

THE FECHNER-BRENTANO CONTROVERSY ON THE MEASUREMENT OF SENSATION

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Abstract. The purpose of this paper is to provide an overview of Brentano's critique of Fechner's psychophysics. An attempt is made to show that, far from being a mere historical curiosity, the dispute with Fechner is of strategic importance for Brentano's theory of sensation. I defend the view that Brentano not only raised strong objections against the logarithmic law, but also sought to lay new foundations for the idea of a psychophysical measurement set forth by Fechner in his *Elements of Psychophysics*. In the first section, I briefly review some facts about Fechner's psychophysical law and discuss two corrections proposed by Brentano. In the second section, I examine some further, more general objections. In the final section, I then show how Brentano's late theory of "sensory spaces" could be viewed as a positive contribution to the psychophysical problem as posed by Fechner.

Key words: Brentano, Psychophysics, sensation, Fechner, intensity.

The purpose of this paper is to provide an overview of Brentano's critique of Fechner's psychophysics. Leaving aside some other significant aspects of this critique, for example, in the area of aesthetics, the focus will be on the problem of sensory intensity. My aim is to show that, far from being a mere historical curiosity, the dispute with Fechner is of strategic importance for Brentano's theory of sensation. The view advocated in this paper is that Brentano not only raised strong objections against the logarithmic law, but also sought to lay new foundations for the idea of a psychophysical measurement set forth by Fechner in his *Elements of Psychophysics*. In the first section, I briefly review some facts about Fechner's psychophysical law and discuss two corrections proposed by Brentano. In the second section, I examine some further, more general objections. In the final section, I then show how Brentano's late theory of "sensory spaces" could be viewed as a positive contribution to the psychophysical problem as posed by Fechner.

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1. TWO CORRECTIONS TO FECHNER'S LAW

Before beginning, it may be useful to say a word about the relationship between Brentano and Fechner from a historical perspective. Brentano's writings clearly show that he felt a deep and friendly admiration for Fechner, who was thirty-seven years older than him. Interestingly enough, Fechner was a close friend of the Brentano family in the larger sense. Brentano's aunt, Bettina von Arnim, was a regular visitor to the Fechner family in Leipzig already in the late 1830s.¹ It is not clear when Brentano read Fechner's *Elements of Psychophysics*. As is shown by the correspondence, he was still planning to buy the book in November of 1873, a time when he asked Stumpf to find it for him as he was in Aschaffenburg. It is important also to mention that Brentano paid a visit to Fechner in Leipzig in November 1873.² This visit is particularly interesting because Brentano took advantage of the occasion to present to Fechner some of the objections he would publish a few months later in his *Psychology*. The meeting was very cordial, but he failed to convince Fechner. For a while, he hoped he could prevail on him by a "new presentation" of his arguments. Fechner defended his views point by point in a letter which Brentano answered and later communicated to Stumpf. A detailed report of this letter and of his response to it is to be found in a letter to Stumpf dated 25 July 1874, which has been published by the Graz University Archive.³

As is well known, Fechner laid the foundations of his psychophysical theory in his 1860 book, *Elements of Psychophysics*, where he presented his famous logarithmic law: $S = k \log E$, the intensity of sensation is directly proportional to the logarithm of the sensory stimulus intensity. He himself rather misleadingly called this law "Weber's law."

Generally speaking, one can say, with the Belgian psychologist Joseph Delboeuf,⁴ that Fechner's psychophysics is based on two distinct theses, which, by the way, are common to Weber and Fechner:

The first thesis states that the logarithmic law is not merely a physiological law, but a *psychophysical* law. The issue at stake, for Fechner, is to rigorously determine the relation between the mental and the physical. The logarithmic law expresses a functional relation between something mental on the one hand, namely sensation, and something physical on the other, namely the stimulation of sensory organs. This first thesis was heavily criticized by many philosophers and psychologists, including Brentano – but more on this later.

