makes the necessary adaptation. This process was conceptualized by Barend van Heusden, and titled as 'decoupling'. The individual adaptation becomes cultural evolution when the adaptation spreads, 'swarms' and is institutionalized. While the concept of exogram was usually associated with the 'extended mind' theory, Merlin Donald also makes an additional argument, that the exogram becomes an actuality with which members of the culture have to reckon. I will expand on this argument. In most cases, we can only conjecture the cultural evolutionary process, but with one type of exogram, the Holy Text, this process is very apparent: The divine authority attributed to the holy text does not allow for change in this artefact, even while the environment does change and eventually renders the holy text less relevant. As scholars, we can thus observe cultural evolution when looking into the interpretation of the holy text. My lecture takes the concept of 'exogram' onto the path of the predictive brain, and shows the centrality of this theory for explaining a variety of religious phenomena, the holy text being one of



them. This approach helps explain some religious phenomena which were not explained or were clumsily explained in the past by focusing on the artifact and not on cognition. I will present cases of Late Antique religions to exemplify the role of the predictive brain in cultural evolution.

Short bio

I have completed my studies at the Hebrew University, Jerusalem with a BA in Jewish Studies, MA in Comparative Religion, majoring in Iranian religions, and a PhD in Comparative Religion, with a thesis on Early Christian monasticism. Currently I am an assistant professor in the chair of Culture and Cognition in the University of Groningen. My research interests are: the cognitive approach to religion and culture, the theory of constructed emotions (Feldman Barrett), Late Antique religions, especially Judaism.

SESSION 2: Enculturation

Marc Malmdorf Andersen (Interacting Minds Centre, Aarhus University)

Play and Prediction in Paranormal Settings

Ouija boards sessions are illustrious examples of how subjective feelings of control can be convincingly manipulated in real life settings. While participants in Ouija board sessions will seemingly spell out words with a planchette themselves, they will often collectively claim that an invisible third party was actually responsible for producing the movements. Influential theories from cognitive science claim that the sense of agency may arise from cognitive processes that serve motor control. According to this account, the brain predicts the sensory consequences of an action, and then compares this prediction to the actual consequences. When prediction and consequence match, the result is the feeling that "I did that". Mismatches, however, give the opposite result. This idea entails that subjective feelings of loss of control in Ouija board sessions may arise because participants are somehow inhibited in predicting Ouija board responses. In this presentation, I present findings from a field experiment at a paranormal conference, where Ouija enthusiasts were equipped with eye trackers while using the Ouija board. The results of this experiment tell us an interesting story about how interacting and predictive minds accomplish the striking feat of producing meaningful sensations of external agency.

Short bio

Marc Andersen is a postdoctoral fellow at the Interacting Minds Centre, Aarhus University, Denmark. His interests include religious belief, behaviour and experience; sense of agency; agency detection; anthropomorphism; perception; predictive processing; and play. Marc has conducted both lab- and field-based experiments using technologies such as mobile and stationary eye tracking, physiological measures, sensory deprivation and virtual reality.

Pia Tikka (professional filmmaker and EU Mobilitas Research Professor at Centre of Excellence of MEDIT, Tallinn University), **Angela Kondinska** (Neuroscience, University of Bremen), **Michael Becken** (Information and Education Science, Humboldt University of Berlin), **Lynda Joy Gerry**, **Ilkka Kosunen**

The Booth: An Exploration of Enculturation Effects on Trust and Empathy towards Refugees

Humans tend to feel empathy or compassion for even strangers in misery. When evaluating the trustworthiness of a stranger, however, evolutionarily automated precaution to unknown may inhibit one's willingness to help. In our psycho-physiological experiment titled "the Booth" participants are engaged in facial encounter with virtual asylum seekers of different ethnicities while listening to pre-



recorded auditory narrative about the reasons that led the person to abandon his home and to flee into a new country. Each subject is asked to adopt the role of an immigration officer and decide after the session to either reject or accept the refugee's application. Before the actual experiment, two film clips prime one half of the participants to view each incoming immigrant as an individual and the other half as members of a large group. We implement an oddball paradigm to explore event-related potentials (ERPs) on electroencephalography (EEG), orienting responses in electrodermal activity (EDA) and heart rate to measure response to unexpected events (prediction errors). By collecting a large amount of psychophysiological time-series data, we explore the possibility to build a predictive model that would allow us to determine in real-time when a prediction error has occurred simply by observing these implicit biosignals. The recorded information on each participant's religious, political, and cultural background allows us to study how enculturation affects predictive processing of social emotions and narrative context. While studying themes such as compassion fatigue, pseudo-inefficacy and inhumanization, we explore factors that contribute to perceived legitimacy, trustworthiness, empathy, and willingness to provide support to refugees.

Short bio

Dr. Pia Tikka, is a professional filmmaker and EU Mobilitas Research Professor at Centre of Excellence of MEDIT, Tallinn University. As the leader of the research groups NeuroCine and Enactive Cinema, she has published widely on the topics of neurocinematics and enactive media. She has acted as a core member of the 5-year neuroscience project aivoAALTO at the Aalto University. She is a Fellow of Life in the Society for Cognitive Studies of the Moving Image. Currently her Enactive Virtuality research group studies the viewer's enactive co-presence in immersive narrative environments.

Angela Kondinska is a Master student in Neuroscience at the University of Bremen in Germany. She has conducted numerous neuroscientific research studies. Her Bachelor thesis conducted at the Jacobs University in Bremen was about enhancing creativity with brain stimulation (transcranial direct current stimulation). Currently during her internship in Enactive Virtuality Lab, Tallinn University, she focuses on studying viewers' psychophysiological engagement with dynamical virtual screen characters.

Michael Becken is a bachelor student in Information and Education Science at the Humboldt University of Berlin in Germany, with interest in both film, art, and neuroscience. He is working with the psychophysiological experiment "The Booth" during his internship at Enactive Virtuality Lab.

