CONTENT

WELCOME

It is our pleasure to welcome all of you to the second SFB 940 Spring School. Building on the excellent contributions from invited speakers and PhD students to the first Spring School in 2013 as well as on the ongoing research in the different SFB projects the focus this year will be on dynamic regulation and neuromodulation of cognitive control.

The aim of the Spring School is to bring together international researchers from diverse fields and several countries as well as researchers from the SFB "Volition and Cognitive Control" in order to discuss their respective projects and to present resent findings. Five symposia will be held by experts who will present the latest developments in the fields of (1) regulation of cognitive control across the lifespan, (2) affective signals for cognitive control, (3) flexible neural mechanisms of cognitive control, (4) cognitive control over learning and action in frontostriatal circuits and (5) affective and decision functions of serotonin.

Furthermore, PhD students will present posters of their own research projects and will have the opportunity to discuss their work within an international and interdisciplinary context. In addition, this Spring School features two Workshop Sessions (*Science Biographies* and *Publish or Perish*), which aim at providing advice and at stimulating reflection and discussion about careers in science.

Thus, we are very pleased that we could bring together researchers from diverse fields in the study of volition and would like to thank the invited speakers and the organizers of the workshops who came here to share their knowledge, expertise, and experiences with the students of our PhD program. We would like to extend our thanks the PhD students themselves who will present and discuss their own research.

We hope you find the Spring School both interesting and stimulating and that this meeting will foster further achievement. We are looking forward to your feedback and wish all of you an inspiring and pleasant time!

Thomas Goschke
CRC Speaker/MGK Represent

Alexander Strobel
Chief MGK Coordinator

Clemens Kirschbaum
Deputy MGK Coordinator

LOCATIONS & MAP

Pre-conference Workshops

Tuesday 11 March 2014

Workshop 1 (Neuroanatomy):	University Hospital C.G. Carus, TUD, Medizinisch Theoretisches Zentrum (Fiedlerstr. 42), Room SR2
Workshop 2 (Matlab II):	TUD, Willersbau, Room B221

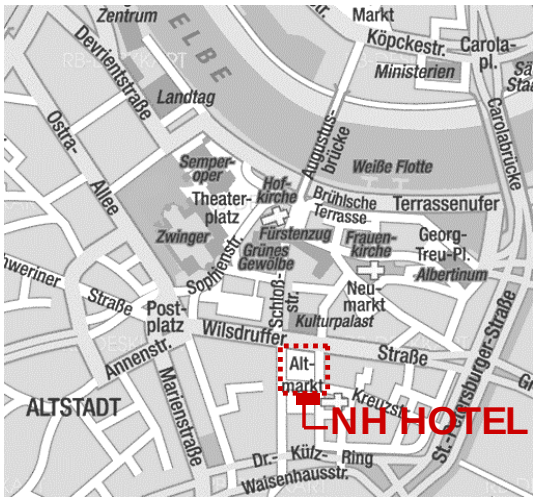
Wednesday 12 March 2014

Workshop 3 (fMRI):	TUD, Willersbau, Room B221
Workshop 4 ("publish or perish"):	TUD, ASB, Room 206abc

Spring School (Thursday 13 March and Friday 14 March 2014)

NH Hotel Dresden Altmarkt, An der Kreuzkirche 2, 01067 Dresden

Symposia:	Room "Semper 2+3"
Poster sessions:	Room "Semper 1" and "August der Starke"



Spring School Social Evening (Thursday 13 March and Friday 14 March 2014)

NH Hotel Dresden Altmarkt, An der Kreuzkirche 2, 01067 Dresden

PROGRAM AND TIME TABLE

Tuesday 11 March 2014

Workshop 1: Neuroanatomy lab course
Richard Funk, Albrecht May (TU Dresden, Germany)

Workshop 2: Matlab II
Kersten Diers, Lydia Hellrung, Max Wolff, Philipp Paulus (TU Dresden, Germany)

Wednesday 12 March 2014

Workshop 3: fMRI and functional connectivity
Nils Kroemer, Lydia Hellrung (TU Dresden, Germany)

Workshop 4: "Publish or Perish"
Matthias Kliegel (University of Geneva, Switzerland)

Thursday 13 March 2014

Symposium 1: Plasticity of cognitive control across the lifespan
Matthias Kliegel (University of Geneva, Switzerland)

Special Issue: Science Biographies: Karriere in der Wissenschaft

Symposium 2: Response conflict and perceptual fluency as affective signals for sequential control adjustments
Gesine Dreisbach (Regensburg University, Germany)

Poster Sessions

Friday 14 March 2014

Symposium 3: Cognitive control over learning and action in frontostriatal circuits
Michael Frank (Brown University, Providence, USA)

Special Issue: "Publish or Perish" II

Symposium 4: Affective and decision functions of serotonin
Roshan Cools (Radboud University, The Netherlands)

Symposium 5: Flexible neural mechanisms of cognitive control
Todd Braver (Washington University, St. Louis, USA)

PROGRAM AND TIME TABLE

	Tue 11 Mar 2014		Wed 12 Mar 2014		Thu 13 Mar 2014	Fri 14 Mar 2014
09:00	Workshop 1: **Neuroanatomy**	Workshop 2: **Matlab II**	Workshop 3: **fMRI**	Workshop 4: **"Publish or Perish"**	Symposium 1 **Matthias Kliegel**	Symposium 3 **Michael Frank**
10:00						
11:00					Break	Break
12:00					**Science Biographies**	**"Publish or Perish" II**
13:00					Lunch	Lunch
14:00					Symposium 2 **Gesine Dreisbach**	Symposium 4 **Roshan Cools**
15:00						
16:00					**Poster Session I**	Break
17:00					**Poster Session II**	Symposium 5 **Todd Braver**
18:00					**Poster Session III**	Social Evening
19:00					Social Evening	

WORKSHOP 1: NEUROANATOMY

Tuesday 09:00-15:30

NEUROANATOMY LAB COURSE

Richard Funk, Albrecht May

Institute for Anatomy, Faculty of Medicine C.G. Carus, Technische Universität Dresden

Understanding macroscopic structure of the *central nervous system* (CNS) is the basis for learning pathways, functional circuits subserving higher cognitive function. Therefore, the study of external and internal morphology of the CNS in a wet lab (i.e. dissection-room) significantly facilitates learning of functional systems (in lecture courses or in computer labs) that makes up the most significant portion of many neuroanatomical courses. Without previous visual experience, it is an extremely difficult task to overcome.

The neuroanatomy course provides a broad overview of the structure of the CNS dealing representative levels of the neuraxis, with a principal focus on issues relevant to further understanding of functional aspects the nervous system. The main objectives of the course are to (1) provide the students with a basic working knowledge and nomenclature of the central nervous system and (2) to present the basic functional neuroanatomy required to understand the functional systems. These objectives are achieved by use of fixed specimens of whole brains in a step-by-step dissection procedure and brain sections to provide a general overview of the 3-D structure of the brain.

Course venue: University Hospital C.G. Carus, Medizinisch Theoretisches Zentrum (MTZ), Room SR2

WORKSHOP 1: MATLAB II

Tuesday 09:00-17:00

MATLAB PROGRAMMING COURSE

Kersten Diers[1], Lydia Hellrung[2], Max Wolff[3], Philipp Paulus[1]

[1]Chair of Differential and Personality Psychology, Technische Universität Dresden
[2]Section of Systems Neuroscience, Faculty of Medicine C.G. Carus, Technische Universität Dresden
[3]Chair of General Psychology, Technische Universität Dresden

This year's Matlab course aims at a further development of general computing and programming skills with a strong focus on interactive and practical work.

After a brief discussion of some general issues of scientific programming (e.g., programming style), participants will split into groups of approx. 4 persons each, and each group will work on a self-chosen set of problems, which will be prototypical examples from the fields of experimental design (e.g., sequence generation), data analysis (e.g., statistics), SPM (e.g., batch programming), and stimulus presentation (Psychtoolbox). It may also be possible to give some space to the discussion of individual projects.

Rather than attempting complete or comprehensive coverage of the above topics, the course aims at providing an opportunity for feedback and discussion, thus facilitating independent study in the future.

To this end, tutors will work with and assist each group wherever necessary, but participants are also asked to share their knowledge and collaborate with each other during the course.

The course is primarily aimed at beginner-to-intermediate levels, but task difficulty will cover a somewhat broader range from introductory to advanced levels. Some tasks are identical with (or build upon) last year's tasks.

Participation in the previous course may be helpful, but is no prerequisite to attend the present course. Novice Matlab users are welcome, but are encouraged to familiarize themselves with some basic properties of the software beforehand.

The course will consist of four sessions (90 min each) and the course language will (mostly) be German.

The number of participants is limited, and assignment of places may be based on how well individual expectations fit with what the course can provide.

