

# PRE-GIBSONIAN OBSERVATIONS ON ACTIVE TOUCH

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James J. Gibson's (1962) now-classic "Observations on Active Touch" demonstrated the superiority of active over passive touch in object discrimination tasks and thereby exposed the paradigmatic limits of preceding research. Before Gibson, according to the received view, the sense of touch had been treated as a mere receptive channel, ignoring the hand's explorative movements. This article challenges this common narrative by juxtaposing Gibson's article with research published in the German-speaking parts of Europe between the early 19th and mid-20th centuries. The concept of "active touch" did not originate from Gibson's paper alone, nor should earlier appearances of the term be treated simply as exceptional cases. On the contrary, throughout the 19th century, the concept facilitated fundamental theoretical, cross-disciplinary discussions and ultimately evolved into an object of experimental study on its own.

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Since its publication in the early 1960s, James J. Gibson's "Observations on Active Touch" (J. J. Gibson, 1962) has held an influential position in the research area of haptics—not so much as an entry point into his broader theoretical construct, known as *ecological psychology*, but as a starting point for historical retrospections. As such, Gibson's paper presents a departure from the classical theory and its preferred object: the passive touch.

But research on active touch did not start in the 1960s. The term itself, as Gordon (1978) has pointed out, was already used by Charles Sherrington at the beginning of the 20th century. A thorough revision of the history of active touch, however, has not yet been undertaken. Contemporary textbooks on haptics rarely go beyond Gibson and his two alleged exceptional forerunners, Katz and Révész, thereby sustaining the notion of a paradigmatic shift.

This paper seeks to correct the standard view of Gibson's significance with an alternative narrative. The narrative rests on material published

in German between the early 19th and the mid-20th centuries, including texts that only recently have been translated and texts that remain unavailable in English even today. Studies from the fields of psychology and physiology are taken into account, as well as their interconnection with educational theories and practices. In context, they provide insights into a previously neglected research area, which had grown from its humble beginnings in the 19th century into the discipline transcending "hand studies" of the 20th-century interwar period.

## Gibson's Active Touch

Using six small cookie cutters, Gibson verified a common, but scientifically neglected, belief: Objects can be distinguished more precisely if a person is allowed to move their fingers. The active outperforms the passive touch. Passive touch relies on an outside agency to leave impressions on the skin. Gibson's active touch, by contrast, can be seen in the hand's exploratory movements. Trying to identify an object without the help of visual cues, his test subjects presented a variety of grasping, tracing, pressing, and rubbing movements while inspecting objects, all the while constantly adjusting their hands in search of information. Active touch, Gibson explained, is a voluntary and purposeful activity. It is an attempt to isolate and enhance specific stimulations, to specify the

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characteristics of an object—a feat so fundamental, it had slipped the attention of previous researchers: “In general, experimenters have not realized that to *apply* a stimulus to an observer is not the same as for an observer to *obtain* a stimulus” (J. J. Gibson, 1962, p. 490).

The only prior works on this topic that Gibson was able to find, heavily relying on Edwin Boring’s groundwork on the history of experimental psychology (Boring, 1942), were those of David Katz (1925a) and Géza Révész (1950). Both, as Gibson argued, “seem to be almost the only investigators who have given much thought to what is here called active touch” (J. J. Gibson, 1962, p. 487). For more than a century, physiologists and psychologists had considered the senses as passive channels of sensations and established the conditions and limits of experimental research correspondingly (see J. J. Gibson, 1966, p. 2). The prevalence and persistence of such a spacious blind spot is bewildering, as the significant role of active movements in perceptual tasks might seem like a generally acknowledged fact. The basic principle is even, as Gibson pointed out, manifested in the English language itself. Active touch is “what is ordinarily called touching”—in clear difference to *being* touched (J. J. Gibson, 1962, p. 477). Nonetheless, active touch just did not seem worth a thorough investigation. Researchers, so Gibson suggested, simply were not interested enough (cf. J. J. Gibson, 1976, p. 398). They preferred to follow a route laid forth by classic experiments on cutaneous localization and two-point thresholds (see J. J. Gibson, 1962, p. 486).

