suitable for monitoring purposes for its large amount of data. Some of the normalized slope descriptors of Hjorth ('activity' and 'mobility') proved useful in these situations because they give a global measure of the activity and changes studied. Similar measures could be the different percentile frequencies which are calculable in the Mikromed-Proster Neuromap-plus program package. The 50th spectral edge gives the frequency belonging to the half of the power and called median power frequency as well. The 70th edge names the frequency below which 70 per cent portion of the power could be found and so on. These measures and their changes could characterize the shape and the changes of the power spectra. The compression of the internal carotid arteries was used a validation test because slowing of the EEG activity could be expected. The simultaneous registration of the spectral edge and traditional power band maps showed that the increase in the theta delta band and the decrease of the faster activities are reflected correctly in the changes of these edges so their topographical maps could help in monitoring the spectral EEG changes.

The Influence of a Well Defined Cognitive Task on the Brain-activity of Children in the Age Between 12-14. S. Mientus, P. Rappelsberger* and G. Tembrock+ (Charite Center of Neurology, *University of Vienna, Neurophysiological Inst.; +Humboldt-University of Berlin, Dept. of Behavioral Biology).

The changing of brain electric activity induced by a sensory-motor task like learning a manual labyrinth was investigated with a group of 36 children in the age between 12 and 14 years. The children where divided into 3 subgroups by the help of a psychological behavioral questionnaire. This questionnaire contains 6 complexes of criteria to describe the personal ability of learning.

The investigations where made with 19 electrodes placed on the scalp according to the 10/20 system and in reference to the linked earlobes. The impedances where 5 kOhm or less.

At first the raw data where transformed by the help of the fast fourier transformation. Afterwards the evaluation of data continues with an analysis of power, amplitude and coherence (based on cross spectral analysis).

The aim of this investigation was to find out general and special influences of a defined learning process and its correlates.

The obtained results show that there is a significant relation activity with the task. Especially significant results where found for this method in an increase of theta-power in the right hemisphere in case of visuo spatial activation. In general the percentage of alpha decreases while the children are involved of visuo spatial activation but an increase in alpha-power was to be seen too. The results of the analyses of coherences lead to the conclusion that the more difficult that means the more complex the task the more significantly higher are the coherences.

Map Topography to Simple and Composite Words in Context. D. Brandeis, T. König and D. Lehmann (Neurology Dept., University Hosp., Zürich, Switzerland).

The topography of event-related potential (ERP) maps to semantically expected and unexpected words can be very different. In a previous reading study (N=17), inverted map topographies characterized semantically expected and unexpected endings of constrained sentences. Anterior negative maps were found for expected, and posterior negative N400-like maps for unexpected endings during two adaptively determined latency segments in the 240-440 ms time range. In contrast, similar map landscapes for expected and unexpected endings were found for less constrained sentences with composite word endings. This may suggest a different mechanism for integrating simple and composite words in sentences. In a new study, predictability of the expected composite word ending was varied. Map topography was again measured by the centroid locations of the positive and negative average reference map areas. First results (N=8) showed reliably different map topography to expected and unexpected endings in blocks with highly predictable correct endings, and reduced topographic differences in blocks with less predictable endings, where the maps resembled those from the previous study. A transient left-lateralization of the negativity in the early segment was also replicated. Map topography thus identified similar language processing states (microstates) for simple and composite words in constrained sentences.

The Contingent Negative Variation: Potential and Scalp Current Density Fields. K.B.E. Böcker and C.H.M. Brunia (Co-operation center Tilburg and Eindhoven Universities, Tilburg University, The Netherlands).

Eight subjects performed a forewarned reaction time task with both hands successively. The inter stimulus interval (ITI) between the warning and the reaction stimulus (RS) spanned 4 seconds.

