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ANTHROPOLOGICAL TURN: A MISSED CHANCE FOR PSYCHOPHYSICS?

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Abstract

Psychophysics, studying law-like functional relations between the ‘mental’ and the ‘physical’, faces the problem of the foundation of the two domains. An interesting alternative to traditional approaches arose in philosophical biology and anthropology: namely, to consider the vital sphere of human being-in-the-world as a neutral domain, upon and out of which the psychophysical polarity is constituted. This ‘anthropological turn’ is here illustrated by works and thoughts of Viktor von Weizsäcker, German physician and philosopher, who also contributed to theoretical and experimental psychophysics. Although von Weizsäcker’s ideas had no influence on the mainstream of psychophysics, they are still of importance for a concept of integral psychophysical science.

Psychophysics, programmatically defined as a study of functional relations between physical and mental phenomena,¹ faces a problem of the origin and foundation of the distinction between the ‘mental’ and the ‘physical’. In Fechner’s ‘dual aspect’ view, the mental and the physical were two forms of appearance of a unitary reality, a notion revised and reinterpreted by his followers, especially E. Mach.² With the transformation of psychophysics from a stand-alone science to a subsidiary discipline of psychology or sensory physiology, these foundational questions were forgotten and disappeared from its agenda. Yet, the same questions and problems persist and reappear in biology, medicine, and anthropology. This was the starting point for an unorthodox approach to psychophysical issues in the work of German physician and philosopher, Viktor von Weizsäcker.

Biographical sketch³

Viktor von Weizsäcker (1886–1957) (Fig. 1a) studied medicine in Tübingen, Freiburg, Berlin and Heidelberg, began his research work in cardiovascular physiology, then moved to sensory physiology and pathophysiology. He held a personal chair of neurology at the University of Heidelberg (1930–41), a chair of neurology at the University of Breslau (1941–45), and then a chair of general and clinical medicine again at the University of Heidelberg (1946–52). On his intellectual path he was influenced by philosopher W. Windelband, physiologist J. von Kries, and physician L. Krehl, but also by Gestalt psychology, psychoanalysis, and existential philosophy.

VvW combined medical and physiological research with his broad interests in philosophy and theology; he is recognized as the founder of ‘medical anthropology’. He was a prolific writer; his *Collected Works* amount to ten volumes, covering a broad spectrum of topics from general and psychosomatic medicine, clinical neurology and neurophysiology up to philosophical, religious and ethical issues. A selection of the most important titles are: *Der Gestaltkreis* (1940); *Natur und Geist* (1944); *Begegnungen und Entscheidungen* (1949); *Psychosomatische Medizin* (1949); *Der kranke Mensch* (1950); *Pathosophie* (1956).

Theoretical biology: Gestaltkreis

Von Weizsäcker’s ‘Gestaltkreis’ theory asserts a unity of perception (*Wahrnehmung*) and movement (*Bewegung*) or, more generally, a unity of *perception and action*. The theory is motivated by

clinical observations of neurological patients: where a mechanistic doctrine seeks explanation of neurological symptoms in terms of ‘processing errors’ on neuronal stimulus–reaction pathways, clinical data instead reveal a ‘functional transformation’ (*Funktionswandel*) of sensorimotor acts in their entirety. Starting from these observations, VvW demonstrates in subtle phenomenological analyses the basic facts of sensorimotor functions. He points out the *coherence* between a subject’s acts and the perceived object, which goes beyond a merely co-ordination: it is truly an *entanglement* of the perceived and the perceiving subject, making perception of an object and action toward the object a unitary biological act. Therefore,

(1) [p]erception must not be conceived as a fabricated image, but rather as a dynamical activity, and (2) it is not a final product for the subject, but rather a process of encounter between the ‘I’ and the environment.⁴

It is the holistic and circular character of this subject–object entanglement for which VvW coined a new word, *Gestaltkreis* (Fig. 1b,c).⁵

In spite of its grounding in sensory (patho)physiology, *Gestaltkreis* is not merely a theory of sensorimotor ‘coordination’ in the sense of an interaction between two pre-existent neural subsystems. VvW aims at uncovering elementary facts and laws of lived experience, providing a basis for further analyses and interpretations of organismic functioning. Now, if an object essentially requires an encountering subject to be real, the concept of subject must be part of the theory; indeed, a declared purpose of VvW’s theory is “the introduction of the subject into biology” [19].⁶

