

THE IMPORTANCE OF GUSTAV FECHNER IN THE HISTORY OF PSYCHOLOGY

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Abstract

The objective of this text is to show the importance of Gustav Fechner's contributions to the history of psychology, related to the epistemology questions, as introduced by modern philosophy. The question of knowledge that initiated with Descartes serves as a starting point for all demonstrable truth, and that generates as a counterpart the study of the risks of illusion that will be produced in the subject. This task lies in the realm of psychology, which, since the 18th century, establishes itself as a partner in the theory of epistemology. The possibility of the positive study of our subjective experiences was condemned by philosophers like Immanuel Kant who argue that the study of psychology is not a scientific endeavor. Through his empiricist work and based in his famous equation, Fechner elevates psychology into the field of science, overcoming Kant's objections and establishing the begging of the history of scientific psychology .

Introduction

Even though Fechner did not call himself a psychologist, some important historians of psychology like Edwin G. Boring consider the experimental rising of this science in Fechner's work (1979, p.297). More specifically, it was Fechner's famous intuition of October 22, 1850 that, according to Boring (quoted by Saul Rosenzweig, 1987), gave opportunity to his work as a psychophysicist (Rosenzweig also remembers that this date that serves as reference to this event, is curiously close to Boring's birthday, October 23rd). In a more concise way, if we think Fechner's psychophysics work as the junction of a philosophical doctrine (that correlates spirit and matter as aspects of the same being), an experimental methodology (correlating the variations of stimulus and sensations perceived) and an assemblage of mathematical laws (the famous Weber-Fechner law); in addition, the last two aspects are considered especially relevant to the rising of psychology. Nevertheless, to think that the rising of a science is restricted to the establishment of experimental procedure and to a mathematical formalization, is to forget a whole field of questioning in which the instruments created by Fechner could, in the middle of the 19th century, overcome some obstacles and answer some questions, notably the ones made by the critic philosophy of Immanuel Kant. Before observing how this answer is possible, let us see how this problematic field that leads to the elevation of psychology arises within modern philosophy, from René Descartes to Immanuel Kant and Augusto Comte. And finally, we will explore how the physiologists of the 19th century, like Johannes Müller and Ferdinand von Helmholtz, will attempt to resolve these questions together with Fechner's psychophysics. In short, what these last authors will present is a suspension of Kantian and Comtean critics as evidence of the possibility of a Scientific

Psychology. It is in this problematic circuit that we are intended to see the importance of Fechner's psychophysics to the constitution of a Psychological Science, more than any methodological or mathematical contribution. Let us proceed, then, to the topic of history and its characters.

Modern Philosophy as the Questioning of the Subject

Antônio Penna (1980, p.81), an imminent historian of psychology in Brazil, considers Descartes as the introducer of dualism in psychology that is divided between the behaviorist and the mental point of view, through his metaphysic dualism between an extensive matter (the body) and a non-extensive matter (the soul). However, more than the delimitation of the metaphysic dualism that lives in the Psychological Science, demarcating the option of the relations between mind and body, in Descartes, we can find the proposal of a new problem, or, at least, a new starting point to the western thought. In the 16th century, Aristotelianism seasoned with Christianity, a particular feature of St. Thomas of Aquino philosophy, was foreshadowing its exhaustion, to the benefit of a whole skeptic thought, like Michel de Montaigne's. It is encouraging from the skeptical point of view (the certainty that there are no certainties), making it more radical, exaggerated, and putting it under the judgment of a supposed malignant genius able to mislead us all the time, that Descartes will establish the first pillars of a new safe harbor of thought:

"There isn't then, any doubt that I am, if he (the supposed Malignant Genius) fouls me; and, even though he fouls me, he will never be able to make me be nothing, while I think I am something. So, in such a way that after having thought a lot about it, and having examined everything thoroughly, I must conclude and have as a constant that this proposition *I am, I exist*, is necessarily true every time I enunciate it in my spirit"(Descartes, 1972, p.100).

This immediate intuition of the own thinking self imposes a new starting point to western philosophy: not the Being, the Essences, or God anymore, but the Spirit and the Subject, as headquarters of truth (even though in Descartes the clear and distinct ideas that instruct our reason are from a divine origin). It is at this point that all our thought turns to the question of knowledge: to know about the subject of truth was necessary to know about the truth of the subject.