During an ITI of 4 seconds the Contingent Negative Variation (CNV) shows an early and a late wave. Both potential and Scalp Current Density (SCD) fields (Hjorth's method) were subjected to ANOVAs with Response-side (R), Hemisphere (H) and Electrode position (E) as repeated measures. The early wave showed a clear maximum at FCz for both potential and SCD fields. For the late wave potentials the R*H*E interaction (pointing at contralateral dominance at central electrodes) was significant from 200 ms before RS presentation to at least one second afterwards. The SCD's only showed R*H and R*H*E interactions from 200 ms after presentation of RS, indicating strong contralateral sinks at postcentral electrodes. These results differ from those obtained in a previous study of self-paced movements, which showed much earlier contralateral activity. This suggests the presence of other cognitive processes and sources related to stimulus anticipation in the CNV. This possibility will be investigated with source localization methods.

Pattern Cognition in the Human Brain - A Study with ERP Mapping. K. Kochi, M. Murasaki and Y. Koga* (Dept. of Psychiatry, Kitasato University, School of Medicine, *Dept. of Neuropsychiatry, Kyorin University, School of Medicine, Japan).

In order to study pattern cognition in the human brain, ERPs were elicited from 13 normal controls under various conditions in which the dimensions of elements used for pattern discrimination were different respectively. The elements were color, form and tilt. Under each condition, subjects were required to discriminate whether two simultaneously presented pattern stimuli were identical or different in the designated dimensions (one-dimensional, two-dimensional and three-dimensional task condition).

In the present study, neither NA1 peak latency nor NA2 peak amplitude differed significantly among three different task dimension. As in the case with NA1, the values of the various parameters of NA2 did not differ significantly among each condition. Under one and two dimensional task conditions, NA1 amplitude was dominant in the parietal area and NA2 was dominant in the posterior area. Under three dimensional task condition, however, both NA1 and NA2 distributed dominantly in the parietal area.

The result indicated that the subjects were able to process multidimensional elements of a stimulus simultaneously (parallel mode) in both the stimulus encoding stage reflected by NA1 and memory stage reflected by NA2. In regard to the distribution of amplitude, however, the areas involved in these processes may not be identical under three dimensional condition.

Source Analysis of Electrical and Magnetic Brain

Responses Associated with Selective Attention and Language Processing. A. Wijers, J. Lange, B. Buijink, M. Peters* and G. Mulder (Experimental and Occupational Psychology, University of Groningen, Groningen and *Faculty of Applied Physics, University of Twente, Enschede, The Netherlands).

For 8 subjects we determined the field distributions of the electrical and magnetic brain responses (in two separate sessions) in selective search tasks and semantic priming tasks. In the selective search paradigm, letters were presented either to the left or to the right of fixation, while the subjects were instructed to attend to one side of fixation only. Subjects searched at the attended side for the presentation of a variable number of pre-memorized target letters. In the semantic priming tasks subjects were presented with word-pairs, which were either associated or non-associated. The results of the selective search tasks and the semantic priming tasks will be presented in two separate posters. In the selective search tasks, early components of both the electrical and magnetic brain responses were modulated by spatial attention. The field-distributions were indicative of localized patterns of brain activity in extrastriate visual regions. Both the electrical and magnetic brain responses showed effects of memory load. In the semantic priming tasks, the ERPs showed a late negativity of the non-associated word-pairs as compared to the associated word-pairs (N400). This effect was maximal at central regions of the head. In the magnetic responses a similar phenomenon was observed; the effect could be observed over both the right and left temporal regions were it had the same field direction. This suggested that brain areas in both hemispheres are involved in generating the N400 component.

Suppression Duration of EEG and MEG Occipital Alpha Rhythm During Mental Rotation. C.M. Michel, L. Kaufman* and S.J. Williamson* (Dept. of Neurology, University Hosp., Zurich, Switzerland; *Dept. of Physics and Psychology and Center for Neural Science, New York University, USA).

We investigated the duration and field pattern of alpha suppression over the occipital scalp during a visual mental rotation task. In 6 subjects, measurements at 9 EEG electrode positions and 30 MEG sensor positions were taken. Two identical alphanumeric characters were visually presented, the first in the upright position (memory figure) and the second tilted by one of 8 possible angles between 0 and 360 degrees (target figure). The subjects had to press one of two buttons to indicate whether the target figure was presented correctly or as a mirror reflection.