The focus of scientific interests on passive touch may reflect the clinical encounter of a passive patient and an inspecting examiner, or of a scientist probing an objectified and quantified test subject. It may exemplify early physiological models of perception, which have their roots in the anatomical examinations of dead or sedated bodies. And the rise of reductionism and laboratory science hardly provided a conducive environment for a theory of information pickup. This environment, one could argue, had to lead to a conceptualization of the sense of touch as a passive mosaic of receptors.

Gibson himself did not speculate much about what factors contributed to the dominant role of passive touch in scientific studies, at least not in his major texts. But he, as well as his wife Eleanor Gibson, did highlight the possible consequences

of his findings. Seeing the senses not only as mere receptive channels, but also as perceptual systems equipped to pick up information, redefines the relationship between man and environment. It sets the ground for alternative developmental theories and pedagogical reforms, favoring the active, explorative approach over the traditional repetitive reinforcement of knowledge on passive, immobilized students (see E. J. Gibson, 1988). Gibson’s conceptualization of active touch appears to be compatible with progressive pedagogical notions. But this is not a coincidence. Educational reform, as the following passages will show, had been one of the main forces that steered research on active touch in the early 20th century—and even before.

### Steinbuch’s Active Touch

At the turn of the 18th century, Johann Jakob Engel, the private teacher of the Prussian prince, introduced a new term into the German language, the *Getast* [sense of touch], which he differentiated from the *Gefühl* [feeling] (Engel, 1800). Wilhelm Humboldt, another prominent student of Engel, elaborated the difference graphically in his notes: Getting beaten will give you a bad feeling, but no definite impression of what hit you; a hand or a stick. Touching an object with your own hands allows you to apprehend its shape (see Leitzmann, 1908, p. 395). Eventually the newly coined term found its way into the Grimm brothers’ influential dictionary (Grimm & Grimm, 1897). But archival research reveals that the term “active touch” was in use, even before Engel worked on the topic. The term already appears in Gehler’s “physical dictionary” (Gehler, 1789, p. 439), which further refers back to Nollet (1745, p. 153). And around 1800, the interest on this topic started to increase. Efforts toward a new fundamental basis of scientific research were being made and the human senses provided a rich starting point for discussions on the intersection of anthropology, physiology, psychology, and epistemology.<sup>1</sup> Natural philosophers such as Schelling (1804/1860, p. 444) and Oken (1805, 1808), as well as practicing physicians, started to write about the active aspects of touch.

<sup>1</sup> For an in-depth look into the institutional histories and curricula of German universities and the rise of empirical psychology in parallel with natural philosophy, see Eckardt, John, van Zantwijk, and Ziche (2001).

One of the latter, Franz von Paula Gruithuisen, proclaimed to be able to identify several persons blindfolded by inspecting their facial profiles with a stick—a feat made possible by combining the *passive* and *active mechanical sense* into a *sense of resistance* (von Paula Gruithuisen, 1810). Johann Georg Steinbuch, another practicing physician, asked a friend to move several objects over the tip of his index finger. The sensitivity of the skin, he concluded, only fulfills a minor, supportive role in the perception of form. This was not a particularly new insight. But in his “treatise on the physiology of the senses,” Steinbuch (1811) went beyond a mere comparison of two different modes of touch as others had done before him. Active touch became the centerpiece of a “new theory of perception”: The world does not impose itself on the touch organs, as philosophers and physiologists had falsely asserted. It is the touch organ that plays the active and the world that plays the passive role.

For Steinbuch, the act of touching was a spontaneous, but also a volitional, act. As we touch an object to apprehend its form, the volitional touch acts become part of our spatial conception of the object. Touch movements thereby show how we actively construct subjective space. Steinbuch extended this line of thought into a novel theoretical framework that connected the awakening of the will and the development of bodily self-consciousness with the self-active utilization of the touch organs. With his or her first movements, a human child begins the construction of an inner and outer touch space: The uncontrolled movements of an infant cause accidental touches of its body. The desire to replicate these experiences leads to its first intentional movements. The repeated active stimulation of the skin produces a spatial conception of the body. Then the relations to the outer world are further explored by successively expanding the area of reach. The active *Getast* and the passive *Gefühl* complement each other, forming the basis for a sense of higher order.