How is Psychology inserted in this project? Initially, not only by the fact that the Subject and the Spirit have been stipulated as the new targets of thought (that, by successive transformations would become the mind or its complement, the behavior as domain of the bodies), but mainly by laying the problem of knowledge as a condition of access to the truth. Since Descartes' time, rationalists and empiricists debate about the safest way of attaining the truth through the Spirit: reason or senses? This discussion still reverberates today, both within epistemology, between applied rationalists (Gaston Bachelard and Georges Canguilhem) and neopositivists (Rudolf Carnap and Moritz Schlick) and within psychology, between behaviorists and cognitivists. However, the question of knowledge that nourishes the rising of psychology is complementary to the search of truth in the subject: it's about the question of error. It is in this aspect that Aron Gurwitsch (1935, p.107) will see the origin of psychology in the question of error, as an apology from the spirit to Reason identified as mechanist ideal of the beginner science in the 17th century:

"What essentially characterises physics, as we know it, is the definitive separation that it establishes between real reality and the "subjective" appearances. The world is not what it seems to be, as it's offered to ordinary perception, in fact it is what physical science can

built... According to the physical science, these are every phenomenal aspect of the world: the qualities considered secondary, the characters of value of every species, the teleological moments that it seems to contain, etc., do not constitute anything real; with these facts we are in the presence of a contribution owed to human subjectivity, and that the man, thanks to his psycho-physiological constitution, projects over a universe that is from another nature... To psychology is given the task of showing how, in one hand being given the objective reality and in the other, man's psypsycho-physiological constitution, the universe can assume this phenomenal and "subjective" aspect, that a natural tendency makes us consider it as reality itself".

This problematic of the Spirit was detected by Galileo and Descartes in the division between primary and secondary qualities. To think the Spirit as place of truth implies, as a complementary task, to think what in it constitutes a mistake. If there is something in Descartes that inspires the rising of psychology in the 19th century, this something is not the *Thinking Self* or the *Mechanical Body*, but the *Passions* in place of the Spirit, in which the two substances mingle, especially through the senses, producing the error.

Which is the way of access to truth through the Spirit? Is it the order of the reasons deflecting from the mistakes of the senses (as the rationalists suggest)? Or is it the impression of the senses, from which our reasons would be nothing more than habit, an illusion (according to the empiricists)? The co-existence of these two-handed ways of truth and error will inspire a student of Gottfried Leibniz by the name of Christian Wolff to produce, in the middle of the 18th century, a new analysis of the Spirit that will be called *Psychologia: Rationalis*, when he studies the immortal soul as substance (in 1734), and *Empirica*, when he studies the flow of our experiences in this soul (in 1732). It is in this aspect that G. Canguilhem (1972, p.111-112) will criticize this supposed origin in Descartes of this philosophical psychology when he affirms that:

"All history of psychology can be written like the one from the counter-senses, of what the *Meditations* (Metaphysics) were the occasion without having it's responsibility... The *Meditations* are called by Descartes *Metaphysics* because they intend to act directly over nature and the essence of the *I think*, in the immediate apprehension of it's existence. The Cartesian meditation is not a personal confidence"

And latter (op. cit, p. 113)

"It is because people were not acquainted with the teachings of Descartes, constituting against him an empiricist psychology as natural history of the self - from Locke to Ribot, through Condillac, the French Ideologists and the English Utilitarians - and believing to constitute, according to him, a rational psychology founded in a intuition of a substantial Self".

Immanuel Kant will be the one who gave expression to the most final critic to this psychology that was badly supported by Descartes' thought. Initially, by proposing that knowledge would be nothing more than the reunion of the empiricist and the rational, given the *a priori* synthesis of the diverse of the senses by the forms and categories of the transcendental subject, and by overcoming the oppositions of the modern theory of knowledge between empiricists and rationalists. In this matter, the own fundamental stone of Descartes' thought becomes problematic: the intellectual intuition of this *I think*, that would be the first evidence in an order of reason, is no longer possible, since the own *I think* cannot suffer sensible intuition. It is not an object in time and space, but goes together with all the representations produced by the subject. If philosophical psychology is a mistake when it

takes the evidence of the *Cogito* as a personal confession, this mistake will be multiplied when it does not allow the *I think* to be drawn from an intellectual intuition. It is because of the *Copernican revolution* of Kant's theory of knowledge that the rational and empiricist psychology of Wolff will be criticized, because there could not be a legitimate science of the *Transcendental subject*. Let us examine the critics and the vetoes to these different methods of psychology.