The results showed a clear relationship between the increase in duration of suppression of alpha activity and reaction time as task difficulty was increased: both reaction time and suppression duration increased with increasing rotation angle in all subjects and all recorded EEG and MEG positions. Examination of the spatial pattern of the alpha activity under the sensor array by means of the spatial point of gravity of alpha power revealed small but significant shifts of the dominant alpha suppression towards parietal region in the early period after the presentation of the target figure as compared with the same period after the memory figure. During the latter portion of the suppression period following the target there was additional suppression of neuronal activity in the right parietal area when the targets were strongly rotated as compared to non-rotated targets.

The study clearly indicates that the duration and the pattern of parieto-occipital alpha band neuronal activity are adjusted to the demands that are required to complete a mental rotation task.

EEG Local Activation Cartography Following Auditory Activation of Vigilance-controlled and Vigilance-free Sequences. P. Etevenon, P. Rioux, E. Legangneux, H. Rebeyrolle, E. Zarifian and A. Segonzac* (INSERM U320, *GRP-SNC, Caen, France).

Twelve young male healthy volunteers were recorded (16 EEGs, EOG, EMG, ECG). Four EEG sequences were recorded in each session, at time zero (pre) and 1 h (post) following a slow i.v. administration of placebo.

Pre and post-injection recordings were made of 2 successive sequences S1 and S2, eyes closed. A first vigilance-controlled sequence (S1, 2.5 mn) was recorded after 10s hearing of 60 dB synthetic sound, followed by free-vigilance sequence (S32, 2.5 mn). After artifact rejection, the 48 sequences of quantified EEGs were spectrally analysed. MANCOVAs (BMDP) were computed with 2 factors: sequence (S1, S2), and EEG channels.

Beta 2 frequencies are increased for S1 over temporal areas; for S2, over right temporal and left parietal. The beta 2 D.S.P. amplitudes are decreased for S1 over temporal areas and left frontal; for S2 over right temporal. The beta 2 relative power % values are decreased also in S1 and S2 over right temporal area.

These significant changes are reflecting our concept of "EEG local activation cartography" following auditory stimulation.

Topography of Cognitive Evoked Potentials in Neurological Lesions - Longitudinal Study. E.S. Petránek (Faculty Hosp. Bulovka, Dept. of Neurology, Budinova, Praha, Czech Republic).

After the experience with over 250 examinations it is possible to conclude that P300 examination in the form of mapping is very helpful for the neurologist to support him with objective proof of the patient's subjective complaints.

There is not only important information about latency, but about topographic distribution of maxima as well. From repeated examinations we observed, that even when changed parameters of stimulation are used to prevent habituation, the results are reproducible. Latencies are slightly different but the topography persists the same.

We consider the correspondence of focus in EEG or BM with the maximum in P300 very significant. The number of examination is still too small to allow for extensive conclusions but so far we have a feeling that the shift of the electric peak could be due to little alternation of nerve cells and subsequent increased synchronized reaction of that area. In some cases the proof of a permanent focus could serve as a marker of some previous neurological damage. Similar preliminary findings are from examinations of magnetic evoked potentials topography verified by NMR examinations.

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BIOMAGNETISM & MEG

Somatotopic Organization of the Sensorimotor Cortex as Indicated by Neuromagnetic Recordings. R. Kristeva, H. Walter+, S. Hampson, B. Ross and M. Hoke (Inst. Exper. Audiology, Univ. Munster, Munster, and +Neurol. Univ. Clinic, Univ. Dusseldorf, Germany)

In a previous study of ours the somatotopic organization of the motor cortex was revealed non-invasively by means of magnetoencephalography. This was achieved by source localization of the motor field, i.e., the component during the last 50 msec prior to the voluntary movement. The present study describes the topographical organization of another movement-related neuromagnetic field, called movement-evoked field I (MEF I) appearing approx. 100 ms after movement onset and mostly reflecting sensory input from the periphery. Movement-re-