Course venue: Technische Universität Dresden, Willersbau, Room B221

WORKSHOP 3: fMRI

Wednesday 10:00-17:00

fMRI AND FUNCTIONAL CONNECTIVITY

Nils Kroemer, Lydia Hellrung

Section of Systems Neuroscience, Faculty of Medicine C.G. Carus, Technische Universität Dresden

Common practice analyses of fMRI studies did not capitalize on information provided by the high dimensionality of acquired data until recently. Analysis of functional connectivity may help to improve our understanding of the inherent complexity of brain activation patterns during task performance. Whereas much interest has focused on resting-state fMRI lately, task-dependent functional connectivity analysis provides different challenges that need to be addressed adequately. This is of critical importance if we want to study how diverse aspects of a task are transcoded in distinct anatomical regions giving rise to the behavioral intricacies of volition. Thus, the goal of the workshop is to introduce the rationales of different approaches (i.e., psychophysiological interaction analysis, PPI, and independent component analysis, ICA) and to illustrate their pros, cons, and limitations. The emphasis will be put on PPI which will be used as a hands-on example for the full connectivity pipeline.

Potential extensions of the general idea of task-dependent functional connectivity (e.g. dynamic causal modeling) and necessary fMRI design features for well-powered connectivity analyses will be discussed. The learning objective is that attendees know how to run PPI analysis using their own data and to inspect the data in order to avoid potential pitfalls regarding interpretation of the results.

Course venue: Technische Universität Dresden, Willersbau, Room B221

WORKSHOP 4: "PUBLISH OR PERISH"

Wednesday 09:00-12:00

STRATEGIES ON HOW TO SURVIVE IN ACADEMIC PSYCHOLOGY

Matthias Kliegel

Faculty of Psychology and Educational Sciences, University of Geneva, Switzerland

This workshop has two aims: (1) Discussing and practicing strategies on how to write and prepare a paper for submission; (2) Discussing and practicing strategies on how to handle a revision.

Participants should have a specific project in mind that they are currently planning to write up and prepare a one page summary of the project. This should be submitted to Matthias Kliegel (Matthias.Kliegel@unige.ch) one week before the workshop.

Because the workshop will include practice phases, participants should bring their own laptop and the main results of their study with them to the workshop. In case they do not have the final results they will focus on the conceptual and methodological parts of the study.

Requirements:
Max 20 participants (PhD students); participants need to have their own project (data collection running; ideally at least one experiment completed)

Course venue: Technische Universität Dresden, ASB, 206abc

SYMPOSIUM 1:
Thursday 09:00-11:00

PLASTICITY OF COGNITIVE CONTROL ACROSS LIFESPAN

Matthias Kliegel

Faculty of Psychology and Educational Sciences, University of Geneva, Switzerland

In research on cognitive plasticity, two training approaches have been established: 1) training of strategies to improve performance in a given task and 2) training of basic cognitive processes (e.g. working memory, inhibition) that underlie a range of more complex cognitive tasks (e.g., planning) in order to improve both the training target and the complex transfer tasks.

Strategy training aims to compensate or circumvent limitations in underlying processes while process training attempts to augment or to restore these processes. Although research on both approaches has produced some promising findings, results are still heterogeneous and the impact of most training regimes for everyday life is unknown. We, therefore, discuss recent proposals of training regimes aiming to improve cognitive control and here especially prospective memory (i.e., forming and realizing delayed intentions) as this type of complex cognition is highly relevant for the development and maintenance of independent living. Furthermore, prospective memory is associated with working memory and executive functions and those processes show marked changes across the lifespan. We review initial evidence suggesting that both training regimes (i.e., strategy and/or process training) can successfully be applied to improve prospective memory. Conceptual and methodological implications of the findings for research on lifespan development of prospective memory and for training research in general are discussed.

Chair: Anett Kretschmer

SYMPOSIUM 2:

Thursday 14:00-16:00

RESPONSE CONFLICT AND PERCEPTUAL FLUENCY AS AFFECTIVE SIGNALS FOR SEQUENTIAL CONTROL ADJUSTMENTS

Gesine Dreisbach

Department of Experimental Psychology, Regensburg University

Adapting to changing task demands is one of the hallmarks of human cognition. The most prominent theory in the field, the conflict monitoring account, suggests that response conflicts signal the need for control recruitment.

In my talk, I will present data from our lab, investigating the role of affect in the context of such conflict-triggered processing adjustments from three different perspectives: (1) the affective value of conflict per se, the impact of (2) perceptual fluency on sequential processing adjustments without conflict being involved, and (3) the interaction of perceptual fluency and sequential conflict adaptation. Results will be discussed with regard to the growing literature on the affective modulation of conflict adaptation.

Chair: Marcus Möschl

SYMPOSIUM 3:
Friday 9:00-11:00

COGNITIVE CONTROL OVER LEARNING AND ACTION IN FRONTO-STRIATAL CIRCUITS

Michael Frank

Department of Cognitive, Linguistic & Psychological Sciences, Brown University, USA

The basal ganglia dopaminergic system is implicated in reward-based learning and decision making.

Computational models specify the detailed mechanisms by which this system operates, as supported by various experimental evidence. However, this system alone leads to inefficient learning and decision making and can in some scenarios lead to maladaptive behavior.

In this talk I will focus on prefrontal cognitive control mechanisms that can modulate both learning and decision making processes in the BG via over-ride, top-down biasing, and hierarchical interactions among multiple frontostriatal circuits.

Chair: Nils Kroemer

SYMPOSIUM 4:
Friday 14:00-16:00

AFFECTIVE AND DECISION FUNCTIONS OF SEROTONIN

Roshan Cools

Department of Psychiatry, Medical Centre, Radboud University Nijmegen, The Netherlands
Donders Institute for Brain, Cognition and Behaviour, Centre for Cognitive Neuroimaging, Radboud University Nijmegen, The Netherlands

The ascending monoamine neuromodulatory systems are implicated in a wide variety of healthy and disordered functions. In the case of dopamine notable progress has been made in the last decade or two. In particular, models of reinforcement learning have been used as a framework to interpret and connect observations that dopamine is involved, on the one hand, in reward and motivation, and on the other in behavioral activation or the vigor of movement.

By contrast, although the neuromodulator serotonin has functional and clinical importance at least equal to that of dopamine (e.g., it is implicated in impulsivity, depression, and pain), there is no similarly well-developed framework for understanding any of its roles. In this talk I will present data from a series of experiments with human volunteers, in which effects of central serotonin levels were studied by means of the dietary acute tryptophan depletion procedure and genetic approaches. Data demonstrate that such manipulation of serotonin has effects along two similar axes: a motivational (aversive processing) as well as an activational axis (inhibiting behavioral responses). We put forward the hypothesis that effects of serotonin can best be understood as serving to couple these two axes rather than affecting them independently.

Chair: Irena Domachowska

SYMPOSIUM 5:
Friday 16:30-18:30

FLEXIBLE NEURAL MECHANISMS OF COGNITIVE CONTROL

Todd Braver

Department of Psychology, Washington University, USA

Research in my lab has focused on the neural mechanisms of cognitive control: the ability to regulate thoughts and actions in an intelligent, goal-directed manner. We have argued that such mechanisms, which involve a network of brain regions centered on the lateral prefrontal cortex, are highly flexible, and can operate in both a proactive and reactive mode. The proactive mode of control is future-oriented, preparatory and sustained in nature, while the reactive mode is transient, stimulus-driven, and frequently engaged by the presence of interference.

I will present some recent work highlighting this theoretical approach, its utility for understanding individual differences and cognitive impairment in different populations, as well as some new directions it has taken us in understanding how motivation interacts with cognitive control.

Chair: Stefanie Beck

SPECIAL ISSUE II: SCIENCE BIOGRAPHIES

Thursday 11:30-13:00

KARRIERE IN DER WISSENSCHAFT – ABER WIE?

Ulrike Lüken[1,2], Rico Fischer[3,], Ben Eppinger[4]

[1]Chair of Clinical Psychology and Psychotherapy, Technische Universität Dresden
[2]Neuroimaging Center, Dept. of Psychology, Technische Universität Dresden
[3]Chair of General Psychology, Technische Universität Dresden
[4]Chair of Lifespan Developmental Neuroscience, Technische Universität Dresden

Doktoranden entscheiden sich zumindest für einige Jahre für eine Tätigkeit in der Wissenschaft und für nicht wenige ist das gleichzeitig der Startpunkt einer akademischen Laufbahn. Welche Möglichkeiten und Probleme erwarten aber Wissenschaftler im Laufe einer akademischen Karriere? Welche Rolle spielt die Wahl des Promotionsthemas? Wie und in welcher Form kann man sich Hilfe und Unterstützung organisieren? Gibt es absehbare Durststrecken? Oder ist die Laufbahn am Ende doch nicht wirklich planbar? Wie sieht es mit der Vereinbarkeit von Familie und akademischen Beruf aus?

