Wilhelm Wundt's epistemology and methodology –

A re-construction of his theory of science in psychology

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Abstract: Wilhelm Wundt developed his theory of science in psychology – the first of its kind – based on the broad scope of his neurophysiological, psychological and philosophical works. He postulated the notion of consciousness as a process of experience and disregarded the metaphysical meaning of the soul. As thinking and intentional subjects, individuals cannot be understood using the tools of the natural sciences alone; psychology requires specific categories and epistemological principles of its own. Psychology is an empirical Geisteswissenschaft but it should not disregard underlying physiology. Wundt's approach is one of perspectivism, in which he appeals for a "complementary" style of thought that applies diverse frames of reference and an appropriate choice of methods. Psychology must stay in close touch with philosophy in order to foster the epistemological critique of the metaphysical assumptions that are widely present in psychological thought.
The attempted re-construction of Wundt's theory of science is part of a reception and impact analysis presented here in a condensed form. A set of hypotheses is deduced on the basis of about 200 contemporary and recent reviews as well as other sources as to why the founding father Wundt almost almost became excluded from mainstream psychological thought.

The investigation of how Wundt's work was received in contemporary and today's psychology led to the central hypotheses that his original theory of science in psychology was not well understood and still is widely unknown. The following outline of the epistemological and methodological principles makes use of more up-to-date terminology to explain Wundt's perspectivism (Fahrenberg, 2011). Wundt's theory of science in psychology is sketched out in many of his articles and relevant books chapters. The general starting position and orientation of his thoughts is of course his own academic training and teaching. He studied medicine, practiced as a hospital physician, and went on to give courses in physiology for medical students of the Hermann von Helmholtz laboratory in Heidelberg. Owing to his academic education and assistance to Helmholtz he was inclined to understand science as a nomological project in search of general laws ("Gesetz"). He often used the words *law* and *exact* in his psychological writings. But as his horizon widened and his episte-

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mology of natural and of mental sciences emerged, he often preferred to use the term lawfulness ("Gesetzlichkeit") so as to indicate that exceptions, singularities and creative syntheses may typically occur in the mental sciences in contradistinction to the natural sciences. His methodological horizon gradually widened to include the traditional hermeneutics stemming from proponents of Geisteswissenschaften, such as Friedrich Schleiermacher and August Boeckh, which however were transformed by Wundt to a psychologically grounded and critical method of interpretation. – Wundt was obviously concerned with the scientific standard of the psychological research of his time, and his comments and general attitude, for example, in a methodological controversy with Karl Buehler was shaped by long-standing research in physiology and his nomological orientation. Wundt provided (1907, 1921) a definition of psychological experiments, which was often cited later, and authored the first treatise on interpretation methods in psychology.

Psychology at that time was more a matter of curiosity than a deliberate multi-facetted endeavor, and it certainly was not an academic discipline. Wundt thus set out to give the discipline the necessary definition that it hitherto lacked. He considered lines of delineation and proposed these along his emerging philosophy of science, especially his notion of the whole (inner and outer) experience ("critical realism") and his notion of psychophysical parallelism (1894a, 1896, 1896-1898, 1904). Wundt, like Kant, rejects any attempt to give empirical psychology a foundation based on a metaphysical concept of the soul. He describes consciousness as a process and is strongly opposed to the still very influential position of Johann Friedrich Herbart that psychology be basically conceived of as an intellectual, cognitive and mathematically psychology. On the contrary, Wundt claimed that cognitive and emotional as well as volitional functions should be understood as equally important aspects of a unitary and psychophysical process.

Psychology cannot be reduced to physiology. Such an endeavor would be in vain "…because this would encounter relationships between psychic processes that are beyond comprehension even when the relationships between neural processes could be seen as clearly as the mechanisms of a fob watch" (Wundt, 1902-1903, III, S. 777; translation J.F.). In contrast to an enduring popular stereotype, Wundt did not postulate that psychology is a natural science. Psychologists should, of course, acknowledge and learn from the methodological advances in the natural sciences, but the two following disciplines should support general psychology"…the developmental history of the soul and the comparative psychology" (Wundt, 1862, p. XIV; translation J.F.). Thus, at the very beginning of his modern psychology, cultural psychology (i.e., Voelkerpsychologie) was the leading idea behind his work toward achieving a comprehensive psychological theory of mental development, that is, an understanding of mental development from animal psychology through to cultural achievement in language, mythos, religion and morality.

