## Ambulatory psychophysiological monitoring of patients with essential hypertension

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Fifty male patients with primary hypertension (WHO I and II) took part in psychophysiological ambulatory monitoring during three days while they participated in a 4–6 week stationary rehabilitation program. Thus, an extended 48-hour monitoring was performed on the tenth day and another 24-hour monitoring approximately 14 days later. Each 24-hour monitoring comprised a protocol of four standardized behavioral tasks (cold pressor test, active relaxation, reaction time task, and climbing stairs) before the daily routine of various psychotherapeutic and somatic treatments and leisure time activities commenced.

The configuration that was employed in this study consisted of two recorders: a recorder for blood-pressure, heart rate, and activity (Physioport/Tonoport, Par-Natic/Hellige) and a pocket-sized computer (PB 1000, Casio) to obtain setting information and psychological self-ratings employing 15 items after each daytime blood-pressure measurement. Forty day- and 6 nighttime blood pressure measurements were recorded on average as well as 25 psychological records. Furthermore, a number of questionnaires were administered.

Stability coefficients for mean day- and nighttime blood pressure and heart rate were high between day 1 and day 2. However, a decrease in average measures was obvious across days 1, 2, and 3. Simultaneously recorded self-ratings, questionnaire, and interview data are employed to assist in interpretation of these trends. Furthermore, the covariation of mood and cardiovascular changes is discussed, taking into account gross changes in physical activity by appropriate segmentation of records. Multiple regression analyses employing measures from standardized behavioral tasks as predictors of daytime averages are performed. We suggest the utility of a complementary approach and a symptom-context perspective.

## Analysis of resource allocation during text processing by means of slow brain potentials

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Slow brain potentials (SP) have proved to be a sensitive index of mental workload. McCallum et al. (1988) suggested that negative DC shifts index both the course of preparatory processes and the level of effort demanded of the operator. Numerous studies have shown that the more demanding the expected activity, i.e., the more resources are expected to be consumed during the performance, the higher the negativity of SP.

In this study SPs (EEG-derivations: Fz, Cz, Pz, C3′, C4′) were applied to analyze activation processes during different steps of text processing. A multifunctional office software system was used which enabled SP parameters time-locked to particular commands of text processing to be measured.

Subjects had to type words differing in difficulty. They had to call up the words and to memorize them for subsequent typing. Both steps of text processing (calling up the words and the preparation for typing) were initiated by pressing particular keys of the computer keyboard. SP analysis revealed an effort-dependent variation of SP parameters. This method may provide a tool for strain-related evaluation of human-computer interaction.

## Drug challenge paradigms in affective disorders

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In neuropsychology and neuropsychiatry the response to a specific challenge may serve as an external marker for validating some category or dimension. If the mechanism of action of the challenge is known, the response may be tentatively interpreted in terms of putative pathophysiology. However, the less selective the challenge and the more composite the system, the more troublesome is any interpretation. Moreover, the more steps are inserted between the challenge and the final response, the more the response is prone to be influenced by separate factors. The only situation allowing definite pathophysiological interpretation is in definitely homogeneous groups, i.e., essentially in inbred animals.



These problems might explain why controversy persists concerning the reliability and specificity of the responses to various challenges proposed as discriminative markers for affective disorders. None of the challenge procedures has yet allowed the definite clarification of the processes involved in pathogenesis. Most studies replicated a blunted response to insulin of ACTH/cortisol and growth hormone (HGH) in depression. About 60% of depressives insufficiently suppress cortisol following dexamethasone. This finding is not specific to depression. The cortisol response of depressives to corticotropin (ACTH) is exaggerated possibly due to hypertrophic adrenals while the response of ACTH to the releasing hormone (CRH) is blunted. One of the few generally accepted findings is the blunted HGH response to the adrenergic agonist clonidine which has been interpreted as indicating a subsensitivity of hypothalamic postsynaptic receptors. However, this subsensitivity has not been replicated using guanfacin and the HGH response to the releasing hormone (GHRH), i.e., it has also been found blunted at the pituitary level. The secretion of prolactin following a challenge by the serotonin releaser fenfluramine is blunted as is the ACTH/cortisol and hypothermic response to the 5-HT1A agonist ipsapirone but not to m-chlorophenylpiperazine (mCPP).

The blunting of prolactin seems to be related to the more global dimension of aggression and autoaggression rather than being specific to depression. However, depressives supersensitively oversecrete ACTH/cortisol and β-endorphin following a cholinergic challenge with physostigmine. This cholinergic supersensitivity includes behavior and REM-sleep induction. The latter finding again is not specific to depression. In healthy subjects, especially cardiovascular sensitivity to physostigmine seems to be related to some lability of personality.

These and other findings suggest that future studies will have to investigate more distinctly the individual steps in these trigger response cascades and control for confounding variables in order to delineate the possibly common denominator in depression.

## Fluctuations of fixation durations and saccadic velocities

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While it is well known that saccadic velocity decreases with fatigue and blink rate increases there is little known about fixation durations in vigilance fluctuation and the mutual relationships of these parameters.

In 9 subjects, saccades and blinks were identified on-line from the EOG while driving a car for more than 6 hours. Subjects drove one day without and another day with a minimal dose of alcohol (less than .5 per ml). Saccadic velocities (in a standardized form), fixation durations, blink interval, and blink velocities (for the eyelid closing phase) were integrated for 30, 60, 120, or 240 s periods. These values were rank correlated with each other. In the table, a typical correlation matrix is shown for one subject for the 120 s period:

Spearman rank correlations between saccadic and blink parameters in Subject A

| Saccadic velocity | Fixation duration | Eyelid velocity | Blink interval |
|---|---|---|---|
| Day without | –.36 ** | .24 ** | .12 |
| Day with alcohol | –.57 ** | .39 ** | –.02 |
| Fixation duration | | | |
| Day without | | –.22 ** | –.03 |
| Day with alcohol | | –.28 ** | –.05 |
| Eyelid velocity | | | |
| Day without | | | .16 |
| Day with alcohol | | | –.12 |

(** = $P < .01$)

While many correlations show a very reliable pattern in individual subjects there are considerable differences between the subjects. But at least three trends are characteristic for the whole group: 1) Fixation durations correlate negatively with saccadic velocities thus indicating that the more cognitively controlled fixation duration is fluctuating with the arousal level thought to be represented by saccadic velocity. 2) Most significant correlations increase from 30 to 240 s periods of integration (for example the mean correlation of the group between fixation duration and saccadic velocity from –.22 to –.28 without and –.34 to –.51 with alcohol). This speaks for a more slowly fluctuating vigilance oscillation (> 6 min half period). 3) Minimal alcohol ingestion interferes in every subject with the pattern of intercorrelations but not in a consistent matter.