

Quantitative Aspects of Organic Brain Diseases

By Hans Heinrich Wieck

ABSTRACT

Function psychosis is the most frequently observed response of the brain to disturbances in general practice and in hospital. A complete test system is presented for measuring grades of severity of function psychoses. It is possible to trace the course of function psychosis in a curve similar to pulse and temperature curves. We could demonstrate a significant correlation between somatic and psychopathometric variables.

I. Feature of Psychopathometry.

In contrast to psychometry, which endeavours to measure normal psychic functions and structure, psychopathometry — the term was introduced by us in 1964 (history: in Wieck, 1977a) — aims at measuring degrees of psychopathologic and behavioral disorders.

TABLE I

Special Features of Psychopathometry.

1. Measuring the degree of disturbances.
 - a) Specificity of the test concerning the syndrome
 - b) Dynamic of the disturbance which is measured
 - c) Causal external criterion
2. No remarkable effects in repetition
 - d) Intraindividual course of disturbance can be investigated

3. Clinical usefulness

- e) Suitable for hospital and general practice
 - f) **Avoiding to stress the patient**
 - g) Economy (Quick and easy to perform)
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Many conditions must be taken into consideration when constructing psychopathometric tests and applying them to the patient (Erzigkeit et al., 1978; Wieck, 1972, 1977b, 1978).

II. Features of Function Psychoses

Function psychoses result from a **diminution of psychic and mental functions** and are basically reversible in respect of the syndrome genesis and **non-specific** in respect of the agents causing cerebral dysfunction (Wieck, 1956, 1979a, & 1977b).

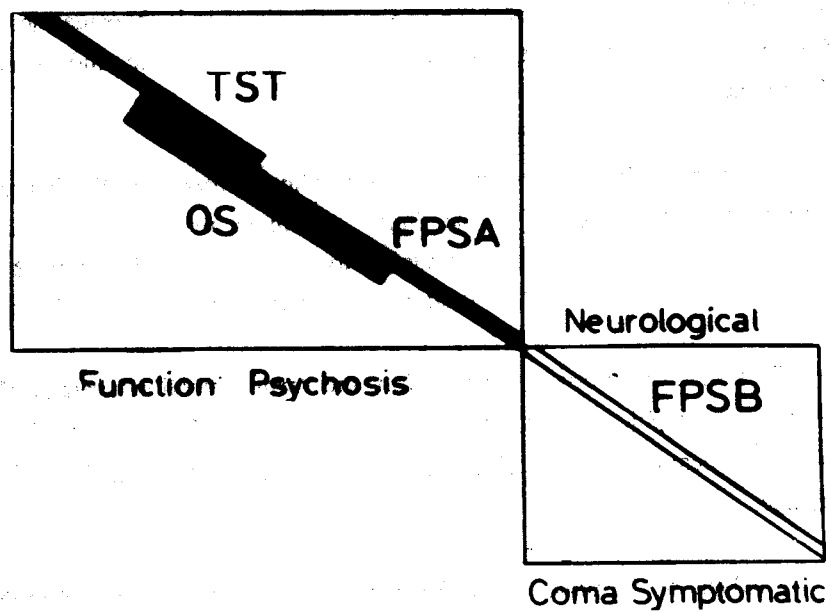
Function psychoses constitute a homogeneous and dynamic system of syndromes ranging from the mild transit syndrome to unconsciousness and coma.

The concept of the transit syndrome (Wieck, 1956) introduced for the first time the principle of dynamic unity of syndrome and of quantitative reduction into psychiatry. — The possibility of measuring the degree of function psychoses was the starting point for developing psychopathometric tests: (history: B. Heerklotz, in: Erzigkeit, 1978).

TABLE II

Feature of Function Psychoses
Diminution of psychic and mental functions
Non-specific pathogenesis
Basic — concerning the syndrome genesis — reversibility
Homogeneous syndrome dynamics

Figure (I): Serum Level of alcohol, Evoked Potentials and Psychopath Ometric scores (From Taghavy, 1974)



Similar to distinction between changes in morphological structures and functional disturbances we can separate structural abnormalities in the psychopathological field from disturbances of psychic and mental functions.