The *Gestaltkreis* theory thus extends to a theory of the *unity of subject and object*. VvW emphasizes the dynamical character of this unity, which is permanently disturbed, endangered, and re-established. The notion of ‘stimulus’ has to be revised accordingly. Stimulus is not just something eliciting a sensory experience *or* a motor response; it is a disturbance or disruption of the *Gestaltkreis* unity that has to be restored in an adaptive response involving both sensory *and* motor components. The artificial distinction and separation between sensation/perception on the one hand, and motor activity on the other hand, thus must be abandoned: biological functions are understandable only as ‘forming factors’ (*Gestaltungen*) in the subject–object relation:

We replace the superficial dualism of substances, of psyche and physis, by a polarly bound unity of the subject and the object.⁷

Contributions to theoretical and experimental psychophysics

Psychophysics was only a temporary stance on von Weizsäcker’s way to a general biological theory of the *Gestaltkreis*. Nonetheless, in his later essay ‘On psychophysics’ [18] VvW focused on some central issues of psychophysical research and theory. Firstly, he criticizes the bias of traditional (Fechnerian) psychophysics toward sensation and perception:

If it was possible to measure sensation as a function of the stimulus, why not [measure] also volition as a function of movement? A psychophysics of voluntary movement would have been another half-part of the intended project. But, to my knowledge this has never been clearly seen as a possible task.⁸

VvW then reviews the lessons for psychophysics obtained from the study of altered sensorimotor functions in clinical neurology, and offers a revision of some key notions. Especially, he defines the psychophysical relation as “a restricted freedom of perception relatively to the object (stimulus),” a concept which is certainly broader than the classical notion of a ‘psychophysical law’. Finally, he discusses studies of kinæsthetic sensations (‘sense of effort’, *Kraftsinn*) and re-iterates the basic tenet of his *Gestaltkreis* theory: the entangled unity of perception and motor action.

Among VvW’s contributions to experimental psychophysics should be mentioned:

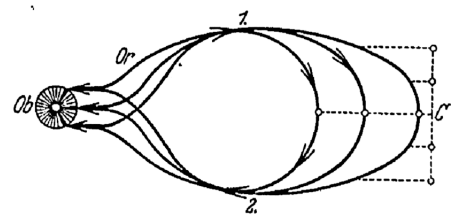
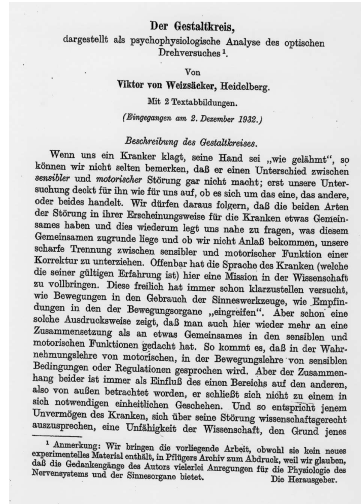


Abb. 2. Ob Objekt; Or Organ, peripheres; C Zentralorgan; 1. zentripetale Erregung; 2. zentrifugale Erregung.

Figure 1. (a) Viktor von Weizsäcker; (b) Title page of an early paper on the Gestaltkreis in Pflüger's Archives [15]; (c) Schematic representation of the Gestaltkreis process.

(1) Research on Fechner–Benham's ('entoptic' or 'polyphanic') colors observed on rotating sectorized disks. VvW and his coworkers examined the phenomenon under narrow band-filtered or truly monochromatic illumination [2]. Characteristically for VvW, the report amounts to a critical essay on physiological and physical theories of color and light.

(2) Research on perception of configurations of moving luminous points [3]. VvW pointed out the subjects' tendency to interpret the observed motions in terms of quasi-physical interactions, potential fields or forces, revealing an intrinsic "idealisation in perception" (*Idealität der Wahrnehmung*). This observation contributed to further development of the Gestaltkreis theory:

The perceptual act has a freedom in forming the seen figure; it is shaped by an idea of a mathematical or physical law [...] One can thus speak about 'nomophilia' or 'nomotropy' of perceptual acts.⁹

Relations to philosophical anthropology

Von Weizsäcker's efforts in psychophysical science have to be seen and interpreted in the context of his 'medical anthropology'. In a terse abbreviation, the basic idea of medical anthropology is understanding illness in terms of alterations of the very structure of human existence—not merely in terms of isolated functional deficits or alterations of the corporeal apparatus. Here VvW's thought resonates with the contemporaneous turn of phenomenologically informed philosophy toward fundamental phenomena of human being-in-the-world, which gave rise to the 'philosophical anthropology' movement associated with names of Helmut Plessner, Max Scheler, and Arnold Gehlen.