Steinbuch’s treatise was a contribution to the then developing German strand of physiologically informed empirical psychology, which started to reevaluate epistemological arguments—Kantian apriorism in particular—from psychological and anthropological perspectives. What constitutes the innate basis of perception and what had to be acquired through experi-

ences were now being discussed on the grounds of genetic (developmental) theories. This raised questions of a pedagogical nature. If fundamental mental capabilities had to be acquired, they demanded proper training. At hand were Pestalozzi’s teaching methods, which were a widely discussed topic at the time of his writing. Fichte had popularized them as possible keystones for a renewed German nation, which was still under French occupation, and their emphasis on sensual experiences and object lessons seemed to Steinbuch like an application of his own theory.

However, Steinbuch’s attempt to legitimize and market his work as a theoretical fundament of political proportions did not bear fruit. Steinbuch’s theory of perception did not become the basis for an educational reformation of Germany, nor did it bring him the acclaim of his peers. The intellectual milieu in Germany might have been open to new ideas, but if published works did not meet the scientific standards of its time, their repudiation was exceptionally harsh. Dismissed for its pompous style and poor scientific quality (Diruf, 1812), criticized for its reliance on circular arguments by Müller (1826, pp. 52–55), and refuted by Tourtual on the basis of counterexamples (see Tourtual, 1827, pp. 223–228), the potential of Steinbuch’s theory of perception as a discipline transcending framework remained unexplored at the time.<sup>2</sup>

What remained of his work—until it was rediscovered in the late 19th century as a forerunner of Alexander Bain’s theory of space (Ribot, 1886, p. 100; Wundt, 1902, p. 500)—was the introduction of the active senses as a possible building block of a physiologically informed and voluntaristic psychology of the senses. Seeing the movement of the sense organs as a product of the will (see, e.g., Burdach, 1837, p. 195) set up a trajectory of psychophysiological research, which renegotiated the interconnection between bodily and mental phenomena on the basis of observable, perceptual activities. The “newer authors,” as Karl Rudolphi noted approvingly, stopped seeing sense

<sup>2</sup> After the publication of his treatise, Steinbuch refrained from engaging related topics again and decided to concentrate on his career as a physician. One year before his death, he gained wider recognition for his systematic research on “sausage poisoning” (botulism). His planned book on the “sense of time” remained unwritten.

organs as “something passive” (Rudolphi, 1823, p. 73).

### Weber’s Moving Touch Organs

Already credited as the “father of psychophysics” by Fechner (1860, p. VIII) during his lifetime and heralded as the “father of experimental psychology” by Wundt (1921, p. 301), Ernst Heinrich Weber’s legacy was foremost of a methodological and discipline building nature.

In his systematic studies of sensory thresholds, Weber demonstrated how an experimental, quantitative approach could lead to generalizable insights into subjective phenomena. In the now-classic measurement of the two-point limen, a beam compass was pressed against the skin. The test person had to report the number of sensations felt. These very experiments embodied the “pitfalls of earlier researchers” from which Gibson so vehemently distanced himself more than a century later: The experimenter imposes the stimulus on the reagent. The stimulus is slight and brief. The test subject is told to report his awareness of the impression, not of the object making it (cf. J. J. Gibson, 1966, p. 98).

Indeed, the isolation of specific parts of a phenomenon in a controlled experiment became a major challenge of late-19th-century physiological research. Limbs were restrained, anesthetized, encased in plaster, hydraulically moved. Muscles were electrically stimulated (cf. Goldscheider, 1889). The experiments of Weber and the later studies of Fechner leveraged the apparatus-based and measurability-focused approach of the natural sciences and thereby prepared the ground for laboratory based psychology. What emerged was the “ideal of a metric psychophysics,” which “dominated the work of sensory psychologists for a century” (J. J. Gibson, 1966, p. 10).