They are affected in reversible psychotic syndrome with demonstrably somatic basis, while the inner structures remain intact. The concept of function psychoses is meant to underline this in contrast to the irreversible psychic defect syndrome associated with organic changes.

It should be borne in mind that the term "function" means the process of psychic activity and experiences. It should not be confused with the meaning of dependent variables in the sense of mathematical science.

Analysis of the unity of psychic and mental functions shows that the basic functions (reaction time and memory) can be separated from the specific entities: sensory perception, thinking, mental representation, inner awareness (introspection), feeling and volition (striving and willing). Taken together, the basic and specific functions constitute the total complement of mental faculties.

III. Psychopathometric Tests for Measuring the Degree of Function Psychoses.

For two decades our research group has been constructing tests for measuring the degree of function psychosis (Erzigkeit, 1977, 1978; Lehrl, 1977; Wieck, 1972). The first method developed to measure function psychoses was published by F. Böcker (see Wieck, 1977a). This syndrome text examines psychic functions and functional systems such as memory and sense perception in 13 efficiency subtests. It was standardized

on persons with and without function psychosis. The test's range reaches from full alertness to mild clouding of consciousness, while more accurate results can be expected in mild to severe transit syndrome.

To be more exact and reliable, my coworkers have developed and extended Böcker's work :

TABLE III

Psychopathometric Tests for Function Psychoses

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1. Transit Syndrome Test after **H. Erzigkeit** TST (1977)
 2. Orientation Scale after **K.F. Druschky** OS (in : Erzigkeit, 1978)
 3. Function-Psychosis-Scale-B after **S. Lehrl** FPSB (1977)
Munich Coma Scale after **R. Brinkmann** et al. MCS (1976)
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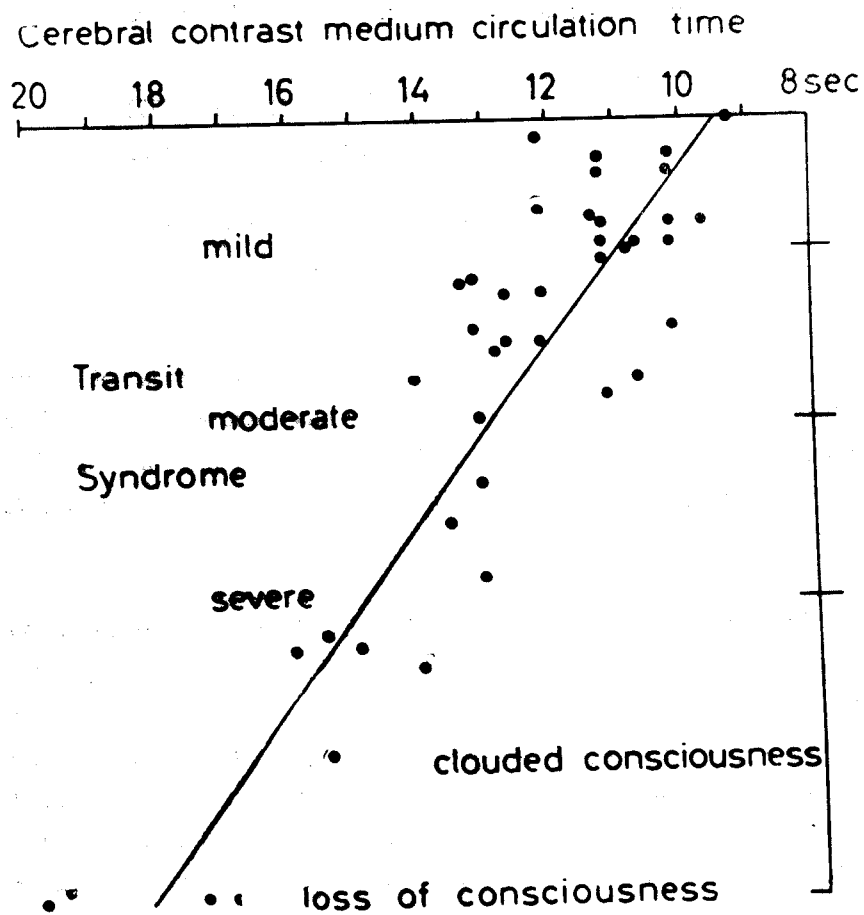
1. **The Transit Syndrome Test (TST)** measures decrease of attentiveness and memory function. It contains ~~nine~~ **nine** subtests each of which should be solved within one minute. Hence the time taken for instruction, carrying out the test, and registration of results does not exceed ten to fifteen minutes.