Im Rahmen der *Science Biographies* werden drei Wissenschaftler von Ihrem z.T. recht unterschiedlichen akademischen Werdegang berichten. Im Anschluss an die Vor- träge besteht Gelegenheit zu Fragen und Diskussion mit den Referenten. Die Veranstaltung wird in deutscher Sprache durchgeführt.

Chair: Ricarda Evens

SPECIAL ISSUE II: "PUBLISH OR PERISH" II

Friday 11:30-13:00

STRATEGIES ON HOW TO SURVIVE IN ACADEMIC PSYCHOLOGY

Matthias Kliegel[1], Stefan Scherbaum[2], Michael Frank[3]

[1]Faculty of Psychology and Educational Sciences University of Geneva, Switzerland
[2]Chair of General Psychology, Technische Universität Dresden
[3]Department of Cognitive, Linguistic & Psychological Sciences , Brown University, USA

This session will provide a summary of the preceding workshop, which focused on how to write and prepare a paper for submission and discuss and practice strategies on how to handle a revision.

Furthermore, this session will provide doctoral students with the opportunity to gain insights into the publishing practice of experienced researchers.

Chair: Kevin Hilbert

POSTER SESSION I
Thursday 16:00-17:00
Room: Semper 1

Baum, Fabian (Z2):
Reliability of ERP components in a coregistered EEG/fMRI study of instruction-based learning

Buse, Judith (associated to A7):
Neural correlates of tactile prepulse inhibition: A combined EEG/fMRI study in children and adolescents with Tourette Syndrome

Cohors-Fresenborg, Elisabeth (A3):
Time of day optimum affects the reliability of cognitive control

Diers, Kersten (A5):
Volitional emotion regulation: the costs of control

Domachowska, Irena (B1):
Affective modulation of attention breadth

Evens, Ricarda (C4):
The role of dopaminergic medication for cognitive flexibility and stability in patients with Parkinson's disease: an fMRI study

Frimmel, Steffi (A2):
Outcome anticipation and the online control of stimulus-based action: an fMRI study

Frisch, Simon:
Hard to set, hard to forget: Exploring continuous goal dynamics with mouse tracking and computational modelling.

Heitmann, Christina (B2):
Switching of means and goals in one task: Testing functional processing versus feature binding

POSTER SESSION I (Thursday 16:00-17:00)

RELIABILITY OF ERP COMPONENTS IN A COREGISTERED EEG/fMRI STUDY OF INSTRUCTION-BASED LEARNING

Fabian Baum, Uta Wolfensteller, Hannes Ruge

Chair of General Psychology, Technische Universität Dresden

Simultaneous EEG/fMRI data acquisition offers a great opportunity of implementing fMRI analysis methods that make use of rapidly changing activation dynamics recorded with EEG. However, EEG data quality suffers losses when acquired in the scanner. After all fMRI introduces a couple of MR-related artifacts to EEG, such as the gradient artifact, the cardioballistic artifact or a mechanic artifact caused by the Helium pump of the scanner.

To obtain an initial estimate of the severity of quality loss in the local scanner environment and to determine the optimal setup of artefact-removal algorithms under these conditions, we performed a systematic comparison of event-related potentials (ERP) from an EEG-only data set with an EEG data set acquired in the scanner. Additionally this analysis is used to identify stable parameters in the EEG data which later can be used for the EEG-informed analysis of the simultaneously acquired fMRI data to uncover the fine-grained temporal process dynamics unfolding within individual trials during the rapid instruction-based learning of novel mental representations (Ruge & Wolfensteller, 2013).

POSTER SESSION I (Thursday 16:00-17:00)

NEURAL CORRELATES OF TACTILE PREPULSE INHIBITION: A COMBINED EEG/fMRT STUDY IN CHILDREN AND ADOLESCENTS WITH TOURETTE SYNDROME

Judith Buse[1], Christian Beste[1], Elisabeth Herrmann[1], Stephan Bender[2], Veit Roessner[1]

[1]Department of Child and Adolescent Psychiatry, Faculty of Medicine C.G. Carus, Technische Universität Dresden
[2]Department of Child and Adolescent Psychiatry, Psychosomatics and Psychotherapy, Johann-Wolfgang-Goethe University, Frankfurt am Main

Tourette's Syndrome (TS) is associated with reduced prepulse inhibition (PPI) of the startle reflex, which is assumed to reflect abnormal sensorimotor gating.
We applied whole-brain functional magnetic resonance imaging (fmri) to investigate the neural correlates of PPI in children and adolescent with TS using a tactile version of the PPI. The tactile startle response was elicited by air bursts delivered to the participant's throat in an event-related fmri-design.

The EMG of the startle reflex was recorded inside the scanner simultaneously to the acquisition of the fmri images. PPI-related brain activity was measured as the difference between the cerebral activation to prepulse trials and the cerebral activation to pulse alone trials. The sample consisted of 22 children and adolescents with TS (male, 11-17 years, without comorbidities) and 22 age-matched healthy controls.
As expected, PPI of the startle reflex was reduced in patients with TS compared to the healthy control group. TS patients exhibited lower PPI-related brain activity compared to healthy controls in the following regions: Right precuneus (BA 40), primary somatosensory cortex (BA 3), left precentral gyrus (BA 9), left caudate and left cingulate. PPI was correlated to the activation in the precuneus, the primary somatosensory cortex and the left precentral gyrus.

POSTER SESSION I (Thursday 16:00-17:00)

TIME OF DAY OPTIMUM AFFECTS THE RELIABILITY OF COGNITIVE CONTROL

Elisabeth Cohors-Fresenborg[1], Franziska Plessow[2,3], Clemens Kirschbaum[2], Rico Fischer[1]

[1]Chair of General Psychology, Technische Universität Dresden
[2]Chair of Biopsychology, Technische Universität Dresden
[3]Department of Neurology, Harvard Medical School, Boston, MA, USA

We investigated the vulnerability of cognitive control functioning to variations in individual time of day optima. While previous studies on the influence of time of day effects on cognitive control have revealed a rather inconsistent picture, we specifically implemented a task that allowed for a quantitative approach investigating cognitive control. 34 extreme/ moderate morning and 34 extreme evening chronotypes performed the Majority Function Task in their individual time of day optimum vs. disoptimum on two consecutive days. We systematically manipulated the amount and content of informational input, thus, implementing a parametrical manipulation of computational load.

Results showed an overall effect of time of day optimum, especially pronounced for extreme evening types. Furthermore, and irrespective of chronotype, the detrimental influence of individual time of day disoptimum on task performance increased with increasing computational load, and thus, with heightened levels of cognitive control demands. At the same time, while performance was influenced by increases in perceptual load, no interaction with individual variations in time of day optima was observed. These findings highlight the role of individual variations in time of day optima on the reliability of cognitive control functioning. Furthermore, the present quantitative approach allowed for a clearer specification of the relation between time of day variations and different forms and amounts of cognitive control involvements.

POSTER SESSION I (Thursday 16:00-17:00)

VOLITIONAL EMOTION REGULATION: THE COSTS OF CONTROL

Kersten Diers[1], Fanny Weber[2], Burkhard Brocke[1], Sabine Schönfeld[2], Alexander Strobel[1]

[1]Chair of Differential and Personality Psychology, Technische Universität Dresden
[2]Chair of Clinical Psychology and Psychotherapy, Technische Universität Dresden

Project A5 investigates the effectiveness and potential costs of the inhibition of prepotent emotional responses. As prototypical examples of volitional control, different cognitive emotion regulation strategies (distraction, detachment, reinterpretation, and allowance) will be compared with respect to their behavioral and neural effectiveness, i.e. their success in changing emotional processing.

An additional focus of the project are the temporal dynamics of emotion regulation, which will be measured along a prolonged timescale in order to examine the potential costs of volitional emotion regulation. Such costs may be operationalized as paradoxical immediate and delayed regulatory after-effects in the activation of the amygdala, a core brain structure involved in emotional processing and regulation.

We report preliminary results of two ongoing studies. Study 1 contrasts the "detach" and "permit" strategies with the passive viewing of emotional stimuli in two separate sessions, while study 2 contrasts these strategies within a single session. Using behavioral, physiological and imaging data, we show how volitional regulation can alter emotional processing. In particular, we demonstrate how the source and target regions of emotion regulation exhibit changes in a spatially and temporally distinct pattern. We finally discuss how design and analysis issues can impact the pattern of results.

POSTER SESSION I (Thursday 16:00-17:00)

AFFECTIVE MODULATION OF ATTENTION BREADTH

Irena Domachowska, Hannes Ruge, Annette Bolte, Thomas Goschke

Chair of General Psychology, Technische Universität Dresden

The control of visual attention during goal directed action requires focused attention on goal-relevant information and inhibition of distracting stimuli. Previous studies have shown that positive affect may broaden the scope of attention and responsiveness to peripheral cues. In the current project we tested the hypothesis that positive affect leads to higher distractibility as indicated by increased RT costs incurred by to-be-ignored singleton distractors as well as stronger brain activation elicited by the distractors.