Lynda Joy Gerry is a PhD student and software developer employing methods from psychology and cognitive neuroscience to test the impacts of embodied interfaces in virtual environments on learning, cooperation, and empathy. Her goal is to cultivate "augmented social cognition" by using virtual environments to enhance our abilities to understand one another through embodied interfaces created based on theoretical models of empathy from neuroscience and psychology.

Dr. Ilkka Kosunen has expertise in physiological computing. He has participated in multiple EU-projects, developed dozens of prototypes and demos using physiological signals in real-time adaptive systems as well as published more than 30 journal and conference papers on the topic. His main interests relate to how human cognitive and emotion processes can be modelled by observing physiological signals.

Jeppe Sinding Jensen (Interacting Minds Centre researcher and School of Culture and Society, Aarhus University)

Normative Cognition in Social Institutions as Collective Predictive Tools

Normative cognition provides governance in cognizing and aids in predicting behaviour in self and others. Normatively guided cognition is also involved in the reflexive capacities of metacognition. Thus, minds create ecologies for other minds in normative conceptual systems where actions, events,



thoughts, emotions – the entire range of human practice – become normatively coded in classification systems. Normative cognition functions as high-level predictive coding because cultural priors ('the way we normally think and do') and social institutions inform humans about what to expect next. Thus, they enable and facilitate understanding of self and other. The 'spaces of reasons' of human social practice are intrinsically normative and enable individuals and groups to have, hold, and share collective ideas, to perceive sociocultural norms, and values, to have joint intentions, plans and actions. Normativity is foundational in culture and society as well as in the making of individuals as social agents. The working hypothesis is that normativity has natural foundations; it grows out of our evolved moral psychology and our hyper-sociality and is encoded in cultural contexts and social institutions.

Short bio

Jeppe Sinding Jensen is an Interacting Minds Centre researcher and emeritus associate professor, School of Culture and Society, Aarhus University. He holds degrees in Classical Arabic and Islamic Culture and the History of Religions. After a decade at the Dept. of Philosophy, University of Southern Denmark, he was an associate professor in the Study of Religion, AU (1995-2018). His research has focused mainly on methods and theories in the comparative study of religion; the relations between cognition and culture, and in later years he has turned to investigating the uniquely human ability to cognize social norms and values, in short: 'normative cognition'.

SESSION 3: Collective Processes

Julian Kiverstein (Academic Medical Centre, University of Amsterdam) and **Michael Kirchhoff** (Macquarie University)

Expectation and Experience: A Role for Cultural Practices in Precision Estimation

We take predictive processing accounts of conscious experience as our starting point in this talk. We thus assume top-down expectations can sometimes influence the brain's processing of sensory signals in such a way as to play a role in determining what a person consciously experiences. We will also assume top-down expectations get to do this work in conscious processing by means of precision estimations – the brain's estimation of its own uncertainty. Our main aim is to argue that precision can be weighted in part, based on regularities in cultural practices. Patterns of activity found in a practice can lead to trust and confidence being assigned to priors that operate at high levels of processing in the sensory hierarchy. The effect of assigning high precision to expectations at higher-levels of sensory processing is the alignment of expectations among the people taking part in a practice. We will show how alignment has as a consequence a literal shaping of experience by a person's cultural niche. It follows that the prediction-error minimising machinery is not always and necessarily assembled by processes that take place within the individual. The precision mechanism that does the work of settling the relative influence of bottom-up and top-down flows of information within the brain can be tuned from outside of the individual. Precision can be set based on stable patterns of interaction that unfold within cultural practices. The machinery for realising conscious experience need not be locally realised in the brain

Short bio

Julian Kiverstein is currently senior researcher at the Academic Medical Centre, University of Amsterdam on the ERC funded project Skilled Intentionality for Higher Cognition (awarded to Prof. Erik Rietveld). He has published extensively on philosophy of 4e (embodied, enactive, ecological, extended) cognition, and phenomenological philosophy of mind. His book *Extended Consciousness*



and Predictive Processing (co-authored with Michael Kirchhoff) is forthcoming with Routledge and will be out end of the year.

Lucia Angelino (Aarhus Institute of Advanced Studies, Aarhus University)

Shared temporal field as tool of Collective Prediction in Joint Improvised Action

Many joint actions require that we anticipate others' actions to better know what to do next: think of playing a duet piano, dancing a tango, walking together or having a conversation with a friend. While predicting others' actions can be easy when people are engaged in joint actions where the goals and the tasks to be performed are specified in advance, less is known about the mechanisms facilitating action prediction in multi-agents improvised actions where predicting others' actions seems to be challenging, or even impossible. How is it possible to make predictions about others' actions in unplanned (improvised), yet intentional actions that are pervasively unpredictable? In this talk, I want primarily to address this question by looking at the other-directed pragmatic strategies engaged by improvising musicians involved in a musical dialogue. Drawing upon Husserl's and Merleau-Ponty's analysis of space, perceptual intentionality and its co-given horizon, I wish to demonstrate that in multi-agents' improvised actions, predictive processes cannot be understood apart from a shared action and perceptual field (i.e., emergent interactional frame) that improvising agents co-create through a continual, dialogical adjustment of actions, gestures, and whole-body expressions. Against this background, it will be argued that such a "shared action space", in tandem with the motor, bodily intentionality of the agents involved, in turn grounds their expectations about future actions and drives basic social predictive and cognitive processes just in virtue of the constraints it generates and of the implicit although structural reference to further intentions it entails as co-given in its horizon. This argument will be based on a processual, turn-by-turn and phenomenological, moment-by-moment analysis of one jazz improvised performance (Billie Holiday, *Fine and Mellow*, film footage).

In conclusion, it will be argued that far from being a strategic planner, aloof from the material world, the mind is in practice a hotbed of tactical and relational improvisation. As it mingles with the world, the mind's creativity is inseparable from that of the total matrix of relations in which it is embedded and into which it extends, and whose unfolding is constitutive of the process.

