

# Kurt Goldstein's innovative approach of neuropsychological assessment

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## Abstract

When Kurt Goldstein was asked in 1916 to set up and organize a rehabilitation clinic for brain-injured soldiers in Frankfurt am Main, he developed his full talent as a clinical neurologist with a great interest in his patients and the philosophical and psychological background of his work. This project stimulated him to introduce significant innovations in all aspects of his work. In this essay, I will highlight several of these, in particular with respect to the assessment procedures he developed together with the psychologist Adh mar Gelb. Goldstein developed a neuropsychological test battery, used for screening various cognitive domains and motor functioning. The screening battery was also designed for providing suggestion for areas of rehabilitation. Moreover, Goldstein already distinguished between laboratory tests and ›ecologically valid‹ procedures, for which he used the terms ›lebensfremd‹ and ›lebenswahr‹. He emphasized that one should observe how a patient performs a task, rather than rely on objective scores. Finally, the Wisconsin Card Sorting Test is derived from the sorting tasks Goldstein and Gelb used to analyze the concrete and abstract attitude of patients. This all happened long before neuropsychological assessment became fashionable in the 1960's illustrating that Goldstein clearly was a significant innovator in the area of neuropsychological assessment.

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## Goldstein's rehabilitation clinic

Kurt Goldstein (1878–1965) received his neurological and psychiatric training to a large extent from Carl Wernicke (1848–1905) in Breslau. Here he learned that brain-injured patients may suffer from isolated cognitive deficits and a variety of simple tests, that we currently would regard as neuropsychological tests, was required to unravel the basic deficit. In 1914 Goldstein went, for the second time, to the *Senkenbergische Neurologische Institut* in Frankfurt am Main, where he became assistant to Ludwig Edinger (1855–1918). During the ›Great War‹, it was decided that specialized centers were needed for the treatment of soldiers with brain injuries, away from the battlefield. Edinger's neurological clinic was chosen as one of these centers and Goldstein was offered in 1916 the chance to develop this specialized rehabilitation center and thus founded the ›*Institut f r die Erforschung der Folgeerscheinungen von Hirnverletzungen*‹ (Institute for the study of aftereffects of brain lesions), a clinic with 100 beds. The Villa Sommerhof was used for this purpose, with several buildings in the park used for psychological assessment, and for different types of therapeutical activities such as carpentry, bookbinding, production of brooms, shoes and small leather objects such as bags and wallets (for a detailed description, [13]).

## Assessment

Goldstein developed a screening battery together with the psychologist Adh mar Gelb (1887–1935), head of the psychological laboratory in the institute (Fig. 1). Unfortunately, we do not know very much about him, but the two worked closely together and Gelb was a first author on some of the publications resulting from the studies on the patients from the clinic [4]. Immediately after the war, Goldstein described the battery in a book, titled ›*Die Behandlung, F rsorge und der Begutachtung*



Fig. 1: Goldstein and Gelb

der Hirnverletzten« (The care for treatment and assessment of brain injured patients). Goldstein [12] wrote an adapted English version for his English colleagues during World War II, titled »*Aftereffects of Brain Injuries in War. Their Evaluation and Treatment; The Applications of Psychologic Methods in the Clinic*« (see for a detailed discussion of this book, Eling, 2015).

The battery was designed both for screening for deficits and for exploring opportunities for rehabilitation, as Goldstein was well aware that his patients often would not be able to return to their original positions and needed to earn an income with their remaining possibilities. The assessment consisted of a general and a special examination. The screening battery was used for the general examination, in particular of cognitive functions. It consisted of experimental psychological laboratory tests (e.g., tachistoscopic visual perception tests, naming tests) and what Goldstein called performance capacity tests (*Leistungsfähigkeit*). In case of distinct disorders in the areas of oral language, reading, writing or arithmetic, an additional special assessment was performed. An explicit protocol was used for the way tests were used and with instructions for patients; it can be found in Goldstein's book. The battery covered the following domains: 1) Orientation, 2) Attention, 3) Language (production), 4) Reading, 5) Writing, 6) Tactile recognition, 7) Comprehension, 8) Praxis, 9) Description of objects from memory, 10) Association test, 11) Construction and drawing tests, 12) Memory, 13) Higher intellectual functional processes, and 14) Fatigue.