Of special interest are ideas of Helmut Plessner (1892–1985), German philosopher and sociologist. In his philosophically most important work, *Die Stufen des Organischen und der Mensch* [8], Plessner attempted an analysis of specifically human modes of being, grounded in phenomenological biology. Plessner rejects psycho-physical dualism of the Cartesian tradition and, particularly, its identification of the body with *res extensa*, i. e., purely physical being: the living body is a dual system of measurable quantities as well as of experienced qualities. A phenomenon of its own is the 'frontier' (*Grenze*) of the body, which is not merely a geometric surface or 'contour' of the body but a 'directionally neutral zone' between the inner and the outer aspect of the living. The frontier is *set* and at the same time *transcended* by the organism; a living body not only 'is in space', it *positions itself* in space. Plessner distinguishes modes of positioning characteristic for the vegetative and for the animal forms of life, and recognizes the latter as 'centered positionality', capable of taking distance from its own body. Its special form is 'eccentric positionality', the ability

of taking distance from its own center and thus creating a condition for self-reflective consciousness and subjectivity.

The concept of ‘eccentric positionality’ as the specifically human form of being is of central importance for Plessner’s philosophical anthropology; particularly, it provides an explanatory basis for the multiplicity of partial and mutually exclusive aspects of reality: the inner aspect (*Innenwelt*), the outer aspect (*Außenwelt*),¹⁰ and the inter-subjective aspect (*Mitwelt*).

VvW published on medical anthropology [14] in a philosophical revue co-edited by Plessner, and he explicitly referred to Buytendijk’s and Plessner’s works on the phenomenology of encounter in his early *Gestaltkreis* paper [15]. As shown above, the notion of ‘encounter’ (*Begegnung*) was of central importance for VvW’s *Gestaltkreis* theory; and also his analysis of relativity of the frontier between a subject and the world shows a certain parallelism with Plessner’s views:

[t]he question where my environment ends and my corporeal and mental ownership begins cannot be read out from phenomenal data but must be judged by the dynamics of the processes in the *Gestaltkreis*. [...] The relocatability of the frontier is an expression of the functional manifold of the organism.¹¹

Another meeting point between Plessner’s and VvW’s philosophical interests was the sensorial/sensual aspect of human existence. For Plessner, a human being is a ‘sensual-moral entity’ (*sinnlich-sittliches Wesen*) par excellence. In an early essay *Einheit der Sinne* [9], Plessner followed Goethe’s call for a ‘critique of senses,’¹² postulated a “total relativity of senses to the human person in its unity,” and pleaded for a theory of human sensoriality which would imply “a principal modification of the fundamentals of psychophysics, and of the science of perception and expression based thereupon.”¹³ In a similar vein, VvW in *Gestaltkreis* called for an “all-embracing fundamental theory of general synæsthesia,” which would not stop at particular bimodal interactions, and argued for a restoration of the concept of ‘sensorium commune’.¹⁴

Concluding remarks

Anthropological dimension: found and lost —

Psychophysics, originally aiming at an elimination of psycho-physical dualism, bears the disciplinary split in its name. Fechner, the ‘founding father’ of psychophysics, as well as the most creative workers in the new discipline (*e. g.* Mach, Schrödinger, von Békésy) were physicists; a tradition interrupted with the progressive assimilation of psychophysics into psychology. Anyway, in the early 20th century *two* sciences, physics and psychology, could claim a ‘fundamental’ status against the seemingly dependent biological and social sciences.

The intellectual climate changed profoundly, even if only temporarily, in 1920–30s due to two factors: (1) the emergence of theoretical biology as a discipline on its own footing (Driesch, von Uexküll), allowing a discovery of the proto-phenomenon of life as a psycho-physically neutral terrain (Plessner); and (2) the ‘anthropological turn’ in the continental philosophy of that time, in which specific phenomena of human existence (*Dasein*) were recognized as irreducible ‘radicals’ of being (Heidegger, Scheler, and others).

VvW’s approach to psychophysical issues, motivated by his background in medicine, biology and philosophy, and particularly his attempts to dispense with psycho-physical duality and to (re)introduce the subject into biology, were in tune with the contemporaneous trends. If these efforts were discontinued, it was not so due to their being principally non-viable; it was rather because of the paradigmatic shift toward ‘mechanism’ as a dominating picture of thought in biological sciences in the post-war era. Although the *Gestaltkreis* theory in some ways anticipated concepts of emerging biological cybernetics (von Holst’s ‘reafference theory’ [6]), hopes for an integration of biological and cybernetic metaphors and views [1] were not fulfilled. The path to anthropologically grounded and informed psychophysics, paved by VvW’s original work, was forgotten.