Short bio

Lucia Angelino is a research fellow at AIAS and associated researcher at the Institute Acte, University Paris 1. She received her PhD in philosophy from the University Paris 1 in 2009. Afterwards (2011), she was awarded a Marie Curie individual fellowship to pursue a project entitled *Thinking of the Body as both Rootedness and Breakthrough* at the Free University of Brussels. Following her position as Former Marie Curie fellow, she served as an associated researcher at the Institute Acte, University Paris 1. The author of two books on Merleau-Ponty, *L'oeil de Merleau-Ponty* (2013) and *Entre voir et tracer. Merleau-Ponty et le mouvement vécu dans l'expérience esthétique* (2014), she is the co-author of *Quand le geste fait sens* (2015). Her scientific background is in phenomenology and aesthetics. The project she is working on at AIAS addresses relevant issues in the fields of social interaction and joint action theory from a phenomenological, aesthetic, and sociological perspective.



Suzanne Hoogeveen (Department of Psychology, University of Amsterdam)

The Power of Suggestibility: Experimental Research on Expectancy Effects in Cognitive Enhancement

Cognitive enhancement is a booming topic. People seem highly fascinated by brain technologies and express a remarkable faith in the potential of cognitive enhancement. This emphasizes the importance of double-blind studies, but also creates interesting possibilities for research on expectancy effects. The focus of this talk will be on a study aimed at investigating the psychological and neurocognitive basis of expectancy effects of cognitive performance modulation through brain stimulation. We used a placebo cognitive enhancement device, and we found that belief in cognitive enhancement was associated with a stronger externalization of agency and a change in neural responses to errors. A subsequent replication study will also be addressed, where we additionally measured individual differences in suggestibility. These findings are integrated in the computational framework of predictive processing, which provides a unifying theory to account for the effects of expectancy manipulations on subjective experience.

Short bio

I am a second year PhD-student at the University of Amsterdam, Department of Psychology, interested in beliefs, religiosity and spirituality. My PhD involves the Religious Replication Project, in which we investigate the (neuro)psychological mechanisms related to supernatural beliefs. We focus on reassessing existing research, addressing new questions and applying Bayesian statistics to shed light on the validity of prevailing theories in the cognitive science of religion. Using cross-cultural multi-lab studies, direct replications, and preregistration, the aim is to give a strong theoretical as well as a methodological impetus to the field.

PARALLEL SESSION 4 A: Literature

Shannon McBriar (Lecturer in Humanities and Academic Core at Amsterdam University College, Amsterdam)

From “Reminiscence to an Expectation”: Figuring Melancholy in Djuna Barnes’s *Nightwood*

“Yet more distressing would be the moment, when, after a pause, the song would be taken up again, from an inner room where Robin, unseen, gave back an echo of her unknown life more nearly tuned to its origin. Often the song would stop altogether, until unthinking, just as she was leaving the house, Robin would break out again in anticipation, changing the sound from a reminiscence to an expectation” (Barnes, *Nightwood*, 87). In *Nightwood*, this phrase signals not only a transition in a moment of cognition, as Nora senses with deep affect the imminent loss of her lover, Robin, but also a moment of temporal complexity. In his chapter, “Time as Space in the Structure of (Literary) Experience: The Prelude”, Mark Bruhn clearly articulates the problematic temporal dimension of “any moment of cognition”, which “is never a matter only of a moment but always of at least two moments or times: the present instant [...] and the instance of the past, that is, consolidated foregoing experience that interprets [...] sensory impulses according to preestablished and therefore anticipated ideas” (Bruhn, 2015, pp. 1-2). Recent research in cognitive literary studies has attempted to engage the ambiguity (or what Terence Cave refers to as the “underspecification”) of this extended moment through focusing on the idea of ‘inference’ or ‘mind reading’ that occurs “between readers and authors, between readers [...] and characters in fiction, and between the characters



themselves” (Cave, 2016, p. 27). For Cave, it is those “limited but suggestive indications about the character and his or her behavior” that allows us to “anticipate their likely utterances or actions” (p. 27). Yet importantly, as Bruhn points out, these “suggestive indications” operate not only on the level of language, but are also played out in the body, in particular, in “muscular and vestibular ‘memories’” that allow us unconsciously to anticipate and therefore ‘supply’ the actions that any given object (such as a staircase) afford us (p. 2). In this paper, I would like to further open up and complicate Bruhn’s attention to moments where anticipation created by these ‘memories’ and past experience is compromised, when instability ensues, when the foot doesn’t “land as expected” and the shadows don’t “lie where they ought”, through drawing on the theory of affordances. In using this theory to open up formally complex texts, such as Virginia Woolf’s short piece of fiction “The Mark on the Wall” and Djuna Barnes’s novel *Nightwood*, I hope to contribute to a better sense of understanding the potential of this theory in exploring transformations between the familiar and unfamiliar in literary studies, and its broader relevance to anticipation and predictive thinking in literary engagement.

Short bio

Shannon McBriar is a lecturer in Humanities and Academic Core at Amsterdam University College, Amsterdam, The Netherlands. In addition to participating in an interdisciplinary research collaboration on “mind wandering” at The Hub, the Wellcome Collection, London, she has presented papers on mind wandering at a number of academic conferences and related public engagement events such as “Mind Wandering: Good for the Mind?”, part of the Rest and its Discontents series held at the Mile End Art Pavilion, London.

Meindert E. Peters (New College, Oxford)

Literary Predictions: On the re-shaping of affordances in Alfred Döblin’s *Berlin Alexanderplatz*

The theory of ‘affordances’, coined by Gibson (1969) and importantly elaborated upon by Rietveld and Kiverstein (2014), describes the way in which we perceive the environment as shaped between our socio-cultural bodies and the material environment. What the world ‘affords’ is based on an embodied mind habituated in a socio-cultural environment. It is on the basis of this familiar environment, then, that our actions and those of others become predictable. But what happens to our understanding of our own actions and that of others when we enter into an unfamiliar environment? What does an unfamiliar environment afford? How can we come back to predictable actions? In this paper, I would like to explore these questions about affordances through Alfred Döblin’s 1929 big city novel *Berlin Alexanderplatz*. In the novel, the main protagonist Biberkopf leaves the familiar environment of the jail for the overwhelming city of Berlin. What follows is an exploration of Biberkopf’s inadequate engagement with his environment, leading to multiple ‘blows’ to his person. Exploring Döblin’s description of Biberkopf’s engagement with his material environment through the theory of affordances shows the way in which the material environment can come to be viewed as instable: open to shaping and re-shaping. Moreover, Döblin’s attention to the ways in which other people help shape affordances – not least through story-telling – asks us not only to take seriously the social aspects of affordances and explore the ways in which others are imperative for re-familiarizing the unfamiliar, but also to think about the reading of literature itself as a way of learning to predict our futures.