An adequate definition of consciousness became an epistemic and a methodological matter. Without scientifically reliable methods, all attempts to achieve an accumulation of psychological knowledge would be in vain. He was thus strongly inclined to demand the inclusion of controls and training in methods and their critical application. Wundt's psychology is basically a psychology of consciousness. Like Helmholtz, he had initially speculated about unconscious aspects of the process of perception because, based on neurophysiology and perception research, he knew about automatic inferential processes. He revoked this use of the term "unconscious" in his *Grundzuege* (1874; cf. Araujo, 2011) and he became opposed to any suggestion that scientific psychology should investigate hypothetical unconscious processes or "the unconscious" as postulated by contemporary philosophers like Eduard von Hartmann and, later, Sigmund Freud. Wundt's reservation appears to stem primarily from methodological consideration. Since there is no direct access to unconscious functions and contents, a reliable assessment of these would presuppose that such covert processes are made conscious for the purposes of their inspection. Wundt also rejected phenomenological approaches by means of mere introspection and theoretical reasoning.

Wundt accepted the position of psychophysical parallelism, but only as a general heuristic principle. He underscored the point that "the phenomena being brought into correlation here" are absolutely incomparable (Wundt, 1902-1903, p. 769). Instead of simply stating this position as others had already done, he went on to build on the implications of this position and generated certain principles of knowledge specific to psychology ("Erkenntnisprinzipien") and a sophisticated methodology. Based on this theory of science, Wundt's psychology utilizes three frames of reference (see, Fahrenberg, 2011):

(1) The reference system of neurophysiology for neuronal processes;
(2) the reference system of general psychology of consciousness for the individual's conscious processes; and,
(3) the reference system of cultural psychology (Voelkerpsychologie) for the mental achievements ("objectivations") and social processes in the community.

Reference systems (1) and (2) are parallel and the processes are non-interactive while they require categorically different but complementary accounts. Processes described in reference system (2) and (3) interact and are alike with respect to basic categories.

Wundt integrated

– a methodological dualism, that is, psychology of conscious process versus neurophysiology;
– a multi-method approach; and,
– a unitary, monistic conception of life, evaluated from categorically distinct perspectives.

Wundt claims that "psychology is an empirical science coordinated with natural science, and that the perspectives of these two complement each other in the sense that they together exhaust the empirical knowledge available to us" (Wundt, 1896, p. 12; translation J.F.). Brain functions are to be explained by referring to their *natural* causality and mental processes are to be explained by referring to their *psychic* causality. In this respect, Wundt demanded psychological investigations that adhere to a co-ordinated use of causal *and* teleological explanations. Psychology requires special categories. He pointed out especially four such categories: subject, values, purpose, and will. The task of the Geisteswissenschaften (mental and social sciences) "always begins at the point where man as a willing and thinking subject is an essential factor of a given phenomenon" (Wundt, 1894b, p. 18, translation J.F.; see, Wundt, 1921, pp.13–20).

Psychology has hence to construct specific principles in order to assess the laws connecting conscious processes (parallel to natural causality in brain functions), that is, basic principles of the connecting of mental events that cannot be reduced any further (1921, pp. 240 ff). Wundt defined a set of guidelines including at least four principles to assess *psychic causality*: (1) Principle of Psychic Context, (2) Principle of increasing Contrast, (3) Principle of the "Heterogonie" of Purposes. Comparatively well known is his (4) Principle of Creative Synthesis: Perception is "never just the sum of sensations, but from their connection emerges something new with specific features not contained in the sensations" (Wundt, 1894a, p. 112; translation J.F.; cf. Wundt, 1963, I, p. 435 f; 1920a, p.183). Likewise this principle applies for feelings and volition and even more so for the higher mental functions, especially in language, fantasy, and other cultural achievements: the whole is richer than the sum of the parts. Wundt's stated this principle, now known as the principle of emergence in system theory, in the year 1863 – long before the Gestalt-psychologists.

The neurophysiologist Wundt regarded observation and the experiment as obvious exemplary methods. Wundt was highly critical of the widespread use of naive, spontaneous and untrained introspection. He could not accept such a subjective approach as a reliable scientific method, seeing in this instead a source of self-deception and an occasion for psychological speculation. In the place of naive introspection, he advocated that trained self-observation should take place under experimentally controlled, systematically varied, and replicable conditions (Wundt, 1874, 1907). However, the aim of perfect experimentation in psychology could be never attained because, unlike experimentation in the physical sciences, the observer and the observed phenomenon are not independent of each other.

Wundt's methodology was essentially influenced by Kant's rejection of research in psychology as an approach otherwise associated with physical science. Psychology could achieve the status of an *empirical* science but not the precision and mathematical constructions of physics. Kant refuted the assumption that conscious events could be measured. Outstanding was his short but decisive critique of the method of self-observation. His objections are still valid: method reactivity, observer bias, distorting effects due to the individual's habitual attitudes, and the questionable compliance of independently thinking subjects (Kant, 1786/1983, A pp. X-XI; 1798/1983, BA pp. X-XII).