— or found again?

In our days, many of VvW's ideas appear as ingenious anticipations of the present trends. Unity of perception and action is a current discussion issue [7], if not a common-place. The role of a subject's corporeal embedding in the environment is back on the agenda under the working title 'embodiment'. Special topics of VvW's keen interest—synæsthesia, nomotropy, *etc.*—are now subject matters of flourishing experimental research. Yet, there is some bitter irony that these ideas and concepts have to be *re-discovered* after decades of mechanistic and/or computational paradigms; since they already have been accessed by careful observation and subtle phenomenological analyses in a unifying anthropological perspective. In spite of all the progress of human sciences in recent years, the latter is still missing.

Ways to integral psychophysics

VvW's approach to psychophysics was not motivated by metaphysical riddles (as was the case of Fechner), but rather by clinical observation and a will to understand a human being, and its pathological alterations, in all its psycho-physical complexity. As seen above, VvW sought to replace the false and schematic ontology of psycho-physical duality with a more adequate and subtle concept of "polarized unity of the subject and the object." In this perspective, unitary life-acts are the primary ground from/upon which the domains of the 'mental' (subjective) and of the 'physical' (objective) emerge. In VvW's summary:

Biology represents the life process as it is experienced by a human subject, whereas physics represents the process in a way, how it could happen without the subject.¹⁵

This view fits well with our plea for an 'integral psychophysics' [10], which would be defined as a "physics of the world inhabited by sentient and sensible subjects" [11].

Notes

¹ "[E]ine exakte Lehre von den funktionellen oder Abhängigkeitsbeziehungen zwischen Körper und Seele, allgemeiner zwischen körperlicher und geistiger, physischer und psychischer, Welt." [4, §1]

² See Chapters 2 and 5 in [5], and also our interpretations in [10].

³ Cf. the biographical account 'Viktor v. Weizsäcker zwischen Physik und Philosophie' [13, pp. 922–946].

⁴ "(1) Die Wahrnehmung muß nicht als fabrikartiges Bild, sondern selbst als eine Tätigkeit im Werden aufgefaßt werden, und (2) sie ist nicht subjektives Endprodukt, sondern geschehende Begegnung von Ich und Umwelt." [19, p. 219].

⁵ The term *Gestaltkreis* cannot be translated adequately into English and will be used in the following text 'as is'. The word *Gestalt* is domesticated in English literature; the word *Kreis* = 'circle' does not refer to a geometrical shape but to a cyclic, circular process.

⁶ In an explicit opposition to von Uexküll's "objectivist" programme for theoretical biology, see [16].

⁷ "[W]ir ersetzen den äußerlich-substantiellen Dualismus von Psyche und Physis durch den polar gebundenen Unitarismus Subjekt und Objekt [...]" [19, p. 311] — For a critical review of the *Gestaltkreis* theory written by a sympathetic physicist see [12, pp. 206–224]. Further extrapolations of the *Gestaltkreis* concepts into the field of general medicine—particularly, the theory of 'pathic crises'—leading to VvW's 'medical anthropology', cannot be pursued in the limited scope of the present paper.

⁸ "War es möglich, die Empfindung als Funktion des Reizes zu messen, warum nicht auch den Willen als Funktion der Bewegung? Eine Psychophysik der Willkürbewegung wäre also die andere Hälfte dessen, was man sich vornahm, gewesen. Aber sie ist meines Wissens nicht einmal als Aufgabe klar gesehen worden." [18, p. 445]

⁹ "Der Wahrnehmungsakt hat hier eine Freiheit, die gesehene Figur zu formen; er folgt dabei insofern der Idee mathematischer oder physikalischer Gesetze [...] Man kann daher von einer Nomophilie oder Nomotropie des Wahrnehmungsaktes sprechen." [19, p. 330] — Note that this research was done in parallel with, and independently from, Michotte's celebrated studies of 'perception of causality'.

¹⁰ Cf. quotation from Fechner *sub* 1 and his identification of the inner and outer aspect with the 'mental' and the 'physical' domain, respectively.

¹¹ “[D]ie Frage, wo mein leiblicher und seelischer Besitz beginne und meine Umwelt aufhöre, ist nicht an Gegebenheiten der Erscheinung abzulesen, sondern sie ist nach der Dynamik der Vorgänge im Gestaltkreis zu beurteilen. [...] [D]ie Grenzverschieblichkeit [ist] ein Ausdruck der Leistungsmannigfaltigkeit des Organismus.” [15, p. 655f]

¹² To be understood as an allusion to Kant’s critiques of reason.