Short Bio

Meindert E. Peters holds a BA from Amsterdam University College in Philosophy and Art History and an MPhil from the University of Oxford in German Studies. At New College, Oxford he is now writing his DPhil thesis exploring embodiment in German Modernist thought and literature. More specifically,



he is investigating the ways in which bodies are understood to shape experience and give meaning to our environments and lives. His latest article entitled “Heidegger’s Embodied Others: On Critiques of the Body and ‘Intersubjectivity’ in Being and Time” is published in *Phenomenology and Cognitive Science*. Meindert is a former professional ballet dancer.

Matthew Scott (Lecture in the department of English literature at the University of Reading)

Writing the City of Rome: Poetic Affect, Memory and Attentive Confusion in Elizabeth Bowen and Wallace Stevens

This paper addresses the ways in which two great modernist writers, Elizabeth Bowen and Wallace Stevens, go about the writing of the foreign city of Rome. Both imagine it as a mental map of sorts that they negotiate as an affective site of confusing memories; one that they figure as the imaginative workings of what we might call predictive and disrupted neural functions. What fascinates me about their writing is the way in which its descriptions of the city function as accounts of what I shall be calling acts of ‘attentive confusion’. In developing this idea, I will be drawing on the complex role of attention when disruption occurs to the predictive function, for example, when a once familiar action is suddenly rendered unfamiliar such as occurs when a person suffering from dementia touches the floor with her feet and no longer unconsciously ‘knows’ what is happening, yet feels urgently compelled by the sensation to adjust in ways she may be unable to. This term helps me to think about the ways in which accounts of mental processes can be both focused and acute, but also vague and uncertain (an idea that borrows from Andy Clark). In employing this term, I will also be addressing the ways in which it might attend to the larger literary-theoretical question of what constitutes the poetic in our time. An underlying contention in the paper is that poetics have developed as literary structures that map and shape the confusion of experience in predictive ways that enable us to focus attention. In so doing, they formalise a function of cognition that can itself be analysed outside the discipline of literary theory by looking closely at literary texts, such as those of Bowen and Stevens, which attend closely to the mapped confusion of alienated social experience.

Short Bio

Matthew Scott has lectured in the department of English literature at the University of Reading since 2006 and has published widely on post-Enlightenment literature.

PARALLEL SESSION 4 B: Discourse

Stephan Besser (Literary Studies, Dutch Studies, University of Amsterdam)

“Our Kind of World”: The Discourse of Patterns in Contemporary Cognitive Science and Aesthetics

“Great keyword of our times, patterns.” This remark by literary scholar Franco Moretti, made in the context of discussions of the digitization of contemporary culture and science, applies to many present day “worldings” of the brain as well. Significantly, “patterns” of various kinds play an important role in numerous recent attempts to conceptualize entanglements of brain, body, and world, for instance in the notion of “patterned social practices” (Andreas Roepstorff et al., 2010), descriptions of the environment of the “predictive brain” as a “world of regularity and pattern” (A. Clark 2016), and studies of the “sociocultural patterning of neural activity” (Yina Ma et al. 2014) in cultural neuroscience. In cognitive literary studies, Brian Boyd (2009) and Patrick Colm Hogan (2016) have offered accounts of aesthetic experience that crucially rely on patterns, while scholars such as



Morten Kringelbach and Peter Vuust analyze the pleasures of pattern recognition in music. In this paper, I will explore the fascination with patterns in contemporary cognitive (neuro)science and cognitive aesthetics from a discourse analytical perspective. While “patterns” in scientific discourse often relate to predictive models of the brain the notion also facilitates specific cross-mappings of the biological and the cultural and the individual and the social, and can shape notions of collectivity in (neuro)cognitive research in particular ways. This pervasive term, in other words, has specific semantic and meaning effects as well. I therefore propose to have a closer look at some of the epistemic and ideological implications of “patterns” in contemporary scientific worldings of the brain. I will take my cue from Dutch writer Maxim Februari’s novel *Klont* (2017), in which the current fascination with patterns takes center stage.

Short Bio

Dr Stephan Besser is Assistant Professor of Literary Studies and Dutch Studies at the University of Amsterdam and program director of the Netherlands Research School for Literary Studies (OSL). He is currently working on a book entitled “The Promise of Patterns: Poetics of Knowledge in 21st Century Neuroculture” on the fascination with patterns and isomorphisms of brain, body, and world in contemporary culture and science. He is the author of numerous articles and book chapters on the cultural and literary history of German colonialism, Dutch and German literature, and a monograph on medical constructions of the tropics in German and European culture around 1900 (*Pathographie der Tropen: Literatur, Medizin und Kolonialismus um 1900*, 2013). Besser is a member of the ASCA research group Neuroaesthetics and Neurocultures at the University of Amsterdam.