In **subtest one**, twelve pictures of items of everyday use are to be named as quickly as possible. The pictures are then covered and the patient is asked to recall the items he can remember (**subtest 2**). In **subtest 3** the supervisor presents a magnetic plate with small movable blocks on it. Each of these blocks bears a two-digit number which must be read as quickly as possible. The patient is then requested to arrange the blocks in arithmetical order (**subtest 4**). Finally he must put them back in their original places, which are marked accordingly (**subtest 5**). Most of the test items are approved in psychology and psychiatry. The main objective was to construct the subtests in such a manner that ~~as~~ **as** most justice is granted the patient in his extraordinary situation.

Further on, a higher reliability was obtained in standardizing by checking variables like age and intelligence, which we believe are extremely important.

The score on every subtest is inserted into a standard schedule and the respective measurable points are added to the overall points. The severity of the function psychosis can be associated with the total score.

(Figure II)



2. **The Orientation Scale (OS)**: Another approach in testing for function psychoses was introduced by **K.-F. Drunchky**, who developed an orientation scale which questions orientation to time, place, and person in hospitalized patients.

3. **Function-Psychosis-Scale-B** : This scale consists of 33 items. It assesses function psychotic patients and covers all states of disturbance from the verge of normality to the loss of consciousness and the neurological coma symptomatic. FPSB inclusively detects disturbances of reflexes and pupil abnormalities. It is used mainly for measuring the severe transit syndrome up to unconsciousness. As patients in this state are mostly hospitalized, this test is meant for clinical use. The supervisor must rate the 33 items as "solved" or "unsolved". The tasks are arranged in order of difficulty and are one-dimensional according to the model of a **Guttman-scale**. Similar test such as the "Mental Status Questionnaire" by **E. Pfeiffer** (1975) have recently been published in the USA. It seems to cover moderate to severe grades of function psychoses.

The first six subtests serve for testing reflexes and registration of pupil dialation. The following 27 items contain requests and such as "Draw a circle in the air!", "How old are you?", "What's the season, spring, summer, fall or winter?", "Which month is it now?" and "Which ward are you in?"

As the tests are strictly arranged in order of difficulty and their single dimension has been proved, the FPSB may be taken before items in which a solution by the patient is not expected. If he fails seven succeeding items, the tester may stop the procedure. For this reason the test very often does not last longer than two or three minutes. So far there has been no significant systematic learning effect on repetition.

Procedure and analysis of the TST, the OS or the FPSB can be learned quickly. They can also be conducted by relatively inexperienced supervisors.

The standard norms are not to be compared with percentage figures. This means, for example, that from a score of 50 points it is incorrect to infer that the subject is in possession of only 50% of his original mental efficiency. The main reason for the introduction of this scale is its practicability. The same reasons probably led Endicott et. al. (1976) to develop a Global Assessment Scale for the extent of general psychotic disturbances, the norms of which range from 1 to 100.

The psychopathometric examination demonstrates in the best way the course and severity of cerebral dysfunction. As FPSB and TST are standardized on the same norms, and no remarkable learning effects in repetition have occurred, the same scale of points can be used for both tests.