The *Psychologia Rationalis* will be the target of Kant's *Critic of Pure Reason*, more specifically for his *Transcendental Dialectics*, where the *Ideas of Reason* are examined (like the one of the *immortal soul*) while products of a search in a conceptual series of an unconditioned term that is mistakenly taken as a *thing in itself*. The task of the Kantian Dialectics is, then, to demonstrate the sophisms contained in an unstoppable reason, like the one contained in the metaphysics, and, especially, in Wolff's metaphysics. The basic argument against Rational Psychology is that the supposed knowledge of an immortal soul is based in the experience of a self, or in the internal phenomenal sense, that is nothing more than an empiricist intuition that refers to the own time of consciousness, very different from the *I think*. This would be a pure function of organization of experience, and the subject of all judgement of the conscience of knowledge, which could not fit in any science. The mistake of the Rational Psychology is in taking this *I think*, as a transcendental function of knowledge, with something to be experienced, like the *Empiricist Self*. In other words, to do so would be to mistake *determinant self* with *determinable self*; subject with object. In Kant's words: "From all this, the conclusion that is taken is that rational psychology owes its origin to a simple misunderstanding. The unity of consciousness, that serves as foundation to the categories, is taken here as an intuition of subject as object, to which is applied the category of a substance" (quoted by Pascal, 1990, p.92).

If the *I think* of *Psychologia Rationalis* cannot become the object of a science, once it is the condition of all sciences, then it remains as the *Empiricist self*, the subject of the *Psychologia Empirica*. This would inclusively be closer to the project that will guide the rising of the Experimental Psychology in the 19th century, aiming at the study of the illusions of the immediate experience. But, the question remains of whether a science would fit in here? Kant's answer in *Metaphysical Principals of the Science of Nature* (1989) is that *Psychologia Empirica* would not be a science, not even "unstrictly speaking" because, unlike chemistry for example, it does not work with mathematical relations (at least in 1786, when Kant writes this book). Let us read Kant's words:

"The empiricist psychology is more distant than chemistry from the class of a science of nature, first because mathematics is not applicable to the phenomena of inner sense and its laws, because in this case only the continuity law in the flow of changes of this inner sense would have to be taken into account. But, the enlargement of knowledge obtained in this fashion would relate to the knowledge obtained by mathematics of the bodies similarly to the way the doctrine of the properties of the straight line relates to all geometry. Because the pure internal intuition on what the phenomena of the soul must be constituted is time, but this has only one dimension. The soul's empiricist doctrine can never get close to chemistry as a systematic art of analysis, or experimental doctrine, once the multiple of internal observation, in it is separated only by a simple division of thought, without possibility of keeping separated, and arbitrarily uniting again; even less possible will be the submission of another thinking subject to our search, in a way according to our principles, and, inclusively the observation itself alters and distorts the state of the observed object. That is why psychology can never be more than a historical doctrine of the inner sense, and, as such, so systematic as possible, a simple description of the soul, but not a science of the soul, not even a experimental psychological doctrine" (op. cit., p. 32-33).

To Kant, according to Canguilhem (1972, p.114), psychology remains a place only in “Anthropology, as basis of a theory of abilities and of prudence, confirmed with a theory of wisdom”. What remains to be said is that Kant’s critics to the empiricist psychology found agreement in the positivism of Augusto Comte, who, in his Positive Philosophy Course (1972, p.20) would criticize the method of introspection: “The thinking individual could not divide himself in two parts, one reasoning while the other would see him reasoning. The organ that is observed and the observer organ would be the same in this case, so how could observation happen?” It must be said that Comte’s critics, in the 19th century, turned against other realms of philosophical psychology, namely the Ideologists and Scottish School. What remains, however, is the challenge proposed by Kant to the empirical psychology. To prove itself as science, it will have to:

- 1) Find out its element in a way similar to chemistry, to make analysis and synthesis;
- 2) Give this element an objective study, in a way that subject and object do not mingle as in introspection;
- 3) Produce a more mathematical approach than the geometry of a straight line, able to encircle the temporal successions of inner senses.

