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Historical paper

Kurt Goldstein's test battery

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ABSTRACT

Kurt Goldstein was a founder of clinical neuropsychology. This thesis is illustrated with a description of Goldstein's test battery that he used as a screening instrument in a special clinic for soldiers in World War I. Parts of the battery were also used for neuropsychological rehabilitation. Goldstein's early work in Germany focused on both neuropsychological assessment and rehabilitation. He was interested in how individuals go about compensating for their deficits, The notion of ecological validity (*Lebenswahr vs Lebensfremd*), only becoming widely popular in the nineteen-eighties, played an important role in Goldstein's selection of test procedures.

1. Early roots of neuropsychology

For centuries, scientists have described and analyzed the effects of brain injuries. From the beginning of the 19th century it was a crucial and heavily debated topic in the medical literature. Franz Joseph Gall (1758–1828), Paul Broca (1824–1880) and Carl Wernicke (1848–1905) played a central role in the debate on localization of psychological functions in the brain. This discussion may be regarded as the beginning of neuropsychology and the protagonists as the pioneers; neuropsychological text books usually take the 19th century history as a starting point (e.g., Heilman & Valenstein, 2003). In essence, this discussion on localization of function is about the relationship between behavior and the brain that is currently the central theme of research performed in the area of cognitive neuroscience. Clinical neuropsychology, as an independent discipline, is generally assumed to have started in the period around 1960–1970 (Benton, 1988; Meier, 1992). Benton (1994) described four pioneers: Henri Hécaen (1912–1983), Oliver Zangwill (1913–1987), Hans Lukas Teuber (1916–1977) and Norman Geschwind (1926–1984), with a further prominent figure in clinical neuropsychology being Alexander Luria (1902–1977). Interestingly, many (not to say most) pioneering neuropsychologists had a medical background, as was the case for Hécaen and Geschwind.

The number of neuropsychologists has grown considerably over the years and they are active in many areas of healthcare. They apply the theoretical framework inherited from the aforementioned 19th century developments in the study of the cognitive effects of brain disorders. They also use many neuropsychological tests that were developed decades ago.

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Arthur Benton contributed significantly to this area with his tests in the area of visuospatial processing (Benton, Hamsher, Varney, & Spreen, 1983). Barr (2008) described the historical development of neuropsychological assessment, with an emphasis on test batteries developed by Ward Halstead and Alexander Luria. He also mentioned individual tests such as the Rorschach test and the Thematic Apperception Test. Evidently, then, Barr's focus was oriented primarily to the United States, thus missing developments of mental testing in the 19th century and around 1900 in Germany (Bondy, 1974). For instance, the Wisconsin Card Sorting test can be traced back to an experimental paradigm used by Ach in 1904 to study concept formation and it was adapted for clinical assessment by Gelb and Goodglass in (Eling, Derckx, & Maes, 2004). A further example is Ziehen's (1908) description of a test battery, presumably used for examining cognition. Some of the tests of this battery resemble those that are still widely used in clinical neuropsychology, for instance the Digits Forward and Backward, the Rey Auditory Verbal Learning test for memory recall and the subtest Similarities of the Wechsler Adult Intelligence Scale. These examples are a clear indication that some current neuropsychological tests have their roots in a rather distant past. To gain better insight into these roots and the original purpose of these instruments, it is important to study the history of the discipline and more particularly the role of their founders. Kurt Goldstein was one of the founders of this discipline and his work has been essential for the field of cognitive rehabilitation, the use of screening tests and the promotion of the notion of ecological validity as I will argue below. After a brief biography, the significance of Goldstein for clinical neuropsychology is illustrated by focusing on his activities in World War I. I will discuss specifically the test battery that he, along with Adhémar Gelb (1887–1935), developed to examine and treat the effects of brain injury, mostly gunshot wounds, with soldiers. Parts of this battery were also used for rehabilitation. I will not elaborate on more theoretical issues such as Goldstein's views on language and aphasia (de Bleser, 1994; Friedrich, 2006; Geschwind, 1964; Goldstein, 1948, 1926a; Noppeney & Wallesch, 2000), his objections to localization (Goldstein, 1927), his notion of concrete and abstract attitude (see Gurwitsch, 1966) and his holistic vision (Goldstein, 1934; see also Ludwig, 2012; Noppeney, 2001). For a discussion on Goldstein's view on rehabilitation see Frommer and Smith (1988) and Ben-Yishay and Diller (2011).