We tested the hypotheses in a series of three experiments. In Experiment 1, using Visual Search Task, participants had to categorize pop-out targets and ignore singleton distracters. Before every trial, either positive or neutral IAPS picture was presented. The results showed that positive affect indeed increased reaction times on trials in which distractors were present. The RT costs were even higher on incompatible trials, suggesting that the distractors were not only noticed, but also actively processed. Experiments 2 & 3 used functional magnetic resonance imaging to further examine the neural correlates of attentional capture. Experiment 2 was a direct replication of Experiment 1. Experiment 3 was conducted in order to disentangle neural correlates of attention paid to the target and the distractor. In a modified version of the paradigm we used as stimuli pictures of tools and faces that are known to elicit category-specific brain activation. Participants were asked to detect pop-out targets, which were defined by a category (tools) and to ignore distracters' category (faces).

POSTER SESSION I (Thursday 16:00-17:00)

THE ROLE OF DOPAMINERGIC MEDICATION FOR COGNITIVE FLEXIBILITY AND STABILITY IN PATIENTS WITH PARKINSON'S DISEASE: AN fMRI STUDY

Ricarda Evens[1,2], Yuliya Stankevich[1,2], Oliver Riedel[1], Alexander Storch[3], Ulrike Lueken[1,2]

[1]Chair of Clinical Psychology and Psychotherapy, Technische Universität Dresden
[2]Neuroimaging Center, Dept. of Psychology, Technische Universität Dresden
[3]Department of Neurology, Technische Universität Dresden

An optimal trade-off between stable maintenance and flexible updating of information is important to respond adequately to changing environmental demands. On a neural level this trade-off is facilitated by fronto-striatal interactions. The present study investigated the effect of dopaminergic medication on flexible shifting and resistance to distraction in patients with Parkinson's disease (PD).

In a still ongoing study, data-sets from 26 patients with early PD were collected on two days using a delayed matching-to-sample task: once while on usual dopaminergic medication and once while off. Reference data of 17 matched healthy controls were obtained. The task included two blocks with 41 trials per block. Each trial started with an encoding period: two pictures of faces and two of scenes were presented. A colored cross in the middle of the screen indicated which of the pictures should be memorized (red for scenes and a blue for faces). Switch trials (25%) required an attentional shift from face to scene or vice versa against a background of non-switch trials. After a variable delay that contained either a scrambled or a non-scrambled distractor of the same stimulus category that had to be memorized, a probe was presented and subjects should indicate whether the presented picture was already seen during encoding period. Flexible shifting was operationalized as the difference in reaction times and error rates between switch and non-switch trials; and shielding as resistance to distraction as the difference between non-scrambled and scrambled distractors. Preliminary behavioral and fMRI results will be presented on the poster.

POSTER SESSION I (Thursday 16:00-17:00)

OUTCOME ANTICIPATION AND THE ONLINE CONTROL OF STIMULUS-BASED ACTION: AN fMRI STUDY

Steffi Frimmel, Uta Wolfensteller, Hannes Ruge

Chair of General Psychology, Technische Universität Dresden

A fundamental prerequisite of goal-oriented action is to correctly recognize contingencies between a response (R) that produces a specific outcome (O) in a specific stimulus situation (S). Previous studies have shown that such triple S-R-O associations can be linked up very fast. The present study investigated the brain activation dynamics linked to the initial incremental strengthening of S-R-O associations during a short period of incidental learning using functional magnetic resonance imaging.

In order to determine the specific contribution of the full triple S-R-O contingency, we also realized two control conditions in which the triple contingency was reduced to R-O contingency and S-R contingency, respectively. We found that learning the triple S-R-O association was specifically linked to enhanced activation in the supplementary motor area (SMA), the anterior caudate and the central orbitofrontal cortex (OFC). Furthermore, the S-R-O-related caudate activation was associated with relative response time differences between the S-R-O condition and the S-R condition. Together, these results suggest that contingent outcomes are only integrated into action selection when they can be anticipated based a contingently preceding stimulus. This integration seems to rely on an interplay between brain areas involved in basic voluntary motor control processes (SMA) and brain areas involved in a diverse range of outcome-related processes (caudate, OFC).

POSTER SESSION I (Thursday 16:00-17:00)

HARD TO SET, HARD TO FORGET: EXPLORING CONTINUOUS GOAL DYNAMICS WITH MOUSE TRACKING AND COMPUTATIONAL MODELLING

Simon Frisch, Maja Dshemuchadse, Thomas Goschke, Stefan Scherbaum

Chair of General Psychology, Technische Universität Dresden

Adaptive goal-directed behavior requires focusing on a task in the face of distraction as well as releasing this focus when adopting new goals. Accordingly, classic task-switching studies suggest that switching goals requires control processes that slow down responses. To gain deeper insight how these processes unfold over time, thus, shaping continuous goal-directed behavior, we tracked mouse movements during a set-switching paradigm.

As expected, goal switches induced temporal switch costs. More intriguingly, mouse trajectories pointed towards two processes as sources for this slowing. First, we found evidence for a persisting activation of former goals: when switches required ignoring previously relevant information, movements were heavily deflected. Second, we found evidence for a time-consuming goal activation process: when switches required attending to new information, trajectories remained indifferent for a longer time. Notably, trajectories did not differ whether this new information had been relevant or irrelevant beforehand. Hence, goal-specific inhibition is unlikely to account for the observed switch costs. Strengthening this interpretation, changing levels of goal activation sufficed to replicate the data in a dynamic neural network model. Implications for the representational nature of goals are discussed.

POSTER SESSION I (Thursday 16:00-17:00)

SWITCHING OF MEANS AND GOALS IN ONE TASK: TESTING FUNCTIONAL PROCESSING VERSUS FEATURE BINDING

Christina Heitmann, Roland Deutsch

Chair of Social Psychology, Technische Universität Dresden

When an obstacle hinders the pursuit of our focal goal, we face the dilemma of either forgoing the focal goal too early by shifting to an alternative goal or shielding alternative goals for too long. Research on this dilemma has mainly ignored the means level at which shielding and shifting can take place as well. To understand processes in solving the dilemma we integrated the goal level and the means level in one paradigm.

For a comparison of switches/shifting and repetitions/shielding in goals and means, two diverging hypotheses can be deduced. According to the functionality hypothesis, it is functional to switch means more easily than goals so that larger switch costs (difference between switch and repetition) in goals compared to means are predicted. The binding hypothesis predicts a different pattern. According to the theory of event coding, features codes are bound into - often binary - event representations. After having formed an event representation it is easier to form a second event representation with no feature overlap than to form a representation with a partial feature overlap. Therefore, the binding hypothesis holds that in a paradigm in which means as well as goal are switched versus repeated, repeating or switching both means and goals should lead to faster responses than repeating one element and switching the other. Results support the binding hypothesis and contradict the functionality hypothesis. Implications and future research options are discussed.

POSTER SESSION II
Thursday 17:00-18:00
Room: August der Starke

Kretschmer, Anett (A4):
Prospective memory in children and adolescents: First evidence for beneficial effects of task importance and implementation intentions

Kruschwitz, Johann (A6):
The good and the bad and the brain's response to anticipating ambivalent future events.

Lee, Ying (B3):
Nicotine dependence is associated with reliance on habitual over goal-directed control

Mohr, Holger (Z2):
Sparse regularization techniques provide novel insights into outcome integration processes

Möschl, Marcus (A3, B5):
Intention retrieval and deactivation following an acute psychosocial stressor

Neukam, Philipp (B4):
Intertemporal choice: amount or delay discounting?

Ritschel, Franziska (associated to C3):
Implicit emotion regulation in adolescent patients with anorexia nervosa

Schade, Susann (B5):
Challenging stress-related impairment theories: The influence of acute psychosocial stress on delay discounting

POSTER SESSION II (Thursday 17:00-18:00)

PROSPECTIVE MEMORY IN CHILDREN AND ADOLESCENTS: FIRST EVIDENCE FOR BENEFICIAL EFFECTS OF TASK IMPORTANCE AND IMPLEMENTATION INTENTIONS

Anett Kretschmer[1], Matthias Kliegel[2], Mareike Altgassen[1,3]

[1]Chair of Lifespan Developmental Neuroscience, Technische Universität Dresden
[2]Department of Psychology, University of Geneva, Switzerland
[3]Donders Institute for Brain, Cognition and Behaviour, Radboud University Nijmegen, The Netherlands

Several studies already focused on prospective memory (PM) development and its underlying mechanisms in children and adolescents. However, to date no study targeted the transition from childhood to adolescence, a phase with strong changes in brain regions that have been related to changes in PM performance. The present study aimed at investigating PM during the transition from childhood to adolescence while manipulating various factors that may influence PM.