Fechner's second thesis is that the functional relation between the mental and the physical is not a relation of direct proportionality. This was the original intuition behind Weber's law as well: the increments of physical excitation are not

¹ Heidelberger (1993: 52).

² See Brentano (1989, Letter 44); Kraus (1919: 130); Heidelberger (1993: 97).

³ Brentano (1989, Letter 52).

⁴ Delboeuf (1883: 11).

directly proportional to the increments of sensation. When the increment of sensation Δs is constant, it is not the increment of excitation ΔE that is constant, but the ratio $\Delta E/E$. Thus, if sensation increases arithmetically (in a constant manner), then excitation increases geometrically, and conversely.

This thesis was also vigorously criticized. Ewald Hering defended the direct proportionality thesis against Fechner in a brilliant essay submitted to the Academy of Science in Vienna in December 1875.⁵ Hering thereby went back not only to the commonsensical view, but also to Herbart's conception according to which "two lights shine twice as brightly as one and three strings sound three times as loud when struck as one."⁶ I shall further suggest that Brentano's position is midway between Herbart's thesis of direct proportionality and the thesis of indirect proportionality promoted by Weber and Fechner.

There is a third point which may be even more fundamental for our understanding of Fechner's enterprise. In fact, Fechner's purpose in his *Elements of psychophysics* was only secondarily to elucidate the relationship between the mental and the physical. His ambition was, first of all, methodological. What he sought to do was to design *exact* methods – similar to those employed in natural sciences – for studying psychic phenomena. As we shall see, it is this aspect that primarily interests Brentano in his 1874 *Psychology*. The question, basically, is whether the psychic is mathematizable or, more precisely, *measurable*. The logarithmic law was first intended to be a rule for measuring psychic intensity.

Here again, Fechner's views were subject to attacks from all sides. In 1882, the Freiburg philosopher Julius von Kries published an influential essay in which he challenged not only the indirect proportionality thesis, but the possibility of a psychophysical measurement itself.⁷ The issue raised by Kries is as follows. Fechner's idea is that a given range of sensations a, b, c, \dots , can always be compared with a range of stimuli A, B, C, \dots , in such a way that it is possible to specify a functional relation between a and A , b and B , c and C , etc. Now, the measurement of sensation, like any other measurement, makes sense only if it makes sense to "equate" (*gleichsetzen*) differences or changes with each other and hence with similar differences within a measuring scale. However, it is unclear how two intensive differences between given sensations might be "equal" (*gleich*). Stimulation increases can be *objectively* equal, so that their being equal is experimentally demonstrable by means of a measuring instrument. But it seems otherwise with intensive differences between sensations. The question is "whether it makes sense, and what sense it makes, to say that the change from a sensation a_1 to another sensation a_2 is equal to the change from a_m to a_n , or, what is the same,

⁵ The essay was entitled "Zur Lehre von der Beziehungen zwischen Leib und Seele. I. Mittheilung: Über Fechner's psychophysisches Gesetz." See *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften*, Mathematisch-naturwissenschaftliche Classe, 72 (1875), 509.

⁶ Herbart (1851: 358).

⁷ Zeller (1882) should also be mentioned here. See Darrigol (2003: 536 ff.).

that the sensation a_p is so many times greater than the sensation a_q .⁸ Kries's answer to this question is that psychophysical parallelism makes no sense, because the claim that two given intensive differences are "equal" can only be arbitrary or based upon an arbitrary notion of equality. His main argument is that intensities do not have parts in the sense in which extensive magnitudes have parts. One minute is 60 times longer than a second, but the intensity of a given sensation cannot be decomposed into smaller intensities which could be perceived in it as parts within a whole.⁹ Sensory intensity is a magnitude only "in an improper sense" in that it "tends to a zero-point."¹⁰ As a result, intensity is altogether not measurable.¹¹ So it is also the antagonism between the direct proportionality and the indirect proportionality view that no longer makes sense.¹²