But it would be wrong to assume that Weber and his contemporaries considered probing the surface of the skin with a beam compass as a sufficient method to study the sense of touch to its full extent. To Weber, it was “fairly obvious that the tactile perception of objects is greatly enhanced if the touch-organ is moved in a deliberate and appropriate manner” (Weber, 1834/1996, p. 59; cf. Thomson, 1833). Learning to use the limbs intentionally gives access to “a new medium for obtaining information about the shape and distance of objects” (Weber, 1834/1996, p. 194). The

tactile recognition of objects moved over immobile touch-organs, by contrast, is poor (see Weber, 1834/1996, p. 59). The discrimination of round and cornered metal tubes pressed against the skin—early forerunners of Gibson’s cookie cutters—is possible, but only because we explore the skin beforehand and thereby spatially connect its sensitive points (see Weber, 1846, p. 541; cf. Cornelius, 1861, p. 604ff.).

The wider implications of these observations were addressed by Hermann Helmholtz in his rector’s speech at the Berlin University in 1878 (Helmholtz, 1878/1903). Using the tip of a pencil to explore the engravings of a medal will bring much better results than pressing the flat hand against it. Hence, when we touch objects, the capabilities of the skin’s sensitive points are negligible. Movement, on the other hand, turns out to be critical in the perceptual process. Movements change our sense impressions, and as we control our movements, we are able to test our understanding of the phenomena before us. The touch act thereby resembles the scientific experimental process itself: It is a “perceptual experiment” that begins with the volition of a specific movement. It ends with the analysis of the perceptible changes. In between lies an assumed chain of physical causes, which the touching person, as well as the scientist, investigates.

### Wundt’s Active Touch Perception

The institutionalization of systematic, experimental psychology through the establishment of the first psychological laboratory is one of the most celebrated contributions for which Wilhelm Wundt has been credited. Wundt’s writings on active touch belong to his lesser known accomplishments. After all, Titchener’s highly influential English translation of Wundt’s work completely omitted the relevant sections. But a comparison between the different German editions of the *Principles of Physiological Psychology*, first published in 1874, reveals Wundt’s growing interest in haptics. By 1902, the section on perceptions of space by touch had grown into a full-fledged chapter covering more than 60 pages and a wide variety of topics.

Drawing from Steinbuch’s work, Wundt used developmental theory to explain how the apprehension of form by passive touch is possible. The nerve endings in the skin have to be moved and touched to develop a mosaic of local signs

(Wundt, 1902, p. 489ff.; cf. Baldwin, 1889, p. 126). But the passive apprehension of complex forms by passive touch, or *resting touch*, as Wundt called it up through the fourth revision of his *Grundzüge der Physiologischen Psychologie* [Principles of Physiological Psychology] (Wundt, 1902), was identified as a “border case.” Wundt used cutout cardboard pieces instead of Weber’s metal tubes, but came to the same conclusion: Pressed against the skin, they give only a vague impression of their size and form. “In reality,” a touching person would use touch movements whenever possible (Wundt, 1902, p. 458ff.).

It is important to note here that Wundt was well aware of the limits of experimental research that solely focused on the passive touch long before Katz and Gibson expressed similar concerns. And a close reading of Wundt’s (1897) *Outlines of Psychology* reveals how Wundt’s appreciation of the notion of activity, observable in the motions of the hands and the eyes, became an integral part of his voluntaristic model of the mind and his introspective reaction experiments: Suppressing the movements of a test subject allowed Wundt to analyze the process of apperception—the process that followed the physiological reception of a stimulus. Apperception brought content from the field of *inner vision* to the *focal point of consciousness*. The preparatory adjustments for an upcoming impression were accompanied by a feeling of activity—here, Wundt spoke of *active apperception*. *Passive apperception* started with a negative feeling of receptivity as the psychical content “forces itself on the attention” (Wundt, 1897, p. 217).

If these routines were not artificially reduced to purely “mental movements”—as they were in many of Wundt’s reaction experiments—they were accompanied by attentive, anticipatory adjustments of the sense organs. Outside the psychological laboratory, active apperception was observed when an infant started to fixate and follow objects and acquired the ability to “turn voluntarily from one impression to another” (Wundt, 1897, p. 287). Active attention and voluntary action developed at the same time. With the first grasping movements, the “first clear symptoms of sense-perception” and the “first indications of the existence of a simple volition process” became apparent (Wundt, 1897, p. 290).

