

Objective: Schizophrenia is likely an ancient condition with a substantial genetic basis. Consequently, evolutionary forces may have played an integral part in its development. **Methods:** We reviewed the literature on this subject published since the 1960's. **Results:** Evolutionary based hypotheses concerning schizophrenia typically fall into two general categories: 1) ideas that speculate on the possible evolutionary advantages of the condition and 2) formulations that frame schizophrenia in its classical orientation, as a disease or accident of normal brain evolution. **Conclusions:** In addition to reviewing previous hypotheses, we present our own idea that shamanism and group selection may elucidate the origins of schizophrenia.

S-48-02

Theory of mind and linguistic skills in patients with schizophrenia
M. Brüne. *Centre for Psychiatry and Psychotherapy, Bochum, Germany*

Objective: "Relevance Theory" proposes that the pragmatic use of human language requires an intact theory of mind (ToM). ToM is defined as the ability to attribute desires, beliefs and intentions to one-self and others. **Methods:** Patients diagnosed with schizophrenia were assessed using a German Proverb Test (Barth and Küfferle, 2001), a 'theory of mind' test battery, executive functioning tests and verbal intelligence. Psychopathology was measured using the PANSS (Kay et al., 1987). Patients' performance was compared to a group of healthy control persons. **Results:** 'Theory of mind' performance predicted, conservatively estimated, about 39 percent of the variance of correct proverb interpretation in the patient group. **Conclusions:** The ability of schizophrenic patients to interpret proverbial metaphorical speech crucially depends on their ability to infer mental states. Future studies may address differences between diagnostic subtypes of schizophrenia.

S-48-03

Non-verbal communication processes predict onset and course of depression - ethological analyses of depressed patients' and interviewers' interpersonal behaviour

E. Geerts, A. L. Bouhuys, T. W. van Os. *University of Groning Dept. of Psychiatry, Groningen, Netherlands*

Objective: Attachment theorists have proposed that the style of parental bonding (PB) may have substantial impact on personality development. **Methods:** We studied whether PB can predict the outcome of treatment in 106 depressed outpatients. **Results:** Poor outcome was predicted by high paternal overprotection and low maternal care in females and by high maternal and paternal care in males. We investigated whether the association between PB and outcome can be explained by non-verbal interpersonal processes. We registered the patients' and interviewers' involvement behaviour during a pre-treatment interview. **Conclusions:** Convergence of these patient and interviewer displays during the interview acted upon the association between maternal care and outcome: the more similar these displays became, the stronger the association between mother care and outcome was.

S-48-04

Deficit of theory of mind found in remitted depression: Practical implication

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It is known that patients with schizophrenia have impaired theory of mind (ToM) during acute episodes. The aim of this study was to investigate ToM ability in patients remitted from the first episode of schizophrenia. In results, patients with schizophrenia showed statistically significant impairment in sequence, a second order false belief task and sum score in ToM task. No correlation was found between answers in any of the four areas of ToM and IQ. Our results suggest that ToM impairment can be detected not only in the acute episode as found in previous research, but also in remission from the first episode. Since the ToM impairment suggests a decline in the function of social relationships, the evaluation of ToM ability in patients with remitted schizophrenia may be a useful tool in providing treatments for better social adjustment. Previously, we have found that patients with major depression continued to have deficit in ToM ability after recovery. We will discuss the difference between the deficit in remitted schizophrenia and remitted depression.

Wednesday, April 6, 2005

S-68. Symposium: fMRI of emotion and cognition

Chairperson(s): Frank Schneider (Aachen, Germany), Ewald Moser (Wien, Austria)
08.30 - 10.00, Gasteig - Lecture Hall Library

S-68-01

Dynamic causal modelling of evoked brain responses

K. Friston, K. E. Stephan. *Functional Imaging Laboratory Institute of Neurology, London, United Kingdom*

Objective: We present an approach (DCM) to identifying dynamic input-state-output systems. Identification of the parameters proceeds in a Bayesian framework given the known, deterministic inputs and the observed responses of the [neuronal] system.

Methods: We develop this approach for the analysis of effective connectivity using experimentally designed inputs and fMRI and EEG responses. In this context, the parameters correspond to effective connectivity and, in particular, bilinear parameters reflect the changes in connectivity induced by inputs. The ensuing framework allows one to characterise experiments, conceptually, as an experimental manipulation of integration among brain regions (by contextual or trial-free inputs, like time or attentional set) that is perturbed or probed using evoked responses (to trial-bound inputs like stimuli).

Results: We show that changes in attentional set, adaptation of evoked responses in fMRI and specific ERP components such as the P300 can all be explained by changes in the coupling among brain regions. Furthermore, inferences about these changes can be made, in a connection-specific fashion using DCM.

Conclusion: As with previous analyses of effective connectivity, the focus is on experimentally induced changes in coupling. However, unlike previous approaches to connectivity in neuroimaging, the causal model ascribes responses to designed

deterministic inputs, as opposed to treating inputs as unknown and stochastic.