And this mission will be assigned to the physiologists of the 19th century, especially Fechner.

Surmounting the Kantian Challenge: Sensorial and Psychophysicist Physiology

The first problem listed, of whether an objective element is missing, will be solved by the *theory of the specific nervous energies* from Johannes Müller, explicit in his *Handbuch der Physiologie* of 1826. For this physiologist, each sense would possess an specific nervous energy that would be translated in a specific sensation of each nerve. In such manner, the optic nerve excited by the action of retina or by mechanical and chemical forces will always produce luminous images. The same would occur with the other senses. This would be a kind of physiological Kantism, in which the perceived world would be a mere property of our specific nervous energy (of what Galileo had called secondary qualities), always stimulated by any physical factor whose nature is not important. This physiological Kantism is about a precise element, namely the body situated in a phenomena, in contrast to the *ideas* and *impressions* described by the empiricists as arbitrary elements. It is for this reason that sensation will be offered as an element for a possible psychology: it will connect the physical world that constantly stimulates the senses with the physiological world, once the specific nervous energies are connected to the nerves, along with the psychological world, once sensation would be the base of representations. And who else will develop this aspect, together with the solution to the second problem, but one of Müller’s students, Hermann von Helmholtz.

Helmholtz will elaborate in 1860 a theory about the rising of psychological representations, that, in it’s reverse, will create a new method to the objective study of sensations. The theory he proposes is *unconscious inferences*, clearly empiricist, and the method, the *experimental introspection*, very different, as we will see, from the one produced in philosophical psychology. Our sensations would be organized by past experiences, that would be stocked as larger premises of a syllogism, able to put in order in an unconscious and rapid way the minor premises informed by the senses, producing as conclusion our psychological representations. The methodology behind the analysis of these sensations, the experimental introspection, will be processed in the inverse of this unconscious synthesis, aiming to neutralize the effects of this syllogistic inference made by past experience. To neutralize this unconscious synthesis, a conscious analysis occurs, in which the subjects of the

experiments are trained to recognize the roughest and wilder aspect of our experience. Like domesticated savage animals that would have to be re-educated to their natural habitat. This training of the subjects (study impossible to happen with children, primitives or people with mental sickness), aims to avoid the error of stimulus, the confusion of the object perceived with the unconscious judgement accumulated through experience. That is why the objective study of sensations on a subject can only be done if this subject himself is also a physiologist, able to separate the wheat of sensations from the tares of past experience. Is because of all these methodological attentions, where the distance between observer and observed is imposed, even if it happens within a same subject and with an objective element, that the introspective method will be distinguished from the introspection of the philosophers-psychologists.

The problem of mathematical reasoning still remains, the third placed by Kant. It is here that Fechner's psychophysics comes into scene, enunciated in *Elemente der Psychophysik* from 1860. It also offers an experimental answer to the second Kantian challenge. But its main conquest is offering to any psychological study the possibility to develop a mathematical process more advanced than the geometry of a straight line. This, through the establishment of the first mathematical law, that he baptized as the Weber-Fechner Law, because of the use of the equation developed by Ernst Weber about the relation of proportionality between the *differences only perceived* between stimulus and their absolute values. Fechner, aside from making the equation more complex, transforms the *differences only perceived* in sensations, suggesting the first psychological measurement. New Fechners are welcome.

Conclusion

Because it refers to the last Kantian challenge, Fechner's work represents the first pillar of a psychology to be born on October 22, 1850, the date that serves as a landmark to Fechner's intuition. But it must be remembered that the value of this work is correlated the power of the answers he offers to philosophical problems that start with Descartes and culminate in the Kantian critics. It is in this circuit of knowledge that the importance of Fechner becomes known, because he opened space to the development of the first scientific psychology, overcoming impasses of an empirical psychology metaphysically based. But history of psychology proceeds in the proliferation of schools and systems that place themselves as the guardians of scientific methodology in psychology. Because of the proliferation of these possibly scientific worlds, we can ask ourselves if the Kantian challenges, created in the end of the 18th century, does not continue to haunt psychology.

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