Emelie Jonsson (Associate Editor, *The Journal Evolutionary Studies in Imaginative Culture*)

H. G. Wells and the Counterintuitive Story of Evolution

Unlike mythological accounts of humanity’s origin, Darwinian evolution violates the predictions of human social cognition. Natural selection cannot be negotiated with like gods or spirits, and it lacks both the human justice and the teleology that mythology projects onto nature. I argue that literature has helped calibrate human minds and cultural discourses to evolution since the latter part of the 19th century. H.G. Wells was one of the first literary authors to depict human beings from an explicitly Darwinian perspective. He was a student of biology who boldly imagined the past and future of the human species. However, his fiction also reshapes the human story in line with known cognitive biases: mind-body dualism, teleological thinking, and agency projection. Wells’s fiction portrays a world in which moral culture must guide self-serving nature toward an ideal social state. His interpretation of human nature influenced policy-makers during the early 20th century, from Theodore Roosevelt to UNESCO. Similar views appeared in a recent survey of academics who study human behavior. In this case study, I use a combination of neuroscience, evolutionary social theory, evolutionary aesthetics, and historical, biographical sources to explain the psychological functions and effects of Wells’s early fiction. Seeing Wells in the light of modern psychology illuminates both his legacy and our current attempts to grapple with human evolution.

Short Bio

Emelie Jonsson received her PhD in English from the University of Gothenburg, Sweden, in 2017. She is an evolutionary literary scholar, primarily concerned with the friction between human psychology and naturalistic cosmology. She has published on Oscar Wilde, E. M. Forster, H. G. Wells, Arthur Conan Doyle, and T. H. Huxley; and she has collaborated on interdisciplinary projects concerning biocultural theory and contemporary academic beliefs about human nature. She is currently working as associate editor of the journal *Evolutionary Studies in Imaginative Culture* (www.esiculture.com).



Alejandra Wah (Department of Arts, Culture and Media Studies, University of Groningen)

The Role of Reflective Imagination via the Artistic Experience in Prediction and Social Cohesion

Elsewhere I have argued that particular degrees of imagination and consciousness, a cognitive strategy that I refer to as reflective imagination, underlie the artistic experience (Wah 2014). I take the artistic experience to be the characteristically human and universal capacity to experience a story by means of music, dance, song, pantomime, drawing, pretend play, and spoken or written language (Wah 2017). Drawing upon evolutionary biology and developmental theory in this presentation, I first argue that the capacity to predict based upon prior experiences is underlain by the cognitive strategy of reflective imagination. I briefly point out the evolutionary and developmental stages of this reflective aspect of imagination via the artistic experience and its possible functions, one of which is prediction. I then underline the positive outcome of this strategy, that it can liberate humans from the immediacy of perception and emotion, making possible conscious control over behavior and action, comparison, and creative reasoning. However, the strategy also has a negative outcome in that it can also lead humans to experience doubts and uncertainties about what they perceive, and about meanings and intentions, thereby making human life an uncertain affair (van Heusden 2009). I finally argue that, at its fullest, the reflective imagination can, through the artistic experience, help humans to forget prior experiences and so-called “cultural programming” characterized by cultural identity (national, religious, ethnic), and cultural knowledge systems and institutions (political, philosophical), and thus contribute to social cohesion.

Short Bio

Alejandra Wah is Assistant Professor of Arts and Cognition and a member of the research group Arts, Culture and Cognition at the Department of Arts, Culture and Media Studies of the University of Groningen in the Netherlands. Her research focuses on the evolution and development of reflective imagination and its role in behavioral adaptation. Her research has been supported by grants from the National Autonomous University of Mexico (UNAM), the Mexican National Fund for the Culture and the Arts (FONCA), the Jumex Foundation Contemporary Art Collection, the Dutch Ministry of Education, the Ubbo Emmius Fund, and the Royal Netherlands Academy of Arts and Sciences (KNAW).

PARALLEL SESSION 5 A: Film

Stefania Balzarotti (General Psychology, Catholic University of the Sacred Heart) and **Federica Cavaletti** (Humanities, Catholic University of the Sacred Heart)

The Influence of Film Editing Style on Time Perception: An Experimental Study

Time is a crucial dimension of human perception of the world. In an effort to understand how time is processed by the brain, one research question concerns time ‘prediction’ processes in film viewing, under the hypothesis that film editing can influence the spectator’s time experience. This question has been recently addressed by two complementary approaches: neurocognitive studies and semiotic research on film language. The main goal of the present study is to examine the effect of distinct types of film editing styles on the individual’s time perception. Seventy-six participants watched nine video-clips while their eye movements were recorded. The clips displayed an actor performing three types of routine actions and were edited by using three different styles: 1) master-shot (frontal perspective, medium shot, no cuts); 2) low-paced editing (cutting on action); 3) high-paced editing (high number of cuts and angle changes). After viewing each clip, participants were



asked to rate their emotional involvement, report subjective judgments of time passage, and estimate the clip duration in seconds. The analyses were done using linear mixed models with editing style as fixed factor and type of action as random factor. The results showed that participants exhibited more but shorter fixations when viewing low- and high-paced edited clips than master-shot clips. Also, they reported higher emotional involvement and perceived time to pass faster after watching high-paced edited clips. Finally, participants were more likely to overestimate the duration of high-paced clips than the master-shot clips. Overall, these results suggest that film editing style can influence time perception.

Short Bio

Stefania Balzarotti is researcher in General Psychology at the Catholic University of the Sacred Heart in Milan since 2010. She has an M.Sc. and a Ph.D. in Psychology, as well as a 2nd-level post-graduate master course in Neuropsychology. Her research activity concerns emotion and emotion regulation, using different methodological approaches (e.g., nonverbal behavior, biosignals, eye-tracking) to investigate how people respond to emotional events and stimuli, including images, emotionally designed objects, and environments.

Federica Cavaletti is a PhD candidate in Humanities (curriculum: Communication, media and performing arts) at the Catholic University of the Sacred Heart in Milan since 2016. Her project concerns aspects of the subjective perception of time in the cinematic experience, investigated both theoretically and experimentally; her work focusses specifically on psychopathological time. During the last year, she presented papers at international meetings in Cracow, Gorizia, and Amsterdam. She is responsible for the Italian translation of various English essays in aesthetics and theory of the (moving) images.