Wundt’s framework, which combined the experimental approach with voluntaristic and developmental theories, prepared the ground for

further inquiries into the psychological aspects of active touch. One of Wundt’s students, Theodor Heller, was to become one of the most influential proponents of this research.

### Heller’s Analytic Touch

During the 19th century, the education of visually impaired students was increasingly organized in special schools throughout Europe. Following the first sporadic collaborations between the schools and academic researchers—foremost as a source of test subjects for physiological experiments—the idea for a more intensive and less one-sided exchange emerged in the late 19th century. Several attempts toward a systematization of these efforts were made by Simon Heller, director of the Jewish Institute for the Blind in Vienna, who emphasized the need for the psychological training of teachers, a scientific grounding of the educational practices, and more developed forms of touch teachings (see S. Heller, 1892).

His son, Theodor Heller, went to Leipzig to write his dissertation on a *psychology of the blind* (T. Heller, 1904). This thesis presented not only an overview of preceding research, but a guide for further studies, based on the new methods of experimental psychology. Heller also introduced two new terms: the *analytic* touch and the *synthetic* touch. The analytic touch is a strategy that brings different parts of an object successively in contact with a limited area of the skin. The synthetic touch is based on the ability of pressure localization and the fusion of simultaneous impressions into a whole. For the precise understanding of an unknown, complex object, the combination of both is essential (see also Wundt, 1897, p. 108).<sup>3</sup> Heller further differentiated *inner* from *outer*, as well as *direct* from *indirect*, touch. But in the end, all classifications were nothing more than crude abstractions for Heller. They were insufficient to cover the variety of touch forms that he observed. Each student, as Heller noted, developed his or her own individual touch system.

<sup>3</sup> Simon Heller (1909) later refers back to the writings of philosopher and educator Friedrich Paulsen, who highlighted the connection between observable touch strategies and mental activities: “The practical analysis and synthesis which the hand employs on objects is repeated in the analysis and the synthesis which the understanding employs in perception” (Paulsen, 1898, p. 413).

Nevertheless, researchers such as Zech (1913), Grasemann (1917), Steinberg (1920), and, later, Révész (1938) tried to apply, extend, and correct Heller's vocabulary. In 1921, the variety of terms had already grown to such an extent as to motivate Karl Bürklen, the director of the Home for the Blind in Purkersdorf, near Vienna, to work on an overview of all codices available (Bürklen, 1921). Now assembled in a single tabular presentation, the classic active–passive dichotomy only constituted one conceptual descriptor pair out of many. The individual cells of Bürklen's table presented specific forms of touch (see Figure 1). The matrix was supposed to have constituted a basis for touch teachings. Simon Heller (1921), in reply to Bürklen, highlighted the missing emphasis of the *forming hand* and its constructive activity. The apprehension of the total form of an object should be trained by letting the students not only recognize, but also replicate the object by manual means. In the following years, Münz and Löwenfeld (1934) started to analyze the inherent laws of form perception on the basis of plastics created by visually impaired students at the Jewish Institute for the Blind.

These groundbreaking activities in the interwar period were paralleled by multiple other significant developments. First World War veterans had to be integrated into the civilian labor force, and the emerging field of prosthetics demanded new psychophysiological models: a psychology of the prosthesis, the amputee, and the “working hand” (D. Katz, 1921). Once recognized as an aspect of labor activity, this topic also entered the field of the industrial psychotechnical rationalization movement. Applied psychology was meant to facilitate economic restructuring. *Psychotechnics* should provide the means to increase the efficiency on the workplace. The measurement of the performance of the hand became part of aptitude tests (see Giese, 1922, 1925). Moreover, with the collapse of the Austrian and German monarchies in 1918, the traditional authoritarian school system had become representative of an outdated model of society, which had to be overcome. This situation provided a unique opportunity for the diverse field of progressive pedagogical movements, which had started to emerge in the late 19th century, to gain broader acceptance. Explorative learning, the value of hands-on experiences, the training of the senses, and manual skills became center pieces of a wide variety of new educational approaches. From the Montessori Kindergarten to

the Waldorf School and the Bauhaus University, touch-related exercises were an integral part of the curriculum.