Specifically, it was tested whether task importance and the provision of a planning strategy (here: implementation intentions) impact on children's and adolescents' PM performance. Overall, 169 participants (N = 48 9-year olds, N = 79 12-year olds, N = 42 15-year olds) were included in this study. Participants worked on a computer-based letter comparison task and were instructed to press a predefined key when one of two PM cues (specific letter combinations) was presented. Analyses of variance indicated a significant main effect for age, but not for task importance or implementation intentions for correct PM responses. However, faster PM reaction times were associated with increasing age and when implementation intentions were provided or the importance of the PM task stressed. Thus, results provide first evidence for positive effects of emphasizing PM task importance and of implementation intentions on children's and adolescents' PM. Importantly, already primary-school children seem to benefit from planning strategies.

POSTER SESSION II (Thursday 17:00-18:00)

THE GOOD AND THE BAD AND THE BRAIN'S RESPONSE TO ANTICIPATING AMBIVALENT FUTURE EVENTS

Johann Kruschwitz[1,2], David List[1,2], Stefanie Beck[2], Uta Wolfensteller[2], Thomas Goschke[2], Henrik Walter[1]

[1]Charité Universitätsmedizin, Berlin, Germany
[2]Chair of General Psychology, Technische Universität Dresden

The ability to anticipate negative and positive emotional experiences associated with upcoming events is a crucial aspect of decision-making. However, no previous study has directly targeted the simultaneous anticipation of negative and positive events, which may come close to a decision-making conflict. Twenty subjects completed an fMRI task in which a cue plus countdown indicated either an upcoming aversive sound coupled with a fixed monetary gain, an upcoming pleasant sound coupled with a fixed monetary loss, or a neutral sound without win or loss as a control condition. Subjects rated levels of anticipated emotions (anxiety, distress, pleasure, relief) during the countdown. Significant brain activations were observed for simultaneous anticipation of aversive sounds and monetary gains and included among other areas the bilateral insula and right ventral striatum, while interestingly, activation of the amygdala was not enhanced. During anticipation of this event, ventral striatal activity was positively correlated with anticipated pleasure and relief, and negatively correlated with anticipated anxiety. In contrast, insular activity was not correlated with either of these measures. We provide first evidence that neural networks involved in anticipating negative or positive emotional events are co-activated when anticipating the occurrence of punishment and reward simultaneously. As higher ventral striatal activity related to more anticipated pleasure/relief and less anxiety during anticipation of the ambivalent outcome, one might speculate that the striatal response to an upcoming reward in an inherently aversive situation may down regulate anticipated negative emotional experiences associated with the upcoming event.

POSTER SESSION II (Thursday 17:00-18:00)

NICOTINE DEPENDENCE IS ASSOCIATED WITH RELIANCE ON HABITUAL OVER GOAL-DIRECTED CONTROL

Ying Lee, Nils Kroemer, Shakoor Pooseh, Michael Smolka

Section of Systems Neuroscience , University Hospital C.G. Carus, Technische Universität Dresden

Smokers persist with smoking despite knowing its detrimental effects, but why? Addiction research suggests that the development of drug-seeking behaviour involves a transition from a goal-directed to a more habitual behaviour (Everitt and Robbins 2005; Wickens 2007). Using nicotine dependence as an addiction model, we hypothesized that nicotine dependence corresponds with a shift in balance between goal-directed and habitual systems governing decision-making.

Data from 36 male smokers and 89 male non-smokers was analysed as part of an ongoing study investigating how learning influences the development of addiction. All participants completed the Fagerström Test for Nicotine Dependence (FTND, Heatherton, 1991), which was used to measure their degree of nicotine dependence. They also performed a two-stage decision task (modified from Daw et al. 2011), which was used to measure goal-directedness (ω) in each participant. The lower the ω, the more their choices were governed by habitual over goal-directed control. As older individuals have been shown to be more habitual (Eppinger et al., 2013), age was controlled for in all analyses. Smokers and non-smokers did not differ in ω ($F_{(1,123)}$ = 2.02, p = 0.158). FTND score in smokers was negatively correlated with ω (r = - 0.42, p = 0.01). Our results suggest that in smokers, the greater the nicotine dependence, the more habitual they were during the task. As smokers and non-smokers had similar ω levels, this might suggest that a greater reliance on habitual control was not a consequence of smoking, but could have predisposed smokers to greater nicotine dependence.

POSTER SESSION II (Thursday 17:00-18:00)

SPARSE REGULARIZATION TECHNIQUES PROVIDE NOVEL INSIGHTS INTO OUTCOME INTEGRATION PROCESSES

Holger Mohr, Uta Wolfensteller, Hannes Ruge

Chair of General Psychology, Technische Universität Dresden

Recent methodological advances in MVPA regularization techniques have made it feasible to produce sparse discriminative whole-brain maps with highly specific patterns. Furthermore, the most recent refinement, the Graph Net, explicitly takes the 3D-structure of fMRI data into account. These advanced classification methods were applied to a large fMRI sample (N=70) in order to gain novel insights into the functional localization of outcome integration processes.

While the effect of differential outcomes is well-studied in trial-and-error learning, outcome integration in the context of instruction-based learning has remained largely unexplored. In order to examine neural processes associated with outcome integration in the context of instruction-based learning, two groups of subjects underwent functional imaging while being presented with either differential or ambiguous outcomes following the execution of varying stimulus-response instructions. While no significant univariate group differences were found in the resulting fMRI dataset, L1-regularized (sparse) classifiers performed significantly above chance and also clearly outperformed the standard L2-regularized (dense) Support Vector Machine on this whole-brain between-subject classification task. Moreover, additional L2-regularization via the Elastic Net, optionally extended by spatial regularization (the Graph Net), improved interpretability of discriminative weight maps but was accompanied by reduced classification accuracies. Most importantly, classification based on sparse regularization facilitated the identification of highly specific regions differentially engaged under ambiguous and differential outcome conditions, comprising several prefrontal regions previously associated with probabilistic learning, rule integration and reward processing.

POSTER SESSION II (Thursday 17:00-18:00)

INTENTION RETRIEVAL AND DEACTIVATION FOLLOWING AN ACUTE PSYCHOSOCIAL STRESSOR

Marcus Möschl[1], Moritz Walser[1], Rico Fischer[1], Thomas Goschke[1], Clemens Kirschbaum[2], Franziska Plessow[2,3]

[1]Chair of General Psychology, Technische Universität Dresden
[2]Chair of Biopsychology, Technische Universität Dresden
[3]Department of Neurology, Harvard Medical School, Boston, MA, USA

We often form and postpone intentions until the appropriate retrieval and execution situation has come, an ability also referred to as event-based prospective memory. After intention completion, our cognitive system has to deactivate no-more-relevant intention representations from memory to avoid interference with subsequent tasks. In everyday life, we frequently rely on these abilities also in stressful situations. Surprisingly, little is known about potential stress effects on these functions.

Therefore, the present study examined the reliability of event-based prospective memory and intention deactivation under acute psychosocial stress. To this aim, eighty-two participants underwent the Trier Social Stress Test, a standardized stress protocol, or a standardized control situation. Following this treatment, participants performed a computerized event-based prospective memory task with non-salient and focal prospective memory cues in order to assess prospective memory performance and deactivation of completed intentions. Although the stress group showed elevated levels of salivary cortisol as marker of a stress-related increase in hypothalamus-pituitary-adrenal axis activity throughout cognitive testing compared to the no-stress group, prospective memory performance and deactivation of completed intentions did not differ between groups. Findings indicate that cognitive control processes subserving intention retrieval and deactivation after completion may be mostly preserved even under conditions of acute stress.

POSTER SESSION II (Thursday 17:00-18:00)

INTERTEMPORAL CHOICE: AMOUNT OR DELAY DISCOUNTING?

Philipp Neukam, Nils Kroemer, Ying Lee, Michael Smolka

Section of Systems Neuroscience , University Hospital C.G. Carus, Technische Universität Dresden

During intertemporal choice, subjective value of an offer is thought to be calculated once the amount and delay information are presented. On a neural level, this is reflected in a 'valuation network' involving the mesocorticolimbic system (i.e., ventral striatum, VS, and ventromedial prefrontal cortex, vmPFC. In more impulsive individuals, the impact of the delay is hypothesized to be stronger compared to less impulsive people which is supposed to result in a smaller subjective value and, consequently, in stronger discounting (i.e., an increase in the discount rate *k*).

Therefore, we set up an fMRI version of an intertemporal choice task in which the delay and amount information were orthogonalized and presented separately in order to disentangle amount and delay information processing for 26 participants. Though offers implying larger delays were generally more discounted, individuals with high *k* values showed less sensitivity regarding amount magnitude when deciding for a delayed offer, whereas sensitivity to delay was similar. Moreover, more impulsive individuals showed increased parametric activation in VS and vmPFC during processing of delay information which is incompatible with utility tracking of the presented offer. This suggests that impulsiveness may be related to altered processing of amount and delay information leading to differences in the computation of subjective value within the valuation network which is not explained by current models of intertemporal choice.