Christina (Xristina) Penna (Leeds Humanities Research Institute, University of Leeds)

The Predictive Scenographer: Performance Design as Predictive Affordance-o-graphy

We are finding parts of ourselves, playing, playing with the light, unexpected events [...] wood, fabric, cameras, sound equipment, and a bit of alcohol. Shades of red, grey, it is pretty dark, you cannot see much. It provokes you in terms of fiction. (Participant S3, practice-research project Work Space III, October 2015). In hybrid and participatory performance environments, the audience's position constantly shifts and is not contained within a viewing area, like in traditional forms of theatre, raising questions for the performance maker such as: How do I design the distribution of the experience of the audience? How do I contextualise this distribution? How do I frame this experience; and the feelings generated by a distributed design?

In this paper, I will reflect through specific performance practice on how the free-energy principle (Friston 2011) and PP (Clark 2013) can be useful for a performance designer (scenographer) as a method for performance making but also as a way of contextualising what participatory performances do and how they do it. The audience-participants' predictive brains are understood to get a grip on multiple fields of affordances (both material, cultural, etc.) simultaneously, and these become interweaved in the circular causal weave between embodied brain and world. The plurality of possible fields of interrelations the audience-participants make in relation to the design stretch across interoceptive, proprioceptive, and exteroceptive information, providing "a rich new entry point for accounts of experience, emotion, and affect: accounts that do not compartmentalize cognition and emotion, but reveal them as (at most) distinctive threads in a single inferential weave" (Clark 2015: 296). WS III's scenography could be described as an embodied, and ecological playful



prediction algorithm that had the audience-participants as anticipating errors predicating the next moves in order to maintain the organisation of the performance system..

Short Bio

Xristina is a performance practitioner and researcher, currently a short-term visiting fellow at The Leeds Humanities Research Institute, University of Leeds. She has contributed to international academic conferences and symposia in the fields of performance, humanities, and cognition such as the Cognitive Futures in the Arts and Humanities, Worlding the Brain, AISB, IFTR. Her performance installation work (www.aswespeakproject.org) has been presented internationally (USA, UK, and Greece). In her practice-led thesis *Towards a CogScenography: Cognitive science, scenographic reception and processes*, University of Leeds 2017 (<http://etheses.whiterose.ac.uk/20624/>) she argues that cognitive theories which understand human cognition as co-originating between brain, body, and world can contribute to both the production and the knowledge of contemporary performance design.

Julia Vassilieva (Australian Research Council Research Fellow and Monash University)

Re-Assessing the Status of the James-Lange Theory of Emotions in Film Studies: Eisenstein and Vygotsky in Dialogue.

Following the turn to affect and the more recent turn towards the neurosciences in the humanities, there has been a surge of interest in the embodied nature of emotions. In this context, the James-Lange theory (developed independently by William James and Carl Lange in the 19th century) that bodily reactions do not follow but, in fact, produce emotional states – that we are happy because we smile and sad because we cry – has attracted fresh interest among neuroscientists. In film theory, scholars have begun to reconsider Sergei Eisenstein's early interest in James's theorizing in an attempt to explain the visceral effects of cinema.

In this paper, I critically re-examine these approaches in film studies by contextualizing Eisenstein's own work historically and then relating it to current advances in studies of emotions. Specifically, I draw on Eisenstein's collaboration with the eminent Russian cultural psychologist Lev Vygotsky, who, in his late unfinished study of emotions, delivered a sustained critique of the James-Lange hypothesis. Emotions are not hard-wired nor pre-determined by human muscular or secretory reactions, Vygotsky maintained. Instead, emotions serve as appraisal of the meanings of a situation and cannot be divorced from intentions, reasons, and beliefs. They are built up every time they are produced, and their forms of expression are historically and culturally constructed. Furthermore, Vygotsky argued, art, literature, and theatre serve as important tools of "social techniques of feelings". These ideas fed into Eisenstein's late work on the emotional effects of cinema in his studies *Method and Non-Indifferent Nature*. As I shall show, they also anticipated current views such as those elaborated by Lisa Feldman Barrett, who argues that emotions are probabilistic guesses, and Ruth Leys, who insists on the intentionalist nature of emotions.

Short Bio

Dr. Julia Vassilieva is Australian Research Council Research Fellow and lecturer at Monash University. Her research interests include narrative theory; cinema and the mind; cinema and philosophy and specifically the work of Sergei Eisenstein. She is an author of *Narrative Psychology*, Palgrave Macmillan, 2016 and co-editor of *After Taste: Cultural Value and the Moving Image*, Routledge, 2013. Her publications also appeared in *Camera Obscura*, *Film-Philosophy*, *Continuum: Journal of*



Media & Cultural Studies, Screening the Past, Critical Arts, Kinovedcheskie Zapiski, Rouge, Lola, Senses of Cinema, History of Psychology and a number of edited collections.

PARALLEL SESSION 5 B: Body and Movement

Nim Goede (School for Cultural Analysis, University of Amsterdam)

Refractive Minds and the Interconnectedness of Being: Exploring New (Materialist) Media Art

Feminist technoscience studies scholars and new materialist thinkers are reimagining the ontological and epistemological foundations of scientific knowledge and our relation to novel technologies. These efforts question the worldviews of Cartesian dualism and traditional physics premised on the notions of individuality, separateness, boundedness, and the act of reflective thought as a means of producing knowledge. For the most part, these endeavors have been textual in nature, leaving underappreciated the unique speculative contributions of the arts. As I argue, interactive new media installations can provide one-of-a-kind spatial environments in which to stage and enact particular interfaces between the situated, embodied and embrained spectator and novel technologies. As a case study, this paper provides a reading of Mariko Mori's otherworldly interactive neurofeedback installation Wave UFO (1999-2003) in which I refrain from simply applying feminist theories to this work but rather attempt to appreciate this work's unique "voice". In doing so, I show how Wave UFO sets out to unveil interconnections between brains, bodies, technologies, and a number of seemingly disparate knowledge systems, like Buddhism, neuroscience, and Jungian psychoanalysis, which ordinarily remain imperceptible. As such, this new media installation can be understood as a tool for making its participants aware of how the human mind tends to function like a prism, refracting the fundamental interconnectedness of being and making the world appear to us as if composed out of separate and clearly demarcated entities like mind and brain, self and other.