In the same line of thinking, the neo-Kantian philosopher Hermann Cohen (1883) accused Fechner of overlooking the Kantian distinction between extensive and intensive magnitude. Cohen agreed with Fechner that sensations show quantitative differences from each other. But, like Kries, he argued that, since these quantities are merely intensive, it makes no sense to attempt to measure them. As Kant had claimed, the degree of a sensation is an intensive magnitude: one hour is composed of two half hours, but – at least at first glance – a sound is not composed of two sounds half as loud. Thus, Cohen challenged the first thesis above and contended that the logarithmic law is actually a physiological, not a psychological law: that which it allows to measure must necessarily be extensive and hence physical, not mental. The physicist Adolf Elsas, a student of Cohen who also taught in Marburg, defended similar views in 1886 in an influential book titled *On Psychophysics* (Elsas 1886). Three years later, Bergson presented a more radical version of the same objections in his *Essay on the Immediate Data of Consciousness*, in which he went even further and problematized the notion of a psychic intensive quantity itself.¹³

Fechner was acutely aware of the intrinsic difficulties associated with the idea of measuring the mental. In fact, the impossibility of a direct measurement of the mental is one of the key assumptions of his psychophysical theory. Fechner's reasoning went as follows. On the one hand, the existence of psychic intensive quantities is unquestionable: hearing this sound is more or less pleasant, the coldness of snow is felt more or less strongly, etc. But on the other hand, being *quantifiable* does not involve being *measurable*. Since psychic magnitudes have no

⁸ Kries (1882: 273).

⁹ Kries (1882: 275).

¹⁰ Kries (1882: 278); cf. Meinong (1896: 33 ff.).

¹¹ Meinong here objected that Kries's argument applies not only to psychic intensities, but to all intensive magnitudes (1896: 135). And yet, he argued (1896: 121), Kries assumed that physical intensities are measurable!

¹² Kries (1882: 294).

¹³ A similar view was defended earlier by Sigmund Exner (1879: 242–243), who suggested that sensory intensity might be purely qualitative.

parts, it seems that they are not directly measurable. However, Fechner continues, these magnitudes can be measured *indirectly*, and the role assigned to the logarithmic law is precisely to allow such an indirect measurement *via the physical*, by determining a functional relation between the two. As Ribot concluded:

The psychophysical law is a new proof that our knowledge is relative. It shows that, in sensation, we have no measurement for absolute magnitudes, but only for relative magnitudes, and that the only thing we can do is *compare* magnitudes. Our mind can conceive of no absolute magnitude of sensation, no absolute magnitude of time, no absolute psychic magnitude whatever.¹⁴

All of the three statements summarized above – the logarithmic law as a psychophysical law, indirect proportionality, the measurement of the mental – are thoroughly discussed by Brentano already in the first volume of his *Psychology from an Empirical Standpoint*. Let us now try to give some account of this discussion, in focusing on the debate on the measurement of the mental and of intensive magnitudes.

The most significant part of Brentano's discussion of psychophysics in his 1874 *Psychology* can be found in Book 1, Chapters 1 and 4. Brentano starts with correcting two misconceptions behind Weber's and Fechner's laws. The first issue he raises is about the object of the psychophysical law.¹⁵ Weber and Fechner contended that their laws expressed a functional relation between sensation increments and excitation increments. One increases the intensity of stimulation to reach a differential threshold (the smallest noticeable increment) which corresponds to a sensation increment 1. Then, one increases the stimulus intensity once more to reach a second differential threshold, so as to obtain a sensation with an intensity of 2, and so on. By proceeding this way, sensation increments are constant (here equal to 1) while stimulus increments are variable. Thus, the functional relation prescribed in Weber's law is that the minimal increment of sensation must be equal to the quotient of the stimulus intensity increment by the initial stimulus intensity: $\Delta E/E = \Delta s$, where E refers to excitation, and s to sensation. For example, in the case of weight sensation, the minimal increment of sensation is constant if excitation increases by about 1/40. In other words, the initial weight must be increased by 1/40 for the increment to be noticeable.