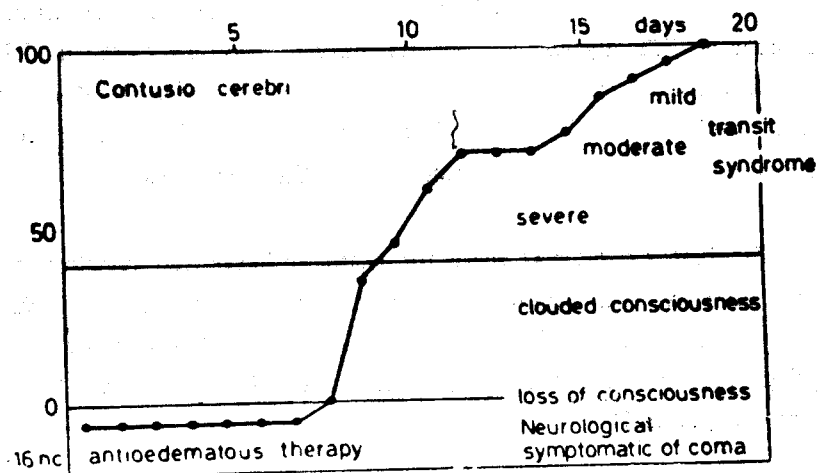


Figure 3 shows the course of function psychosis of a patient suffering by a contusio cerebri.

From the function psychosis curve one can deduce important facts at a glance, as from pulse and temperature curves.

IV. Significant Correlations between Somatic and Psychopathometric Variables

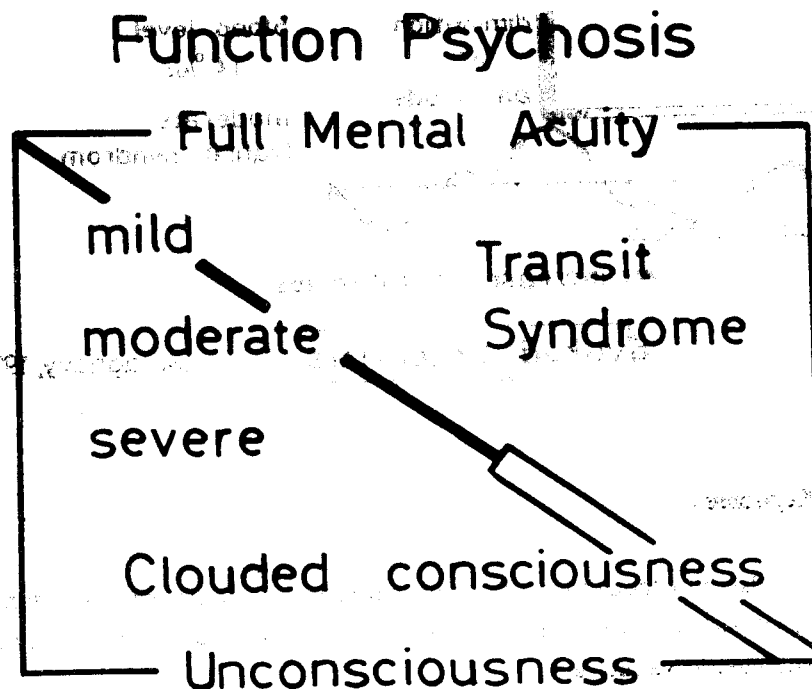
Concerning the almost unlimited range of variation in etiopathogenic cerebral processes, there are only a few somatic variables which can be measured :

The level of barbiturate in serum, the level of alcohol in serum, cerebral hypoxidosis (blood flow).

We have examined 150 patients who attempted suicide with an overdose of barbiturates with psychopathometric tests during the course of intoxication. In the course of elimination of the drug, corresponding serum levels of barbiturate could be matched with the results of the psychopathometric tests. We found a high significance in the correlation between somatic and psychopathometric variables.