¹³ A project evidently exceeding the disciplinary scopes of psychology or neurophysiology. Plessner’s question “Why these senses and not some others?” aims at a philosophically central problem of an *a priori* in the very structure of sensory experience.

¹⁴ See [19, pp. 192–193]. The recent revival of interest in cross-modal sensory interactions brings in a considerable expansion of the notion of ‘synæsthesia’, which is reminiscent of VvW’s broad conception of these phenomena. However, VvW’s name is hardly ever mentioned in that context.

¹⁵ “Die Biologie stellt das Werden eines Lebensgeschehens so dar, wie es dem Menschen erlebbar wird, während die Physik das Geschehen so darstellt, wie es ohne ihn geschehen könnte.” [16, p. 70]

¹⁶ Thanks to Robert Bishop for helpful comments on a draft of the present paper.

References

- [1] F. J. J. Buytendijk, P. Christian, ‘Kybernetik und Gestaltkreis als Erklärungsprinzipien des Verhaltens.’ *Nervenarzt*, 34: 97–104, 1963.
- [2] P. Christian, R. Haas, V. von Weizsäcker, ‘Über ein Farbenphänomen (Polyphäne Farben).’ *Pflügers Archiv gesamter Physiologie*, 249: 655–701, 1948.
- [3] P. Christian, V. von Weizsäcker, ‘Über das Sehen figurierter Bewegungen von Lichtpunkten.’ *Zeitschrift für Sinnesphysiologie*, 70: 197–221, 1943.
- [4] G. Th. Fechner, *Elemente der Psychophysik* (2nd ed.), Leipzig: Breitkopf & Härtel, 1889.
- [5] M. Heidelberger, *Nature from Within. Gustav Theodor Fechner and His Psychophysical Worldview*. Pittsburgh: University of Pittsburgh Press, 2004.
- [6] E. von Holst, H. Mittelstaedt, ‘Das Reafferenzprinzip.’ *Naturwissenschaften*, 37: 464–476, 1950.
- [7] A. Noë, ‘Précis of *Action in Perception*.’ *Psyche*, 12: 1–31, 2006.
- [8] H. Plessner, *Die Stufen des Organischen und der Mensch* (3rd ed.), Berlin/New York: de Gruyter, 1975.
- [9] H. Plessner, *Anthropologie der Sinne. Gesammelte Schriften, vol. III* (ed. by G. Dux, O. Marquard and E. Ströker) Frankfurt: Suhrkamp, 2003.
- [10] J. Wackermann, ‘Psychophysics, or algebra of primary experience?’ In *Fechner Day 2007* (ed. by S. Mori, T. Miyaoka and W. Wong) Tokyo: International Society for Psychophysics, pp. 51–56.
- [11] J. Wackermann, ‘Psychophysical experiments and perceptual situations.’ In: *Fechner Day 2008* (ed. by B. A. Schneider, B. M. Ben-David, S. Parker and W. Wong) Toronto: International Society for Psychophysics, 2008, pp. 157–162.
- [12] C. F. von Weizsäcker, *Der Garten des Menschlichen. Beiträge zur geschichtlichen Anthropologie*. München/Wien: Hanser, 1982.
- [13] C. F. von Weizsäcker, *Zeit und Wissen*. München/Wien: Hanser, 1992.
- [14] V. von Weizsäcker, ‘Über medizinische Anthropologie.’ *Philosophischer Anzeiger*, 2: 236–254, 1927.
- [15] V. von Weizsäcker, ‘Der Gestaltkreis, dargestellt als psychophysische Analyse des optischen Drehversuchs.’ *Pflügers Archiv gesamter Physiologie*, 231: 630–661, 1933. Reprint: in [19, pp. 23–61]
- [16] V. von Weizsäcker, ‘Zum Begriffswandel der Biologie.’ *Zeitschrift für die gesamte Naturwissenschaft*, 1: 316–322, 1935. Reprint: [19, pp. 63–70]
- [17] V. von Weizsäcker, *Der Gestaltkreis. Theorie der Einheit von Wahrnehmen und Bewegen*. Stuttgart: Thieme, 1940. Reprint: [19, pp. 77–337]
- [18] V. von Weizsäcker, ‘Über Psychophysik.’ *Nervenarzt*, 16: 465–476, 1943. Reprint: [19, pp. 445–465]
- [19] V. von Weizsäcker, *Der Gestaltkreis. (Gesammelte Schriften, vol. 4* (ed. by P. Achilles, D. Janz, M. Schrenk and C. F. von Weizsäcker) Frankfurt: Suhrkamp, 1997.