All of these developments fueled a short-term but intensive interdisciplinary knowledge exchange from which research on touch started to turn into an acknowledged field of study on its own, promising practical results for educational, work-related, and social matters.

This was the context in which the well-known *World of Touch* by David Katz (1925a) came into being. In 1920, the progressive educationalist Otto Scheibner (1920) had already identified the earlier phenomenological work of Katz as an important contribution to the reform pedagogical concept of the *Arbeitsschule* [activity school] (see also D. Katz, 1925b). These remarks must have resonated with Katz, as he later presented his seminal work as a first step toward a new theory of *Werkunterricht* [manual training] (see D. Katz, 1925a).

In coauthorship with his wife Rosa Katz, he wrote several texts on pedagogy and child psychology, and 1 year after the publication of *World of Touch*, Rosa Katz founded a kindergarten where she undertook extensive touch experiments, inspired by the sensorial blindfold games of Montessori (R. Katz, 1930b). But her studies had to be published outside of Germany, as the changing political situation required the Katz family to leave the country.

### The Cognizing Touch of Hippius

With the rise of National Socialism in Germany and Austria, the existing vibrant network of the specialized and experimental schools and universities quickly disintegrated.<sup>4</sup> But research on active touch did not come to a sudden halt. Psychology was just about to become a fully institutionalized discipline (see Geuter, 1992), and the major writings of Jewish authors remained influential up to the 1940s (see, e.g., Wittke, 1943), regardless of their persecution.

<sup>4</sup> Shortly after the annexation of Austria, Theodor Heller died as a result of an attempted suicide. The Jewish Institute for the Blind in Vienna was dismantled in the following years. Heller's wife and daughter were deported in 1941 and died in the massacre of Kaunas. For an overview of the organizational changes in Austrian institutions for visual impaired people under the Nazi regime, see Hoffmann (2012).

## Die Tastarten der Hand in ihrem Verlauf und in ihrer Wirksamkeit.

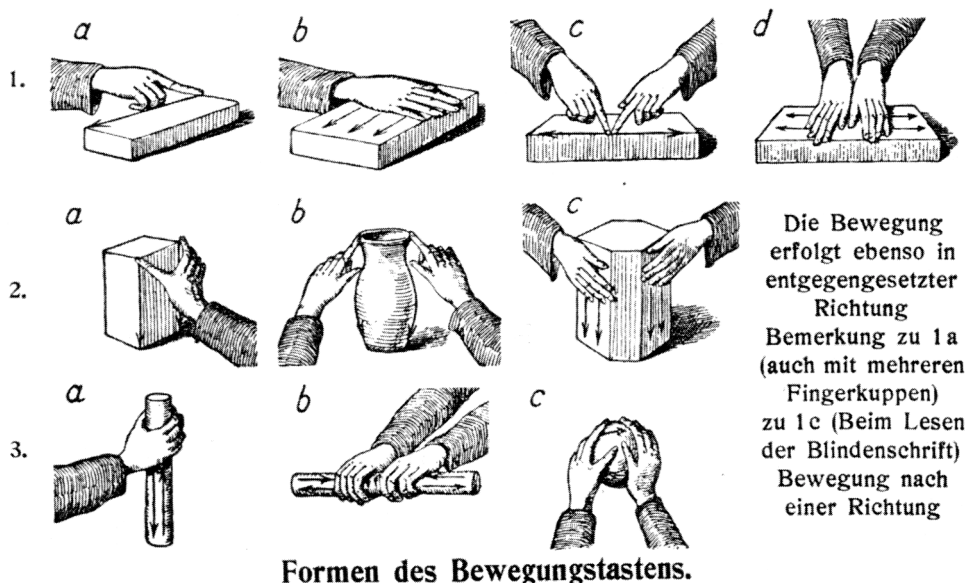
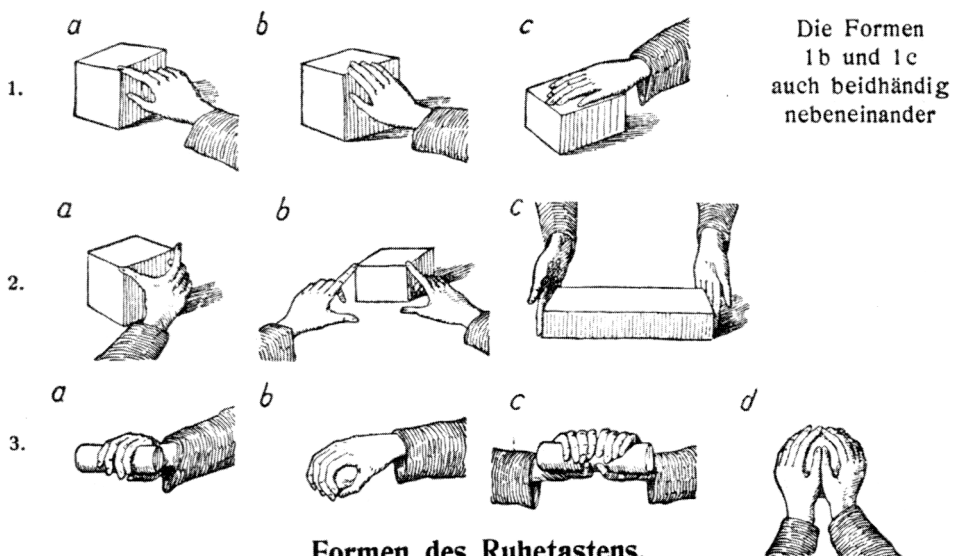