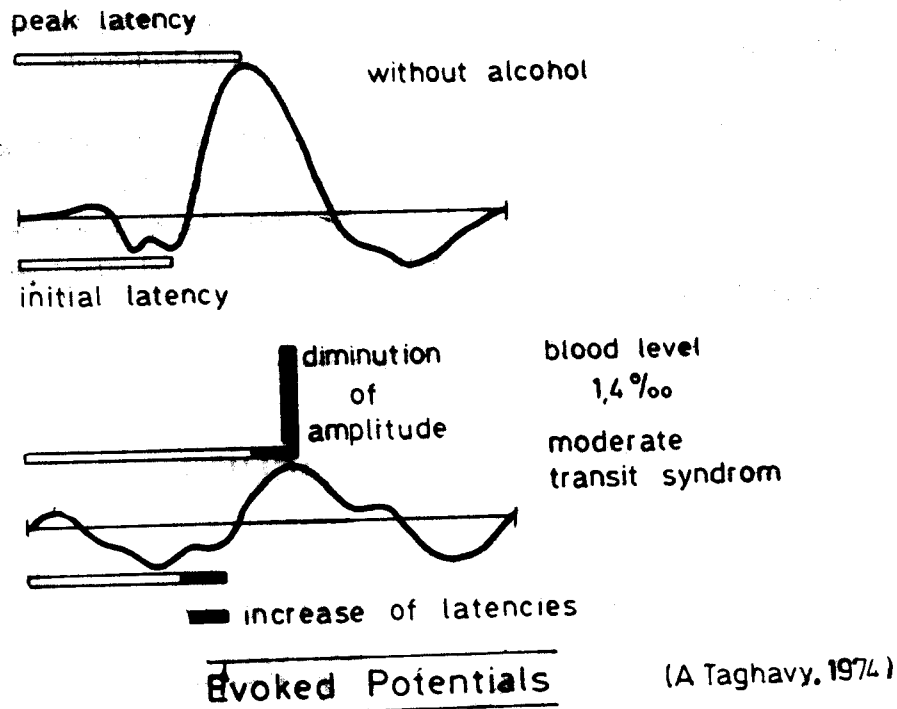
We could demonstrate, that the improvement of psychic function, such as reaction time and memory functions, sensory perception and mental faculties corresponded to the increasing level of barbiturate.

My coworkers have also investigated the influence of alcohol on reaction time, quantified EEG, evoked potentials and function psychoses (Flügel, 1974; Taghawy, 194). On the first day subjects were tested without alcohol; on the second day the tests were repeated after ingestion of alcohol.



It could be demonstrated that even in mild and moderate transit syndrome initial and peak latency of the visual evoked potential are increased. At the highest level of serum alcohol correlations of the variables are significant on the 1% niveau.

Our investigations have also demonstrated that the degree of function psychoses caused by intracranial space-occupying processes depends on the decrease of blood flow and therefore on the degree of hypoxidosis.



Keywords :

Psychopathometry — function psychosis — transit syndrome test — Function-Psychosis-Scale-B — correlations between somatic and psychopathometric variables.

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الموجز

الجوانب الكمية للأمراض العضوية المخية

ذهان الوظيفة هو أكثر الاستجابات المخية تواترا نتيجة لشتى الاضطرابات التي تحدث في الممارسة العامة أو في المستشفيات ، ويعرض هذا البحث نظاما كاملا للاختبارات لقياس درجات شدة ذهان الوظيفة ، ومن الممكن أن نتتبع مسلك ذهان الوظيفة على خط بياني مماثل للخطوط البيانية للنهض ودرجة الحرارة ، كما أمكننا أن نبين أن هناك علاقة ذات دلالة بين المتغيرات الجسمية والمتغيرات السيكوباتومتريّة .

ABSTRAIT

Les aspects quantitatifs des maladies organiques du cerveau

La psychose de fonction est la réaction du cerveau la plus fréquemment observée à la suite d'un dérangement, dans la pratique générale ou dans les hôpitaux.

Un système complet de test est présenté pour mesurer les grades de sévérité des psychoses de fonction.

Il est possible de tracer le cours de la psychose de fonction sur une courbe similaire à celle du pouls et de la température.

Nous avons pu démontrer une corrélation significative entre les variantes somatiques et psychopathométriques.

N.B. Fonction : Processus d'activité et d'expérience psychique.