POSTER SESSION II (Thursday 17:00-18:00)

IMPLICIT EMOTION REGULATION IN ADOLESCENT PATIENTS WITH ANOREXIA NERVOSA

Franziska Ritschel, Daniel Geisler, Laura Soltwedel, Joseph King, Ilka Schober, Maria Seidel, Johannes Zwipp, Jessika Weiss, Veit Roessner, Stefan Ehrlich

Department of Child and Adolescent Psychiatry, Translational Developmental Neuroscience Lab, University Hospital C.G. Carus, Technische Universität Dresden

Based on self-report data, patients with anorexia nervosa (AN) have difficulties in recognizing, expressing and regulating emotions. However, data from behavioral experiments regarding emotion regulation (ER) in AN are scarce. We focus on implicit ER and use functional magnetic resonance imaging (fMRI) to study behavioral marker and underlying neural network functions of implicit ER in AN.

We hypothesize, that in AN behavioral indices and brain-based markers (fronto-limbic connectivity) of implicit ER will differ depending on the stimulus type (disorder-relevant vs. –irrelevant). This ongoing study includes patients suffering of acute AN (n=20), weight-recovered AN subjects (n=13) and healthy controls (n=36). During an fMRI scan, participants perform a modified emotional face n-back consisting of a 2-back working memory task flanked by irrelevant stimuli. Working memory (WM) performance data (reaction time, accuracy) are analyzed with ANOVAs. SPM 8 was used to preprocess fMRI data and conduct analysis at subject level to localize main effects of WM. Brain regions in the lateral prefrontal cortex that show robust neural responses to WM manipulation will be used for subsequent PPI (psychophysiological interaction) analyses. Analyses of behavioral data revealed no main effects or interactions in performance data. fMRI analysis on single subject level showed robust neural responses in WM related brain regions.

Our preliminary findings suggest preserved ER, on behavioral level, in AN. First fMRI data underline the paradigm's feasibility. This ongoing fMRI study will shed light onto implicit ER and underlying neural networks in AN.

POSTER SESSION II (Thursday 17:00-18:00)

CHALLENGING STRESS-RELATED IMPAIRMENT THEORIES: THE INFLUENCE OF ACUTE PSYCHOPHYSICAL STRESS ON DELAY DISCOUNTING

Susann Schade[1], Stefan Scherbaum[2], Maja Dshemuchadse[2], Clemens Kirschbaum[1], Rico Fischer[2], Franziska Plessow[1,3]

[1]Chair of Biopsychology, Technische Universität Dresden
[2]Chair of General Psychology, Technische Universität Dresden
[3]Department of Neurology, Harvard Medical School, Boston, MA, USA

Choosing smaller but immediate rewards over larger but delayed ones is referred to as delay discounting. Acute stress may increase discounting rates due to higher impulsivity conditioned by stress-related impairment of prefrontal cortex (PFC) functioning and elevated dopamine levels. However, results regarding this link remain mostly inconclusive. Despite this, recent studies of our lab revealed a stress-related context-sensitive adjustment of cognitive functioning and increased cognitive stability for tasks belonging to the shielding-shifting dilemma. If this also holds for discounting tasks, appertaining to the anticipation-discounting dilemma, the explanation for greater discounting under stress would not be durable anymore. Instead we suggest lower discounting rates conditioned by inhibition of impulsive behaviour in favour of attaining more stability in stressful situations. To test this, 48 healthy participants underwent either the standardized Trier Social Stress Test or a standardized control situation. Prior to and after the treatment, they performed a delay discounting task by moving an avatar through a playing field for collecting smaller but nearer or greater but further coins. Stress induction, measured via salivary α-amylase and cortisol levels, was successful. Stressed participants showed a significant decrease in discounting rates from pre- to post-treatment assessment of delay discounting whereas performance of the control group remained constant. The results support our view that acute stress does not lead to an impairment of PFC functioning. Instead, we propose that stress leads to increased stability by inhibiting impulsive behaviours.

POSTER SESSION III

Thursday 18:00-19:00

Room: Semper 1

Schober, Ilka (C3):
Subliminal and supraliminal processing of rewarding stimuli in patients with anorexia nervosa

Schulz, Ulrike (B1):
Phasic modulation of cognitive flexibility by affective and incentive cues: distinct or common neural pathways?

Seidel, Maria (C3):
Influence of emotions on rumination in patients with anorexia nervosa

Stankevich, Yuliya (C4):
Behavioral and neural correlates of motivational flexibility during a reversal learning task

Weber, Fanny (A5):
The avoidance of negative emotional contrasts in high worriers

Weckesser, Lisa (B5):
Hydrocortisone accelerates the decay of iconic memory in young and healthy men

Wolff, Max (C1):
Laboratory measures of conflict monitoring and response inhibition predict self-control failures in everyday situations

Zwosta, Katharina (A2):
Neural processes during distinct stages of goal-directed behavior

POSTER SESSION III (Thursday 18:00-19:00)

SUBLIMINAL AND SUPRALIMINAL PROCESSING OF REWARDING STIMULI IN PATIENTS WITH ANOREXIA NERVOSA

Ilka Schober, Maria Seidel, Joseph King, Franziska Ritschel, Daniel Geisler, Laura Soltwedel, Sabine Clas, Juliane Petermann, Benjamin Roschinski, Veit Rössner, Stefan Ehrlich

Department of Child and Adolescent Psychiatry, Translational Developmental Neuroscience Lab, University Hospital C.G. Carus, Technische Universität Dresden

It has been established that subliminally presented rewarding stimuli affect executive control functions and motivation. In patients with anorexia nervosa it was found that supraliminally presented food pictures disrupt working memory performance, whereas subliminally presented food stimuli had no such an effect. The aim of this study is to investigate whether subliminally presented food stimuli elicit neural responses in the same reward-related brain regions in patients with anorexia nervosa as in female healthy controls.

With this study we would like to shed light on the question whether patients with anorexia nervosa have a general dysfunction of reward related processing or whether appetitive reactions towards primary rewards (food) is altered due to an secondary volitional over-regulation.

Forty-five female patients with anorexia nervosa, forty-five female patients recovered from anorexia nervosa and forty-five female healthy controls will complete an epoch-related fMRI paradigm. This paradigm consists of four runs where respectively neutral, social-rewarding and food cues are presented in an either subliminal or supraliminal fashion. In each run, every condition is presented three times in blocks of 10 trials. To ensure participants alertness, a simple attention capture task is presented. While participants view the stimuli, electrodermal activity as a measure of the emotional arousal will be assessed.

Piloting results will be presented and discussed.

POSTER SESSION III (Thursday 18:00-19:00)

PHASIC MODULATION OF COGNITIVE FLEXIBILITY BY AFFECTIVE AND INCENTIVE CUES: DISTINCT OR COMMON NEURAL PATHWAYS?

Ulrike Schulz, Hannes Ruge, Annette Bolte, Thomas Goschke

Chair of General Psychology, Technische Universität Dresden

Adaptive behavior requires both the rapid switching between different goals and to stick with a goal by shielding it from alternative goals that are triggered by currently irrelevant information. Converging evidence emphasizes the role of positive affect and reward cues in balancing these two complementary cognitive control functions. In particular, behavioral studies show that positive affect shifts the balance towards a greater flexibility and a broader scope of attention, as indicated by facilitated set-switching, but higher distractibility.

Nevertheless, the underlying neural mechanisms remain insufficiently understood. Using event-related fMRI, we address the question whether positive emotional stimuli and reward cues elicit similar activation patterns in reward-related brain areas and whether this activation predicts the hypothesized changes in the cognitive control functions measured via distinct performance indices in a set-switching task.

POSTER SESSION III (Thursday 18:00-19:00)

INFLUENCE OF EMOTIONS ON RUMINATION IN PATIENTS WITH ANOREXIA NERVOSA

Maria Seidel, Juliane Petermann, Joseph King, Ilka Schober, Daniel Geisler, Franziska Ritschel, Johannes Zwipp, Yvonne Friedrich, Jessika Weiß, Veit Rößner, Stefan Ehrlich

Department of Child and Adolescent Psychiatry, Translational Developmental Neuroscience Lab, Faculty of Medicine, Technische Universität Dresden

In Anorexia Nervosa (AN), volitional inhibition of rewarding behaviors, such as eating, involves a conflict between the desire to suppress appetite and the inherent motive to consume. This conflict is thought to have costs that carry over into daily life, e.g. triggering negative affect and/or recurring ruminations; which may ultimately impact long term outcome. This is supported by studies that show that repetitive negative thinking and rumination appear to be elevated in AN.
Further research seems to suggest that negative affect in general, but also mood fluctuations increase the likelihood for maladaptive eating patterns.
We investigated whether mood or situational factors influence disease relevant rumination in AN applying "ecological momentary assessment", a method which allows the experimenter to gain insight into psychological processes in the natural environment and assess data in real time. Participants were given a smartphone for 14 days. A ringtone signaled the participant at six random times each day to fill in a questionnaire consisting of 11 items which gauge disorder-typical thoughts, mood state and situational factors.
This is an ongoing crossectional study and acute AN patients, recovered patients and matched healthy controls are continuously being recruited.
Preliminary results, applying hierarchical linear models seem to confirm that AN patients spend more time thinking about food, body shape and weight than do healthy participants. Additionally, the results support the hypothesis that emotional states are associated with the amount of disease relevant rumination, dependent on diagnosis.