2. Short biography

Kurt Goldstein (1878–1965) is probably familiar to most neuropsychologists. In neuropsychological textbooks, he is mostly depicted as one of the opponents of the 19th century idea of localization and a supporter of a holistic approach (e.g., Ben-Yishay & Diller, 2011). Through his work with brain injury patients he developed a vision on the behavior of these people that was very different from what he had learned from his teacher Carl Wernicke. It also changed his views on how one should investigate human behavior, both in neurological and psychiatric patients. His views fitted in a broader cultural development, especially in Germany, where the Gestalt psychology of Max Wertheim (1880–1943), Kurt Koffka (1886–1941) and Wolfgang Köhler (1887–1967) and the personalistic psychology of William Stern (1871–1938) rebelled against the analytical approach of Wilhelm Wundt (1832–1920). Goldstein's work had a significant impact on the emergence of humanistic psychology in America.

Much has been written about Kurt Goldstein, including by himself (Goldstein 1967). There are several biographies, many of which seem to be based on that of Shakow (1966; for more details see Simmel, 1968; Eling, 2012). I restrict myself here to a brief sketch. Goldstein was born in 1878 in Katowice in southern Poland. He studied medicine in Breslau, specialized in neurology and psychiatry under Carl Wernicke and became a physician in 1903. Subsequently he became an assistant to Ludwig Edinger (1855–1918) in the *Senkenbergische Neurologisches Institut* in Frankfurt. Edinger was the leading comparative anatomist at that time and head of the neurological clinic. Goldstein considered him, besides Wernicke, as his main teacher. From 1906 to 1914 Goldstein worked in the psychiatric clinic in Königsberg (now Kaliningrad, Russia). He returned to Frankfurt, where Edinger gave him the opportunity to become director of the newly founded *Institut für die Erforschung der Folgeerscheinungen von Hirnverletzungen* (Institute for the study of aftereffects of brain lesions), a special clinic for soldiers with brain damage (see Kreft, 2005). When Edinger died in 1918, Goldstein took over his chair. In 1930 he accepted a professorship in Berlin (see also Holdorff, 2004) but because of the rising Hitler regime, he had to leave, as did many other Jewish scientists, including the aforementioned Gestalt psychologists. He spent a brief period in Amsterdam, where he put his holistic vision on paper in six weeks (Goldstein, 1934). He then emigrated to the United States with support from the Rockefeller Foundation, which played an important role in the emigration of German Jews. There he received an appointment as Professor of Neurology at Columbia University and later at Tufts Medical School. He remained active after his retirement and has written more than 200 articles and books that, at that time, were popular among the many adherents of a holistic and humanistic psychology. In August 1965 he suffered a cerebral hemorrhage and died on 19 September of that year in New York City.

Goldstein was trained as a medical doctor and specialized in psychiatry and neurology. Driven by his experiences in the clinic, he paid special attention to the more personal matters of patients with brain injury. This interest in the psychological component was important for him and characteristic of his work. His interest in psychology is illustrated by the fact that in 1922 he was one of the founders - and long time editor – of the journal *Psychologische Forschung* (Psychological Research), then popular among Gestalt psychologists.

3. Neuropsychological rehabilitation in Germany

In the 19th century, many 'neuropsychological' articles dealt with quite specific cognitive deficits. In general, patients stayed in hospitals or psychiatric institutions: neurological clinics did not exist. But the situation changed significantly through the work of Walther Poppelreuter (1886–1939) and Kurt Goldstein (Poser, Kohler, & Schoenle, 1996). During World War I large