The Emergence of German Experimental Psychology

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Until the middle of the 19th century, psychology was widely regarded as a branch of philosophy. For instance, Immanuel Kant (1724-1804) declared in his Metaphysical Foundations of Natural Science (1786) that psychology cannot be made into a "proper" science because its phenomena cannot be rendered in mathematical form, among other reasons. However, Kant proposed what looks to modern eyes very much like an empirical psychology in his Anthropology from a Pragmatic Point of View (1798).

Johann Friedrich Herbart (1776-1841) took issue with Kant's conclusion and attempted to develop a mathematical basis for a scientific psychology. Although he was unable to empirically realize the terms of his psychological theory, his efforts did lead scientists such as Ernst Heinrich Weber (1795-1878) and Gustav Theodor Fechner (1801-1887) to attempt to measure the mathematical relationships between the physical magnitudes of external stimuli and the psychological intensities of the resulting sensations. Fechner (1860) is the originator of the term psychophysics. Meanwhile, individual differences in reaction time had become a critical issue in the field of astronomy, under the name of the "personal equation". Early researches by Friedrich Wilhelm Bessel (1784-1846) in Königsberg and Adolf Hirsch led to the development of a highly precise chronoscope by Mathias Hipp that, in turn, was based on a design by Charles Wheatstone for a device that measured the speed of artillery shells (Edgell & Symes, 1906). Other timing instruments were borrowed from physiology (e.g., the kymograph) and adapted for use by the Utrecht ophthalmologist Franciscus Donders (1818-1899) and his student Johan Jacob de Jaager in measuring the duration of simple mental decisions.

The 19th century was also the period in which physiology, including neurophysiology, professionalized and saw some of its most significant discoveries. Among its leaders were Charles Bell (1774-1843) and François Magendie (1783-1855) who independently discovered the distinction between sensory and motor nerves in the spinal column, Johannes Müller (1801-1855) who proposed the doctrine of specific nerve energies, Emil du Bois-Reymond (1818-1896) who studied the electrical basis of muscle contraction, Pierre Paul Broca (1824-1880) and Carl Wernicke (1848-1905) who identified areas of the brain responsible for different aspects of language, as well as Gustav Fritsch (1837-1927), Eduard Hitzig (1839-1907), and David Ferrier (1843-1924) who localized sensory and motor areas of the brain. One of the principal founders of experimental physiology, Hermann von Helmholtz (1821-1894), conducted studies of a wide range of topics that would later be of interest to psychologists - the speed of neural transmission, the natures of sound and color, and of our perceptions of them, etc. In the 1860s, while he held a position in Heidelberg, Helmholtz engaged as an assistant a young M.D. named Wilhelm Wundt. Wundt employed the equipment of the physiology laboratory - chronoscope, kymograph, and various peripheral devices - to address more complicated psychological questions than had not, until then, been investigated experimentally. In particular he was interested in the nature of apperception - the point at which a perception occupies the central focus of conscious awareness.

In 1874 Wundt took up a professorship in Zürich, where he published his landmark textbook, Grundzüge der physiologischen Psychologie (Principles of Physiological Psychology, 1874). Moving to a more prestigious professorship in Leipzig in 1875, Wundt founded a laboratory specifically dedicated to original research in experimental psychology in 1879, the first laboratory of its kind in the world. In 1883, he launched a journal in which to publish the results of his, and his students', research, Philosophische Studien (Philosophical Studies) (For more on Wundt, see, e.g., Bringmann & Tweney, 1980; Rieber & Robinson, 2001). Wundt attracted a large number of students not only from Germany, but also from abroad. Among his most influential American students were G. Stanley Hall (who had already obtained a PhD from Harvard under the supervision of William James), James McKeen Cattell (who was Wundt's first assistant), and Frank Angell. The most influential British student was Edward Bradford Titchener (who later became professor at Cornell). Experimental psychology laboratories were soon also established at Berlin by Carl Stumpf (1848-1936) and at Göttingen by Georg Elias Müller (1850-1934). Another major German experimental psychologist of the era, though he did not direct his own research institute, was Hermann Ebbinghaus (1850-1909).

Experimentation was not the only approach to psychology in the German-speaking world at this time. Starting in the 1890s, employing the case study technique, the Viennese physician Sigmund Freud developed and applied the methods of hypnosis, free association, and dream interpretation to reveal putatively unconscious beliefs and desires that he argued were the underlying causes of his patients' "hysteria." He dubbed this approach psychoanalysis. Freudian psychoanalysis is particularly notable for the emphasis it places on the course of an individual's sexual development in pathogenesis. Psychoanalytic concepts have had a strong and lasting influence on Western culture, particularly on the arts. Although its scientific contribution is still a matter of debate, both Freudian and Jungian psychology revealed the existence of compartmentalized thinking, in which some behavior and thoughts are hidden from consciousness - yet operative as part of the complete personality. Hidden agendas, a bad conscience, or a sense of guilt, are examples of the existence of mental processes in which the individual is not conscious, through choice or lack of understanding, of some aspects of their personality and subsequent behavior.
Psychoanalysis examines mental processes which affect the ego. An understanding of these theoretically allows the individual greater choice and consciousness with a healing effect in neurosis and occasionally in psychosis, both of which Richard von Krafft-Ebing defined as "diseases of the personality". Carl G. Jung was an associate of Freud's who later broke with him over Freud's emphasis on sexuality. Working with concepts of the unconscious first noted during the 1800s (by John Stuart Mill, Krafft-Ebing, Pierre Janet, Théodore Flournoy and others), Jung defined four mental functions, which relate to and define the ego, the conscious self. Sensation (which tell consciousness that something is there), feelings (which consist of value judgments, and motivate our reaction to what we have sensed), intellect (an analytic function that compares this event to all known events and gives it a class and category, allowing us to understand a situation within a historical process, personal or public), and intuition (a mental function with access to deep

behavioral patterns, intuition can suggest unexpected solutions or predict unforeseen consequences, "as if seeing around corners" as Jung put it). Jung insisted on an empirical psychology in which theories must be based on facts and not on the psychologist's projections or expectations.