POSTER SESSION III (Thursday 18:00-19:00)

BEHAVIORAL AND NEURAL CORRELATES OF MOTIVATIONAL FLEXIBILITY DURING A REVERSAL LEARNING TASK

Yuliya Stankevich[1,2], Ricarda Evens[1,2], Oliver Riedel[1], Alexander Storch[3], Ulrike Lüken[1,2]

[1]Chair of Clinical Psychology and Psychotherapy, Technische Universität Dresden
[2]Neuroimaging Center, Dept. of Psychology, Technische Universität Dresden
[3]Department of Neurology, Technische Universität Dresden

Parkinson's disease (PD) is characterized by a progressive dopamine depletion affecting dorsal striatal circuits already in early PD, and progressing later to ventral striatal circuits. The dorsal part of the striatum is related to cognitive (rule-based) flexibility, whereas the ventral striatum is associated with motivational (reward and punishment related) flexibility. Recent evidence suggests that individual baseline dopamine levels determine the effects of dopaminergic drugs, resulting in either optimizing or overdosing certain functions. We investigated the impact of medication status on motivational flexibility and its neural correlates in patients with mild PD. In an ongoing pharmacological fMRI study, 25 patients with mild PD and 15 matched healthy controls performed a reward and punishment reversal learning task. PD patients were assessed twice in a randomized order: once after taking regular dopaminergic medication and once after an overnight medication withdrawal. In the present task, participants were presented with two cards and were instructed to maximize their gains by choosing the card predicting gains or by avoiding losses, in both cases compared to a neutral card. After a predefined variable learning criterion for gain approach or loss avoidance was achieved, reversals were initiated by an unexpected punishment or reward. Preliminary analysis of behavioral data revealed no significant group differences in reaction times (RTs) and error rates (ERs). Faster RTs and reduced ERs were observed after reversals. Comparisons of medication on and off status in PD group showed slower RTs on medication, with no significant differences for ERs and valence.

POSTER SESSION III (Thursday 18:00-19:00)

THE AVOIDANCE OF NEGATIVE EMOTIONAL CONTRASTS IN HIGH WORRIERS

Fanny Weber[1], Kersten Diers[2], Sabine Schönfeld[1], Alexander Strobel[2]

[1]Chair of Clinical Psychology and Psychotherapy, Technische Universität Dresden
[2]Chair of Differential and Personality Psychology, Technische Universität Dresden

Contrary to the widely accepted avoidance theory of worry (Borkovec & Inz, 1990) studies by Llera and Newman (2010a, b) suggest that people with generalized anxiety disorder (GAD) utilize worry to sustain a negative emotional state in order to avoid an increase in negative emotionality both on a subjective and physiological level when confronted with a stressor rather than avoiding experiencing negative emotions per se.

Llera and Newman provided evidence for the contrast avoidance effect of worry for subjective ratings and vagal tone. Both, the avoidance theory of worry and the contrast avoidance hypothesis require further examination.

The present study investigates whether the contrast effect or the experiential avoidance effect of worry can be confirmed on a neurological level, e.g. in amygdala reactivity, and in skin conductance as another autonomic parameter. In the experimental design of this fMRI study neutral and unpleasant pictures are presented to healthy university students. Additionally subjective arousal ratings and the traitlike tendency to worry as well as pathological worry are assessed.

If high worriers compared to non-anxious subjects show less increase in their emotional responses between neutral and unpleasant pictures due to a higher baseline level they already hold, the contrast avoidance hypothesis would be supported. However, results revealing comparable activation levels between high and low worriers when exposed to neutral images and less emotional reactivity in high worriers when confronted with unpleasant pictures, would rather confirm the avoidance theory of worry.

POSTER SESSION III (Thursday 18:00-19:00)

HYDROCORTISONE ACCELERATES THE DECAY OF ICONIC MEMORY IN YOUNG AND HEALTHY MEN

Lisa Weckesser[1], Robert Miller[1], Clemens Kirschbaum[1], Franziska Plessow[1,2]

[1]Chair of Biopsychology, Technische Universität Dresden
[2]Department of Neurology, Harvard Medical School, Boston, MA, USA

The present study investigated the effects of cortisol administration on iconic memory, a form of sensory memory that is characterized by its high capacity and rapid decay. Using a within-subject double-blind placebo-controlled design, 0.06, 0.12 or 0.24 mg of hydrocortisone per kilogram bodyweight and a placebo were administered to eighteen healthy young men in random order (time lag: one week).

After cortisol or placebo was administered, iconic memory was assessed using the *Partial Report Paradigm*. Based on the signal detection theory, the sensitivity index (d') of correct detection was used to estimate three parameters of iconic memory.

Cortisol was found to significantly influence iconic memory performance. In fact, the decay of iconic memory was much faster under cortisol compared to placebo administration, whereas the information transfer from iconic to working memory was unaffected by cortisol. Indeed, we observed a linear relationship between the administered doses of cortisol as well as the resulting area under the cortisone-time curve and the decay of iconic memory.

Because selective information transfer is modulated by mechanisms of *top-down* control, the present data offer an alternative approach for explaining previous effects of stress or cortisol on complex cognitive functions. Cortisol could mediate such stress-effects by actually affecting basic (visual) information processing.

POSTER SESSION III (Thursday 18:00-19:00)

LABORATORY MEASURES OF CONFLICT MONITORING AND RESPONSE INHIBITION PREDICT SELF-CONTROL FAILURES IN EVERYDAY SITUATIONS

Max Wolff, Klaus-Martin Krönke

Chair of General Psychology, Technische Universität Dresden, Germany

Most people frequently experience temptations, or conflicts between short-term rewards (e.g., to smoke a cigarette) and long-term goals (e.g., to stay healthy), but the individual frequency of self-control failures in such situations varies considerably. We tested a model that links cognitive dispositions (capacities in conflict monitoring and response inhibition) to individual self-control performance.

Participants (N = 30) underwent assessment of self-control performance in everyday situations (via experience sampling) and absolved behavioral tests of conflict monitoring and response inhibition. Measures of both conflict monitoring and response inhibition were correlated with individual numbers of self-control failures. Furthermore, in accordance with the proposed model, a synergistic interplay between conflict monitoring and response inhibition was observed.

POSTER SESSION III (Thursday 18:00-19:00)

NEURAL PROCESSES DURING DISTINCT STAGES OF GOAL DIRECTED BEHAVIOR

Katharina Zwosta, Hannes Ruge, Uta Wolfensteller

Chair of General Psychology, Technische Universität Dresden, Germany

Goal-directed behavior requires selecting an action in a certain situation according to a desired outcome. Importantly, goal-directed behavior can be decomposed into distinct sequential stages: setting a goal, selecting an action according to this goal and processing the action's outcome. In this fMRI study we aimed at identifying brain activation related to each of these stages. To this end, we employed an event-related partial-trial approach and compared a condition where subjects were instructed to choose their response according to a specific outcome to an otherwise identical condition where response selection relied on stimulus-response rules.

Behavior aiming at distinct outcomes was associated with increased activation in several frontal (pre-SMA, premotor cortex, and VLPFC) and parietal areas (inferior parietal lobe and precuneus) already during goal-setting. In contrast, brain activation during response selection did not differ between the conditions. During outcome processing, intended outcomes compared to non-intended but action-contingent outcomes elicited stronger activation in caudate, hippocampus and inferior parietal lobe.

These results suggest that a fronto-parietal network is involved in guiding behavior according the intended outcome before a response is chosen and performed, while subcortical and parietal structures are engaged later during outcome processing.