Short Bio

Nim Goede is a PhD candidate affiliated with the Amsterdam School for Cultural Analysis (ASCA) and a member of the Neurocultures & Neuroaesthetics research group for which he acts as coordinator of this group's reading group. With a RMA degree in both Cognitive Neuropsychology and Art Studies, he adopts a humanities perspective to reflect on the brain (sciences) through the lens of the arts, exploring ways in which the arts enable us to rethink the brain and what it means to be an embrained subject. He is also a writer/art critic for the Dutch contemporary art magazine Metropolis M for which he recently guest-edited an issue on the theme of Entanglement.

Cordula Vesper (Cognitive Semiotics and Cognitive Science, Aarhus University) and **Vassilis Sevdalis** (Sport Psychology, Department of Public Health, Aarhus University)

Communicating through Modulations of Action Kinematics

When two or more people perform a joint action together, they often need to exchange relevant information in order to coordinate their common goal. Typically, language or gestures can help overcome information asymmetries; however, conventional forms of communication are not always available or useful. In such cases, joint action partners may be required to spontaneously create novel, non-conventional forms of communication. For example, by exaggerating specific kinematic aspects of their action performance, such that the communicative function (i.e. informing the partner) is embedded in the instrumental function (i.e. performing the joint task), joint action partners can



facilitate action prediction processes for each other and thereby support interpersonal coordination. We will present recent studies on non-conventional communication established through modulations of action kinematics that extend previous work by going beyond visually available information. Specifically, two studies measuring movement kinematics of pairs of participants while they perform joint matching tasks together provide evidence that joint action partners 1) systematically modulate action duration to communicate about positions in space and 2) systematically modulate grasp position to communicate about abstract object properties such as weight. We will conclude by discussing the generalizability of these novel communication systems as well as their link to expressive body movements in sports and the performing arts.

Short Bio

Cordula Vesper is assistant professor in Cognitive Semiotics and Cognitive Science at Aarhus University. Her research interests focus on the cognitive processes that allow groups of people to perform collaborative actions together – from a simple handshake to having a meaningful conversation to playing a piano duet. Her background is in Cognitive Science and Neuro-cognitive Psychology, which she studied in her home country Germany. She received her PhD from Radboud University Nijmegen (Netherlands) and worked as a postdoc at Central European University in Budapest (Hungary). She is also a young fellow at the Center for Advanced Studies in Bielefeld, Germany.

Vassilis Sevdalis is assistant professor in Sport Psychology at the Department of Public Health, Section for Sport Science, at Aarhus University.

Camden McKenna (New Hampshire, University of Edinburgh, Scotland)

Culture, Subjective Time, and the Rolling Present

It is commonly believed that culture affects the subjective experience of time. However, it is not well understood exactly how this occurs. This presentation will first review the variable effects of culture on our experience of time and then locate these effects in the context of a novel predictive processing account of temporal experience. The specific view expressed here is a mechanistic theory of subjective time, called the Rolling Present View, which derives certain features of temporal phenomenology from continuous Bayesian updating of posterior probabilities throughout a multilevel functional hierarchy. On the Rolling Present View, the experience of the passage of time and of the present is rooted in the inherent temporal structure of the predictive processing framework itself, rather than a result of predictions per se. This is in keeping with Kant's contention that temporal experience is a precondition for the possibility of any experience whatsoever. However, beyond the minimal experience of some kind of flow or passage, we also find that other, higher-order temporal features can be targets of predictions, and therefore the contents of our perception. The idea here is that higher-order predictions about the phenomenal flow of time, as it is instantiated by the system of Bayesian updating, inform our perception of interval duration and event segmentation. These kinds of inferences are highly malleable, and exhibit significant variation depending on cultural, social, and other factors, which can tune these sorts of predictions – affecting, for example, whether dinner with one's in-laws goes by too quickly or feels like eternity.

Short Bio

I am a 2nd year PhD student from New Hampshire, USA, currently studying at the University of Edinburgh in Scotland. I work primarily in the philosophy of cognitive science, philosophy of perception, with special attention to subjective time and predictive processing. My supervisors are Alistair Isaac and Keith Wilson. In 2017, I completed an MSc in Mind, Language and Embodied



Cognition at the University of Edinburgh and in 2013 received an MLitt in Philosophy from the University of Saint Andrews, with a few years teaching English as a foreign language in Latvia in between.

TALK

Pia Tikka (Professional filmmaker and EU Mobilitas Research Professor at Centre of Excellence of MEDIT, Tallinn University), **Jenni Hannukainen**, and **Mikko Sams**

Narrative Priming of Moral Judgments in Film Viewing

How does narrative priming influence the moral judgements of the film viewers? In two studies, we focus on the evaluation of the rightness of the perceived action of the characters and the acceptability of these actions, in relation to the viewer's experience of sympathy and filmic tension. Providing additional narrative information beforehand for the viewers is an effective method to manipulate how they perceive and make sense of the film narrative. Our experiment data is collected from two different studies, behavioral and psychophysiological. In both experimental settings, two groups receive additional background information of either the male or the female character, while the third controls are not primed. All subjects view the same 25 minute long drama film and reply to post questionnaires online.

Based on the collected data in the first experiment using parallel mixed method analysis, we showed that the narrative priming itself does not increase the spectrum of the moral judgment statements and the acceptance of the wrong-doings by the characters but a more influential factor seems to be the type of the action and its relation to the generally accepted moral norms. Yet, the narrative priming increased the explanatory spectrum of the subjects, which showed to some extent the trend for accepting or trying to understand actions that embody socio-emotionally complex situations. In the second currently on-going psychophysiological study (HR, EDA, EEG), we expect the explanatory spectrum collected via online questionnaires to correlate with the results of the first behavioral study. However, we also expect to show more priming dependent and spatio-temporal film-event dependent differences in arousal between all groups, indicating the influence of priming to the unconscious emotional and cognitive processes related to moral judgements.