S-68-02

Exploring the human declarative memory system by functional neuroimaging

G. Fernandez. *Radboud University F.C. Donders Center, Nijmegen, Netherlands*

Objective: The kind of memory one ordinarily means when using the term "memory" is declarative memory, which enables us to retrieve consciously past events and facts. After an era when lesion studies have identified the declarative memory system and its essential anatomical structures, functional imaging techniques like functional MRI and electrophysiology have begun to delineate the neural underpinnings of mnemonic operations like the formation of new memories and the retrieval of old ones. Here, I will initially characterize the neural correlates of these transient and short-lasting operations occurring during memory encoding and retrieval. Thereafter, I will present new data shading some light on declarative memory consolidation, a presumably long lasting (set of) operation(s) transforming initial, labile memory traces into stable forms of long-term memory. Our functional MRI data seem to provide initial confirmation for the time limited role of the hippocampus in human declarative memory. With time, memory retrieval is associated with less and less hippocampal activity but in turn with more and more activity in neocortical brain areas related to the specific cortical representation of the stimuli. Moreover, our data is in line with the notion that slow-wave- and rapid-eye-movement sleep plays a crucial role in this operation. In conclusion, functional imaging provides a useful tool for assessing the neural correlates of fundamental mnemonic operations. Thus, we might use these techniques in the near future to probe the genetic and biochemical basis of the normal and the impaired declarative memory system.

S-68-03

E-motion: The importance of optimised fMRI strategies to study emotions

E. Moser, S. Robinson, C. Windischberger, U. Habel, B. Hoheisel. *Department of Medical Physics, Wien, Austria*

Objective: After a short introduction on fMRI data sampling using BOLD-EPI and spiral imaging, strategies to avoid or reduce artifacts due to physiological and stimulus-correlated motion (SCM), and susceptibility related artifacts in the human brain, will be discussed. Detailed examples illustrate the potential for erroneous results as a consequence of using standard, low-resolution EPI and analyses (e.g. SPM) only and underline the value of methodological improvements in fMRI.

Methods: Advanced measurement and data processing strategies to avoid or ameliorate these problems and an optimised protocol used in Vienna will be presented. In addition, biological factors potentially contributing to gender or cultural differences will be discussed. Visual stimuli - colour images of facial expressions of five emotions (happy, sad, disgust, fear, anger) and neutral expressions - were presented on a screen within the scanner bore. Tasks were presented in an event-related design and EPI-measurements performed on a 3T-scanner (Medspec, BRUKER-

Biospin). Pre- and postprocessing was performed using in-house software and SPM2.

Results: Differences in BOLD-based activation were established in response to the five emotions, and between male and female viewers, and posers of different ethnic origin. This was made possible via an optimised (high-resolution) EPI measurement protocol and high field strength (3T). Maximum t-values were increased by approximately 20% via the correction of physiological artefacts. Strategies for reducing SCM allow these results to be attributed with unprecedented confidence to genuine activation in the amygdala.

Conclusion: Advanced measurement and data processing strategies help reduce artifacts and improve data quality, which may allow more subtle details in brain function to be studied. This is particularly important in single subject and patient studies.

S-68-04

Learning to play pong with fMRI neurofeedback: Implications for clinical applications

R. Goebel. *Department of Cognitive Neuros, Maastricht, Netherlands*

Objective: We report about a novel type of experiment during which fMRI signals of two subjects are measured simultaneously, analyzed in real-time, and used to control actions in a simple video game. The two simultaneously scanned subjects look at a screen depicting the same video game, a simple version of the classical computer game "Pong". The task of the subjects is to move their racket up and down to hit the approaching ball and to gain as many hit points as possible by regulating the amplitude of the BOLD signal within a selected region-of-interest (ROI).

Methods: The fMRI measurements were performed on two MRI scanners (Siemens 1.5 T Sonata and 3 T Trio, TR=2000ms, 25 slices, matrix: 64x64). In individual neurofeedback sessions, subjects first learned to modulate regional brain activity to 3 or 4 different target levels as well as to adapt to the hemodynamic response delay. The brain area which responded best to imagery episodes was then selected for controlling the vertical position of the subject's racket in the subsequent video game.

Results: During neurofeedback pretraining, all subjects (N = 8) were able to learn to activate spatially localized brain regions to different target levels. In six conducted Pong experiments, subjects succeeded in controlling the up and down movement of the racket by regulating voluntarily the activity in the selected ROIs achieving a hit rate of 50% to 80% (chance hit rate: 20%).

Conclusion: The observed ability of graded control over regional brain activity offers interesting research and clinical applications. Furthermore, the Pong experiment demonstrates that it is now possible to not only simultaneously measure two subjects during social interactions but also to use subjects brain activity in real-time during these interactions.