LIST OF PARTICIPANTS

Name	Email
Armbruster, Diana	armbruster@psychologie.tu-dresden.de
Baum, Fabian	baum@psychologie.tu-dresden.de
Beck, Stefanie	beck@psychologie.tu-dresden.de
Bluschke, Annet	annet.bluschke@uniklinikum-dresden.de
Bolte, Annette	bolte@psychologie.tu-dresden.de
Braver, Todd	tbraver@artsci.wustl.edu
Brocke, Burkhard	b.brocke@tu-dresden.de
Bühringer, Gerhard	buehringer@psychologie.tu-dresden.de
Buse, Judith	Judith.Buse@uniklinikum-dresden.de
Cohors-Fresenborg, Elisabeth	Elisabeth.Cohors-Fresenborg@tu-dresden.de
Cools, Roshan	roshan.cools@donders.ru.nl
Deutsch, Roland	roland.deutsch@tu-dresden.de
Diers, Kersten	kersten.diers@tu-dresden.de
Domachowska, Irena	domachowska@psychologie.tu-dresden.de
Dreisbach, Gesine	gesine.dreisbach@psychologie.uni-regensburg.de
Ehrlich, Stefan	stefan.ehrlich@uniklinikum-dresden.de
Enge, Sören	enge@psychologie.tu-dresden.de
Eppinger, Ben	benjamin.eppinger@tu-dresden.de
Evens, Ricarda	evens@psychologie.tu-dresden.de
Fischer, Rico	fischer@psychologie.tu-dresden.de
Frank, Michael	Michael_Frank@brown.edu
Frimmel, Steffi	frimmel@psychologie.tu-dresden.de
Frisch, Simon	frisch@psychologie.tu-dresden.de
Gärtner, Anne	anne.gaertner4@tu-dresden.de

LIST OF PARTICIPANTS

Affiliation
TU Dresden, Chair of Differential and Personality Psychology
TU Dresden, Chair of General Psychology
TU Dresden, Chair of General Psychology
University Hospital C.G. Carus, Department of Child and Adolescent Psychiatry, TUD
TU Dresden, Chair of General Psychology
Washington University, Department of Psychology
TU Dresden, Chair of Differential and Personality Psychology
TU Dresden, Chair of Addiction Research
University Hospital C.G. Carus, Department of Child and Adolescent Psychiatry, TUD
TU Dresden, Chair of General Psychology
Radboud University Nijmegen, Donders Institute, The Netherlands
TU Dresden, Chair of Social Psychology
TU Dresden, Chair of Differential and Personality Psychology
TU Dresden, Chair of General Psychology
Regensburg University, Department of Experimental Psychology
University Hospital C.G. Carus, Department of Child and Adolescent Psychiatry, TUD
TU Dresden, Chair of Differential and Personality Psychology
TU Dresden, Chair of Lifespan Developmental Neuroscience
TU Dresden, Chair of Clinical Psychology and Psychotherapy
TU Dresden, Chair of General Psychology
Brown University, Department of Cognitive, Linguistic & Psychological Sciences
TU Dresden, Chair of General Psychology
TU Dresden, Chair of General Psychology
TU Dresden, Chair of Differential and Personality Psychology

Goschke, Thomas	goschke@psychologie.tu-dresden.de
Hartwig, Josephine	hartwig@psychologie.tu-dresden.de
Heitmann, Christina	christina.heitmann@tu-dresden.de
Hellrung, Lydia	lydia.hellrung@tu-dresden.de
Hering, Alexandra	Alexandra.Hering@unige.ch
Hilbert, Kevin	hilbert@psychologie.tu-dresden.de
Jacob, Marc	mark.jacob@tu-dresden.de
King, Josef	Joseph.King@uniklinikum-dresden.de
Kliegel, Matthias	Matthias.Kliegel@unige.ch
Korb, Franziska	franziska.korb@tu-dresden.de
Kräplin, Anja	Anja.Kraeplin@tu-dresden.de
Kretschmer, Anett	anett.kretschmer@tu-dresden.de
Kroemer, Nils	nils.kroemer@tu-dresden.de
Krönke, Martin	klaus-martin.kroenke@tu-dresden.de
Kruschwitz, Johann	Johann.Kruschwitz@charite.de
Lee, Ying	ying.lee@tu-dresden.de
Li, Shu-Chen	Shu-Chen.Li@mailbox.tu-dresden.de
Lüken, Ulrike	lueken@psychologie.tu-dresden.de
Luong, Cäcilia	caecilia.luong@tu-dresden.de
Marxen, Michael	michael.marxen@tu-dresden.de
Maslowski, Nina	maslowski@psychologie.tu-dresden.de
May, Albrecht	albrecht.may@tu-dresden.de
Mennigen, Eva	eva.mennigen@tu-dresden.de
Mohr, Holger	mohr@psychologie.tu-dresden.de
Möschl, Marcus	Marcus.Moeschl@tu-dresden.de
Müller, Dirk	dirk.mueller@mailbox.tu-dresden.de
Neukam, Philipp	philipp.neukam@tu-dresden.de

TU Dresden, Chair of General Psychology
TU Dresden, Chair of Engineering Psychology and Applied Cognitive Research
TU Dresden, Chair of Social Psychology
Faculty of Medicine C.G. Carus, Section of Systems Neuroscience , TUD
University of Geneva, Faculty of Psychology and Educational Sciences
TU Dresden, Chair of Clinical Psychology and Psychotherapy
Faculty of Medicine C.G. Carus, Department of Psychiatry and Psychotherapy, TUD
University Hospital C.G. Carus, Department of Child and Adolescent Psychiatry, TUD
University of Geneva, Faculty of Psychology and Educational Sciences
TU Dresden, Chair of Lifespan Developmental Neuroscience
TU Dresden, Chair of Addiction Research
TU Dresden, Chair of Lifespan Developmental Neuroscience
Faculty of Medicine C.G. Carus, Section of Systems Neuroscience , TUD
TU Dresden, Chair of General Psychology
Charité Berlin, Department of Psychiatry and Psychotherapy / TU Dresden
Faculty of Medicine C.G. Carus, Department of Psychiatry and Psychotherapy, TUD
TU Dresden, Chair of Lifespan Developmental Neuroscience
TU Dresden, Chair of Clinical Psychology and Psychotherapy
TU Dresden, Junior Professorship in Process-oriented Assessment
Faculty of Medicine C.G. Carus, Department of Psychiatry and Psychotherapy, TUD
TU Dresden, Institute of Clinical Psychology and Psychotherapy
Faculty of Medicine C.G. Carus, Department of Anatomy, TUD
Faculty of Medicine C.G. Carus, Department of Psychiatry and Psychotherapy, TUD
TU Dresden, Chair of General Psychology
TU Dresden, Chair of General Psychology
Faculty of Medicine C.G. Carus, Section of Systems Neuroscience, TUD
Faculty of Medicine C.G. Carus, Section of Systems Neuroscience, TUD

Paulus, Philipp	philipp@paulus-online.de
Ritschel, Franziska	franziska.ritschel@uniklinikum-dresden.de
Ruge, Hannes	ruge@psychologie.tu-dresden.de
Schade, Susann	Susann.schade@tu-dresden.de
Scherbaum, Stefan	Stefan.Scherbaum@psychologie.tu-dresden.de
Schmidt, Nadine	Nadine.Schmidt@uniklinikum-dresden.de
Schmidt, Kornelius	korsch@web.de
Schober, Ilka	ilka.schober@uniklinikum-dresden.de
Schulz, Ulrike	uschulz@psychologie.tu-dresden.de
Seidel, Maria	Maria.Seidel@uniklinikum-dresden.de
Shi, Yiquan	Shi@psychologie.tu-dresden.de
Smith, Kevin	smith@psychologie.tu-dresden.de
Smolka, Michael	michael.smolka@tu-dresden.de
Stankevich, Yuliya	yuliya.stankevich@tu-dresden.de
Strobel, Alexander	Alexander.Strobel@tu-dresden.de
Thurm, Franka	franka.thurm@tu-dresden.de
Trikojat, Katharina	k.trikojat@psychologie.tu-dresden.de
Weber, Fanny	Fanny.Weber@tu-dresden.de
Weckesser, Lisa	Lisa.Weckesser@tu-dresden.de
Wolfensteller, Uta	uta.wolfensteller@tu-dresden.de
Wolff, Max	max.wolff@tu-dresden.de
Wuttig, Franziska	franziska.wuttig@tu-dresden.de
Zimmermann, Uta	uta.zimmermann@tu-dresden.de
Zwosta, Katharina	zwosta@psychologie.tu-dresden.de

TU Dresden, Chair of Differential and Personality Psychology
University Hospital C.G. Carus, Department of Child and Adolescent Psychiatry, TUD
TU Dresden, Chair of General Psychology
TU Dresden, Chair of Biopsychology
TU Dresden, Chair of General Psychology
Faculty of Medicine C.G. Carus, Department of Psychiatry and Psychotherapy, TUD
TU Dresden, Chair of Biopsychology
University Hospital C.G. Carus, Department of Child and Adolescent Psychiatry, TUD
TU Dresden, Chair of General Psychology
University Hospital C.G. Carus, Department of Child and Adolescent Psychiatry, TUD
TU Dresden, Chair of General Psychology
TU Dresden, Chair of Social Psychology
Faculty of Medicine C.G. Carus, Section of Systems Neuroscience, TUD
TU Dresden, Chair of Clinical Psychology and Psychotherapy
TU Dresden, Chair of Differential and Personality Psychology
TU Dresden, Chair of Lifespan Developmental Neuroscience
TU Dresden, Chair of Biopsychology
TU Dresden, Chair of Clinical Psychology and Psychotherapy
TU Dresden, Chair of Biopsychology
TU Dresden, Chair of General Psychology
TU Dresden, Chair of General Psychology
Faculty of Medicine C.G. Carus, Department of Psychiatry and Psychotherapy, TUD
TU Dresden, Chair of General Psychology
TU Dresden, Chair of General Psychology