Wundt (1874) in the introduction to his *Grundzuege* rejected Kant's critique in general terms, and set out to justify the experimental approach and to counter Kant's more specific arguments. Wundt agreed in principle that the quantification of conscious events contains a fundamental problem in that measurement presupposes the isolation of such events. Wundt pointed to the contemporary advances in psychophysics as brought about by Fechner and referred to encouraging findings of complex reaction time experiments to establish mental chronometry. Later on, he conceded that measurement and mathematics in psychology have narrow limits and are applicable when investigating very elementary processes only. He saw statistical methods as having very limited value, for example, in psychophysics or in population statistics. And, the forthcoming questionnaire method might, he suggested, have some benefit in social surveys, but, according to his judgment, was inadequate for use in other fields.

Wundt's methodology fits well with his epistemological framework and is many-sided. He refined especially two approaches: the experimental strategy of controlled self-observation and the content analysis, that is, comparison and interpretation of objective mental productions created in cultural systems. Wundt called for the use of a mainly inductive empirical approach and a pluralism of methods: trained self-observation in psychological experiments, chronometry of complex reaction times, observation of expressive behavior, psychophysiological and psychophysical methods, comparative strategies and critical interpretations ("qualitative methods").

Experimental psychology in Leipzig used mainly four types of methods: *Methods of Perception* (Eindrucksmethoden) to measure intensity of sensations in psychophysics; *Methods of Reaction* (Reaktionsmethoden) to measure simple and complex reaction times in research on attention and apperception (mental chronometry); *Methods of Expression* (Ausdrucksmethoden) making use of physiological measures in research on emotions; *Methods of Reproduction* in memory research (Wundt, 1902-1903; cf. Meischner-Metge, 2006; Wontorra, 2009). Only a small percentage of investigations conducted at the Institute in Leipzig used *only* self-observation in experimental settings. Wundt strongly disproved of psychological research based merely on naïve introspection and self-judgments, for example, to assess the mental process of thinking. Appropriate access to such higher functions could come above all from the psychology of language, fantasy, etc.. – Thus, Wundt made use of certain behavioral measures, that is, motor reactions and expressive behavior, but he did not apply the term *behavior* in the sense of the later behaviorism. He probably understood such simple motor effects primarily as physiological events (today: *behavior physiology*), except when concomitant conscious experiences prompted a psychological analysis as would be in line with his general epistemology.

Wundt advocated a pluralism of methods and did not ask for a fundamental choice to be made between experimental-statistical methods and comparative-interpretative methods. Chapters on language development or on fantasy in his *Voelkerpsychologie* contain findings from experimental psychology, some statistics, and psychophysiological findings relating to emotional components. He was competent in both the experimental and the interpretative paradigm and more so than anybody before him and probably since. Wundt did not exclude the brain and neurophysiology as can be seen in his continuing work toward the development of neuropsychological concepts of the fronto-cortical representation of attention control and apperceptive processes.

Given that Wundt developed special categories and epistemic principles of psychology rather than of neurophysiology, it would be reasonable - when applying these perspectives today - to choose the term *complementarity* instead of perspectivism: Two self-contained (reference) systems, distinct, not reducible to each other, but mutual in complementing each other and indispensable for understanding the whole. Niels Bohr pointed out that in physics light can be examined either as a wave or as corpuscular phenomenon. Both perspectives comprise physical categories and may be thus considered on the same categorical level. Both experimental set-ups are mutually exclusive but both are necessary to provide a complete physical theory of light. Bohr (1931, 1937) further suggested another application of this Complementarity Principle where categorical levels differ. One of his examples was the Mind-Body problem which refers to inter-categorical relations, that is, the distinct levels of psychology of consciousness and of neurophysiology (Fahrenberg, 1979; and recently, Hoche, 2008). Relational and contextual thinking (cf. Reich, 2002) is an outstanding feature of Wundt's work. Many misunderstandings are apparently due to reviewers and students alike being unwilling to follow his epistemic principles, apply perspective taking, and use the multi-method approach.

In his centennial lecture to commemorate Leibniz' death in 1717, Wundt (1917, p. 117; translation J.F.) portrayed Leibniz' style of discourse in a way that we might consider a suitable portrayal of Wundt himself:

> "… the principle of equal rights for mutual complementing points of view" plays an essential role in his reasoning, with perspectives which "complement each other, but at the same time appear in a contradiction that is only resolved when considered at greater depth."

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Note: The German editions are preferred when referring to Wundt's books and articles. English translations may contain many flaws, incorrect terms and other limitations, and some of his essential publications were never translated. A careful and comprehensive evaluation of Wundt's thoughts should be based therefore on the original publications.

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