S-68-05

Neural correlates of emotion and cognition as key components in the understanding of the pathophysiology of psychiatric disorders

F. Schneider. *Universitätsklinik Psychiatrie und Psychotherapie, Aachen, Germany*

Objective: Most psychiatric disorders are characterized by impairments in cognitive and emotional processes. FMRI studies

on different samples of schizophrenia patients revealed characteristic dysfunctions in the cerebral network underlying emotional experience, emotion recognition, working memory as well as interactional processes between emotion and cognition. Most prominent are amygdala hypoactivations and prefrontal dysfunctions. In a further advance for a more detailed characterization of such dysfunctions, a differentiation between state and trait components has been attempted by investigating early-onset psychoses, unmedicated and first-episode schizophrenia patients as well as patients with prodromal symptoms and unaffected relatives. Trait components have been revealed in subcortical as well as cortical regions during different cognitive and emotional tasks. However, fMRI in psychiatry reveals its potency last but not least in the evaluation of different therapeutic approaches on cerebral dysfunctions. Pharmacological as well as behavioral interventions have been examined with respect to effects on the activation pattern and have been proven to be effective in reducing abnormal brain activity in schizophrenia during cognitive and emotional processes. Such therapeutic effects could also be demonstrated in alcoholic patients. The neural correlates of craving, elicited by visual and olfactory cues in alcoholic patients, have been examined by fMRI and differential intervention strategies demonstrated modality specific therapeutic effects. Hence, the application of fMRI still offers an exceptional and exciting tool for augmenting the understanding of the pathophysiology of psychiatry disorders.

Sunday, April 3, 2005

SS-06. Section symposium: The interface between biological and social factors in borderline personality disorder

Chairperson(s): Sabine Christiane Herpertz (Rostock, Germany), Henning Sass (Aachen, Germany)
16.15 - 17.45, Holiday Inn - Room 3

SS-06-01

E. Seifritz. *Department of Clinical Psychia, Bern, Switzerland*

SS-06-02

Dissociative experiences in borderline personality disorder and other trauma disorders

E. Vermetten. C. Schmahl, J. D. Bremner, R. Loewenstein.
Department Psychiatry Central, CX Utrecht, Netherlands

Objective: Borderline personality disorder (BPD) patients have a wide range of dissociative experiences, including experiences of absorption, amnesia, and experiences of depersonalization. These phenomena are understood to be components of high hypnotic susceptibility. An empirical relation has been demonstrated between trauma-related psychopathology and hypnotizability, with a strong link between the phenomenology of hypnosis and symptoms of trauma-related psychopathology, e.g. analgesia, memory problems, time distortion. Symptom patterns of BPD may also be linked to a relative inability to engage in cognitive

inhibition and may be a factor related to suggestibility; levels of trauma-related stress can be warded off by virtue of high dissociative capacity.

Methods: We used the the Dissociative Experience Scale (DES) and the Clinician Administered Dissociative Symptoms Scale (CADDSS) to assess trait and state dissociation, the Tellegen Absorption Scale (TAS) to assess absorption, and the Guddjonsson Suggestibility Scale (GSS) to assess suggestibility. In addition we assessed hypnotic susceptibility with the Hypnotic Induction Profile (HIP) in a female population of trauma controls (n=17), post traumatic stress disorder (n=15), BPD (n=10) and DID (n=16).

Results: As a group, BPD patients were highly hypnotizable, showed high levels of absorption and trait dissociation, with low state dissociation scores. In addition, BPD patients were the among the highest suggestible in the study group.

Conclusion: These findings support the notion that BPD patients frequently engage in dissociative experiences, which may give them a sense of loss of agency since it points to a mechanism that coincides with high level of absorption, suggestibility and hypnotic susceptibility.

SS-06-03

Perception of facial affect in borderline personality disorder (BPD)

G. Domes, S. Herpertz, S. Herpertz. *Department of Psychiatry & Psy, Rostock, Germany*

Objective: It has been suggested that inadequate perception of social-affective cues is a basal factor in the psychopathology of psychiatric conditions. Impaired recognition of facial affect for example has been well documented in schizophrenia, affective disorders, autism and other psychiatric disorders. Since emotional hyperreactivity is one of the key symptoms in BPD, we expected the BPD patients to be more sensitive to facial affect in general.

Methods: Fifteen women with BPD were compared to 15 age and IQ matched healthy controls. Participants were exposed to pictures of facial affect which displayed different emotions. In a computerized procedure the intensity of the displayed emotion was increased in a pseudo-continuous manner. Participants were instructed to indicate by a button-press when they became aware of the particular basic emotion (sadness, fear, disgust, anger, happiness, surprise), and to label the emotion displayed. Mean detection intensity and mean error rate were recorded.

Results: Analyses of data is still in progress. The results so far show, that BPS patients tend to detected the disgusted faces at a lower mean intensity compared to normal subjects. So far no other differences in detection sensitivity and accuracy could be observed.

Conclusion: The results so far contradict the hypothesis, that in BPD patients sensitivity and accuracy in the perception of facial affect is generally enhanced. Preliminary data suggest that BPD subjects are more sensitive to subtle cues of social hostility. This specific effect might reflect a bias towards the perception of potentially self-threatening cues in the social environment.

SS-06-04

Biological and psychological aspects of self-injurious behavior in borderline personality disorder