Figure 1. Forms of resting and moving touch. Detail of Bürklen's tabular overview in Bürklen (1924; see also Bürklen, 1921; Giese, 1935).

In 1935, Fritz Giese, a former student of Wundt, traced out two possible futures of "hand studies." Supplied with additional data, such as the wide range of "Anglo-American literature

on eugenics," research on the *working hand* could be used for *Völkerdiagnose*, that is, racial-oriented work assessment (Giese, 1935). However, psychotechnics was already on a decline

in 1935, and Giese, one of its main promoters in Germany, died in the same year. The other possible trajectory he suggested was Gestalt-oriented research, which had mainly focused on visual phenomena until then (see Becker, 1935).

What seemed particularly fruitful to Giese was the study of “whole–part relationships” in perceptual tasks. One of the leading institutions dedicated to this matter was the Second School of Leipzig, where Krueger, after Wundt’s retirement, developed and promoted *Ganzheitspsychologie* [genetic psychology of the whole]. Of special interest was the *Aktualgenese* [actual genesis], the dynamics that lead from a first diffuse feeling into a clear understanding of an object. In contrast to the doctrines of the Berlin school of Gestalt psychology, a *Gestalt* did not instantaneously appear. It *evolved* and went through various qualitatively distinct stages. In 1934, Rudolf Hippus had already presented a comprehensive ganzheitspsychological study on touch in the form of a dissertation and a published book (Hippus, 1934). In over 180 individual tests, the test subjects had to describe their experiences in minute detail while exploring various objects with their hands only.

Karl Hamann’s series of recall tests on non-sense objects, executed at the State Institution for the Blind in Berlin-Steglitz, also originated in this context. His dissertation (Hamann, 1937) was supervised by Friedrich Sander, a former assistant of Wundt and Krueger, who developed his own strand of *Ganzheitspsychologie* in Jena. But Hamann’s studies found no continuation. The interest on ganzheitspsychological studies on active touch faded during the Second World War, and even more so afterward.<sup>5</sup>

### Conclusion

The selected material only reflects fractions of scientific research that has been dedicated to active touch. A thorough analysis of research published in other languages might reveal an even richer picture. Nevertheless, it presents enough evidence to demonstrate that the notion of “active touch” did not originate from Gibson’s paper, and that earlier mentions of active touch should not simply be classified as exceptions. This by no means weakens the radical novelty of Gibson’s contributions in the broader context of his ecological psychology. But it challenges a simplified view of the history of

haptics that portrays preceding research as something that had to be overcome for the first time in the mid-20th century.