### Lebensfremd and Lebenswahr

Goldstein argued that laboratory tests may be sensitive to specific cognitive disturbances, but at the same time they may not be good for predicting how well a patient may perform in daily life. In order to perform daily life activities, a person may use various strategies and the capacity to deal with deficits by adapting one's strategy may not be revealed adequately by these laboratory tests. Goldstein therefore introduced some tests that he considered to be »*lebenswahr*«: these tests resembled, in some aspects, daily life activities such as working in an office in which one has to operate instruments like a telephone. Goldstein discussed various arguments in favor and against both types of tests and relied on both for the definitive assessment. Tests used in the battery were also offered to patients to practice during the rehabilitation period in the clinic (see also [3]).

### Evaluation

When Goldstein and Gelb developed their test battery, the field of psychometrics had not yet been developed. There were no formal procedures for investigating validity, reliability or for producing norm tables. Clinical

neurologists to a large extent relied on their observations rather than on strict objective measurements. However, there was yet another reason why Goldstein emphasized in his book to use clinical observations. This is also related to the issue of strategies mentioned above. Goldstein was aware that a test score could not reveal how a patient had attempted to perform a given task. An impaired performance might be the result of various deficits in processes required for a given task. One subject may limit himself to a specific strategy, another patient may look for a way to compensate for a deficit. Therefore, clinical observations during test performance are more valuable than simple scores. The necessity to report in an »objective« manner in the scientific literature has resulted in a reliance on scores and norm tables, but it is obvious that neuropsychological assessment may profit a great deal from clinical observations, even though they are not accepted in general in the scientific literature.

### Abstract and concrete attitude

The insight that it is important to examine closely the way a patient performs a specific task finally was a main cause for Goldstein to adapt his basic philosophy, to reject the classical localizationist approach and to develop the concept of concrete and abstract attitude. These ideas slowly developed over the years following the war [8, 9, 10, 11]. Goldstein kept treating patients from the clinic, sometimes for over ten years. Together with Gelb he performed several in depth case studies and these were reported in a book, »*Psychologische Analyse hirnpathologischer Fälle*« [4], which contains 16 studies, mostly dealing with perceptual problems. Among them is the study on patient Th., in which sorting tasks were used. Sorting tasks had originally been developed by the German psychologist Narziss Ach, (1871–1946), a student of Oswald Külpe (1862–1915). The task was used to demonstrate that perception is not only a bottom-up process but may be influenced by top-down processes, expectations or instructions. It was essentially a demonstration that one could examine thinking in an experimental way, in contrast to the claim of Wundt [2]. Applying these sorting tasks to patient Th. and other patients, Goldstein and Gelb noticed that the patient appeared to have problems to abstract from concrete features and to sort items according to an abstract label, for instance, all red objects independent of shape or size. With Martin Scheerer (1900–1961), originally a German psychologist who fled to the United States before World War II, Goldstein described various sorting tasks [6]. This publication was a starting point for the American psychologist Harry Harlow (1905–1981) and David Grant (1916–1977) to ask Esther Berg to write a master thesis on a variation of these sorting tasks, which became later, in particular to the studies of Brenda Milner on patients

with frontal lobe lesions, known as the Wisconsin Card Sorting Test [2].

### Innovator

Every domain in science has its icons, scientists that produce new ideas and new methods, that influence the thinking and working of scientists in that domain to a large degree. In the area we have such icons as well, for instance, Henri Hecaen, Alexander Luria, Hans Lukas Teuber, Norman Geschwind and Arthur Benton. In fact, Teuber [16] and Luria [14] praised Goldstein after he had died in 1965. For some people this might have come as a surprise at that time. After all, Goldstein had left Europe in the thirties. Moreover, his opposition to the localizationist approach and his emphasis on observation contrasted with the new belief in splitting up the mind in cognitive modules by looking for dissociations with decent experimental procedures [see also 1, 15]. Indeed, Benton [1] did not select him among the group of four pioneers. However, looking back at the valuable insights Goldstein had derived from his extensive experience and his unorthodoxy in thinking about the issues involved in human behavior, it is easy to see why he was, and still is one of the icons in neuropsychology (see also [5]).

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### Interessenvermerk

There is no conflict of interests.

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