Short Bio

Dr. Pia Tikka is a professional filmmaker and EU Mobilitas Research Professor at Centre of Excellence of MEDIT, Tallinn University. The principal investigator of NeuroCine research project, she has acted as a core member of the directory group of the neuroscience project aivoAALTO at the Aalto University and the advisory board in NeuroService research project at the Laurea University of Applied Sciences, Finland. She is a Fellow of Life in the Society for Cognitive Studies of the Moving Image. Currently her ENACTIVE VIRTUALITY research group studies the viewer's enactive co-presence in narrative immersive environments.



SESSION 6: Perception

Ksenia Fedorova (PhD (University of California Davis), PhD (St. Petersburg State University, Ural Federal University), postdoctoral research fellow at the Institute for Image and Art History at Humboldt University in Berlin)

Figuring Temporal Thinking. Experiments in between Art and Science

The paper addresses issues of perception and representation of temporal relations in today's visual culture and art. Particularly, I am interested in the status of diagrammatic thinking and methods of its analysis, including neuroscientific ones. What happens in our brain when we imagine abstract concepts, particularly such dynamic ones, as time? Inner images of time may differ widely and often are not even representable. A provocative artistic proposal to visualize our thinking about time is a neurofeedback-based interactive installation by Maurice Benayoun and Tobias Klein "The Brain Factory" (2016). The authors claim to "give shape to human abstractions" by recording the brain signals of the participants during their meditation on abstract issues, such as freedom, time, power, peace, etc.; the collected data are then interpreted into a virtual figure that can be 3D-printed into a sculpture. I consider this piece in the context of experimental studies of visual perception, particularly of diagrammatic representations of speculative future scenarios. Positioned in between text and image, the logical and the sensible, the diagram appeals to both rational and aesthetic types of cognition, being also an example of an "operative imagery" (Sybille Krämer). Among different temporal relations, operations of prediction and decision making may be seen as both structurally complex and potentially emotionally loaded. History of art and contemporary visual culture offers a rich iconography of the processes of decision-making (forking paths, scales, branching trees, etc.). The paper will present work-in-progress research in collaboration with Berlin School of Mind and Brain about the effects of these and other specially created figures.

Short Bio

Ksenia Fedorova, PhD (University of California Davis), PhD (St. Petersburg State University, Ural Federal University), postdoctoral research fellow at the Institute for Image and Art History at Humboldt University in Berlin. She is the co-editor of *Media: Between Magic and Technology* (2014, in Russian), and has published articles on issues of transmediality, interactive media, affective computing, etc. in *Leonardo Electronic Almanac*, *Media & Culture Journal*, *Acoustic Space*, *Dialog of Arts* and other editions. In 2007-2011, she was an initiator and curator of the "Art. Science. Technology" program at the Ural branch of the National Center for Contemporary Arts (Ekaterinburg, RU).

Elvira Brattico (Center for Music in the Brain (MIB), Dept. of Clinical Medicine, Aarhus University)

Prediction and beyond – A multifarious account of the musical experience

Despite having no obvious survival value, music is everywhere in the world and accompanies human life from start to end. Indeed, newborn babies are calmed down by soothing tunes, adolescents nurture their self-identity through music idols and preferences, adults carefully choose music for their wedding ceremony, and in the elderly age music comforts and accompanies humans towards their last voyage. This omnipresence of music serves cognitive, aesthetic, social, emotional and even therapeutic functions, such as regulating the mood daily or during challenging life events, training our sensory-motor-cognitive abilities, and functional rehabilitation in e.g., stroke, schizophrenia, autism, depression. While empirical findings attest all these musical functions, a systematic account of the mechanisms enabling those functions has yet to be provided. Herewith I present a model of



the neuropsychological mechanisms that work in concert to produce musical functions for humans, grouping them into 1. bottom-up ones, namely sensory encoding and probabilistic prediction, 2. contextual ones, including the physical/social environment, and the listening history/culture, and 3. top-down ones, such as intra- and inter-individual attitudes, goals and intentions. This model aims to provide a comprehensive account of a real-life musical experience as an artistic aesthetic domain that cannot not equaled to a perceptuo-motor-cognitive domain fully covered by predictive mechanisms. Instead, music listening and performing is here described as a multifarious experience involving also evaluative, meaning-attribution and sometimes even spiritual-like processes.

Donna Jung (University Paris I Panthéon-Sorbonne)

The Dichotomy between Neuroaesthetics and Contemporary Art: The Role of Collective and Cultural Factors in Perception

Art is a tool that both structures the world and is structured by it. We distinguish two types of approaches of art based upon the conditions of this structuration. Whereas some neuroaestheticians, following Kant's theory, argue that the perception of beauty is a subjective universal, researchers and professionals of the art world have insisted on the role of political and societal issues of the contemporary world. Led by Semir Zeki, the traditional approach of the dominant branch of neuroaesthetics is focused on the neural processes that take place when subjects look at a beautiful or sublime object. By doing that, these neuroscientists hope to answer the question of how art becomes Great Art, hence, how those works of art structure the world. To achieve their goal, they reinterpret the aesthetic theories of a tradition originating in the Academic period when art and beauty became linked by historical contingencies. By focusing on political, cultural and societal issues to understand perception, academics and professionals of the art world have developed different questions regarding perception. By rejecting or ignoring prior notions such as beauty and harmony, this community focuses instead on the way art should be bound to the research of social sciences to understand the influence of social and cultural factors. As Walter Benjamin wrote in 1936: "Instead of being based on ritual, it [the work of art] begins to be based on another practice — politics." The goal of this paper is to analyze, from an epistemological point of view, this dichotomy between the two visions of art developed in neuroaesthetics and contemporary art, as the consequences on the structure and prediction of the world. By looking at how these fields communicate, we will analyze how the approach to art influences research, questions, experiments and productions, and we hope to provide a framework that will reconnect art and science, two human activities to understand and predict the world.

Short Bio

Donna Jung is a teaching assistant in aesthetics at University Paris I Panthéon-Sorbonne. Her thesis work focuses on an epistemological approach to neuroaesthetics, more specifically on the generalizations of neuroaesthetics balanced by sociological and anthropological theories.