Explorative touch movements were not ignored in scientific discourses. On the contrary, they were identified as a fundamental conceptual challenge. They played a key role in the consolidation of developmental models of perception and volitional models of the mind. The notion of “activity” in general—ambiguously suggesting some sort of bodily and mental interplay—proved valuable as a flexible facilitator of cross-disciplinary discussions. These discussions included not only theoretical discourses between philosophical, psychological, and physiological teachings during the development of modern experimental psychology, but also pedagogical considerations. The connection that Steinbuch had suggested between his theory of perception and educational practices admittedly remained relatively unexplored at the beginning of the 19th century. But a century later, pedagogical reform movements revolved around the idea of explorative learning, hands-on experience, and the image of the *active child*.<sup>6</sup> And the educational setting served not only as a possible application of perceptual research—in the early 20th century, several schools for visually impaired students turned into hubs for haptic research. Bürklen, Grasemann, Hamann, Simon Heller, Theodor Heller, and Löwenfeld were researchers as well as educators. By facilitating the collaboration of the specialized schools with academia, they elevated the teaching of touch movements into a recognized field of scientific interest.

Given these intensive activities, the question remains how the impression of active touch as a scientifically neglected topic could turn into the prevailing narrative. In the early 20th century, the versatile active–passive dichotomy was not only well known—the many attempts to analyze touch movements in detail had already led to a multidimensional system of additional dualities: resting–moving, simultaneous–successive, immediate–indirect, receptive–purposive,

<sup>5</sup> Noteworthy exceptions are the works of Auersperg (1949) and von Weizsäcker (1943). Their specific combination of neuropathological studies and holistic theories remained influential throughout the following decades.

<sup>6</sup> See John Dewey’s take on “activity” in Monroe (1915, p. 33).



near–far, synthetic–analytic. It has to be noted that this process of dichotomization and diversification was repeated not long after Gibson reintroduced the active–passive dichotomy in its basic form (cf. Kaczmarek & Bach-Y-Rita, 1995; Loomis & Lederman, 1984; Symmons, Richardson, & Wuillemin, 2004). And affinities to Bürklen’s “touch forms” can be found in the exploratory procedures described much later by Lederman and Klatzky (1987). What caused this discursive “reset”?

When Gibson wrote his paper in 1962, he called attention to a blind spot in the scientific discourse. But what he had found was not the symptom of paradigmatic limits. It was a gap, a discontinuity, which becomes apparent if the language barrier and the inaccessibility of relevant literature are taken into account. Only few contributions have been translated, many of them only recently and partially. Titchener’s influential translation of Wundt’s *Grundzüge*, to take a prominent example, is limited to the first volume of the fifth edition only. It thereby not only misses a helpful reference to the pioneering but also internationally relatively unknown work of Steinbuch. It lacks the whole section on active and passive touch. The knowledge spread by the many visiting, multilingual scholars of Wundt’s laboratory was consequently difficult to attribute and contextualize. Edwin Boring’s (1942) influential book on the history of experimental psychology mentions Steinbuch, but only as the originator of the conception of the sense of innervation. A more detailed account on Steinbuch’s contributions, putting a focus on his theory of spatial perception, has only recently been given by Hatfield (1990).

Katz and Révész, on the other hand, were presented by Boring as the new “phenomenologists of the Gestalt school”: sole representatives of a fresh and original approach (Boring, 1942, p. 512). When Révész (1950) presented a fully translated book a few years after Boring’s publication, he advertised it as “the first treatise on tactile aesthetics”—a “rather presumptuous” claim, as Löwenfeld called it (see Löwenfeld, 1952, p. xxiii), being well aware of the body of literature available in German. The translation of Katz’s *World of Touch* had to wait until 1989. But the extensive review by Zigler (1926) had already positioned it firmly in the academic canon beforehand. In 1926, Katz’s book was introduced to the English-speaking audience as

the “most important single contribution that appeared in the period” (see Metcalf, 1926). And in 1929, Katz visited the University of Maine and published his lectures in English, including a text on the “psychology of the human hand” (D. Katz, 1930a).

Considering this context, it is not surprising that Katz and Révész appeared to Gibson as exceptional cases in a research field solely dedicated to the passive side of touch. And it is not surprising that numerous articles that followed, being unaware of the vast corpus of untranslated material, perpetuated the idea of a paradigmatic shift.

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