The question now to be decided is, what does the psychophysical law talk about? Are we sure, after all, that it really speaks of sensation increments? This is the first point of disagreement between Brentano and Fechner. Brentano remarks that the constancy in question is not exactly that of the minimal increment of sensation. Indeed, talk of differential thresholds and just noticeable sensory

¹⁴ Ribot (1874: 563).

¹⁵ See Brentano (1973: 97 [67]). Page numbers for the 1874 *Psychology* correspond to the German edition, and are followed in square brackets by the pagination of the English translation.

differences actually forces us to introduce some further element, namely, the notion of *noticeability*. As he observed in *Psychology from an Empirical Standpoint*: “In reality, it is by no means self-evident that each barely noticeable increase in sensation is *equal* (*gleich*), but only that it is *equally noticeable* (*gleich merklich*).”¹⁶

The very meaning of Brentano’s correction is not altogether clear in the 1874 *Psychology*. Fechner himself, in a letter of the same year to Brentano, says he finds the distinction between equal and equally noticeable increments “incomprehensible” (*unverständlich*).¹⁷ Nevertheless, this correction might be more serious than it first seems. In particular, it led Brentano to significantly restrict the scope of the psychophysical law, by attempting to explain increase in sensation intensity by other factors than external stimuli. Indeed, if the psychophysical law talks not merely of equal sensation increments, but of increments equally noticeable, then one needs to take into account psychological conditions such as memory¹⁸ or differences in the *degree of attention*. But I shall return to this objection later.

We can now turn to the second correction proposed by Brentano. Since it is less central to our problem, I shall confine myself to a couple of brief remarks.

To adequately understand this second correction, it is necessary to consider once again the distinction between *gleich* and *gleichmerklich*. Supposing that Brentano’s first correction is correct, Weber’s law means something like this: when an initial sensation enjoys intensity increments all of which are “equally noticeable,” these increments correspond to a constant magnitude $\Delta E/E$. Thus, it is no longer possible to say, as Weber and Fechner did, that here the increments of sensation are equal, that is, constant, but only that they are “equally noticeable.” Now, Brentano enunciates a principle which he thinks governs the relations of *Gleichmerklichkeit* between sensory intensities. Two sensation increments are equally noticeable, he claims, if and only if their ratio to the intensity of the initial sensation is equal. In other words: Δs_1 and Δs_2 are equally noticeable if and only if $\Delta s_1/s_1 = \Delta s_2/s_2$. As a result, Brentano thereby came to oppose the view that sensation increments should be constant. What is constant is no longer the sensation increment Δs , as Fechner and Weber claimed, but the quotient $\Delta s/s$.

What this means is simply that, to be noticeable, the excitation increments ΔE must stand in a constant ratio to E , just as the corresponding sensation increment Δs stands in a constant ratio to s . For example, if the sound level of a continuous noise is increased by a third, and then by a third again, etc., the intensity of the corresponding sensation each time increases by a certain constant fraction (a half, a third, a quarter, etc.) of the initial sensation. So, one can infer the following equation, which Brentano himself calls a “law”: $\Delta s/s = \Delta E/E$. This notation is Fechner’s, not Brentano’s. However, Fechner himself claimed that

¹⁶ Brentano (1973: 97 [67]).

¹⁷ Brentano (1989: 57).

¹⁸ Brentano (1973: 98 [67]).

Brentano had approved it in their correspondence. In a study entitled “On the psychic principles of measurement and Weber’s law,” published in 1888 in Wundt’s journal, *Philosophische Studien*, Fechner remarked that Weber’s law was subject to two different interpretations.¹⁹ The first one, which he called the “difference hypothesis” (*Unterschiedshypothese*), was the one he defended along with Wundt, namely, the law: $\Delta E/E = \Delta s$. The second interpretation results in the law discussed above, which Fechner called the “ratio hypothesis” (*Verhältnishypothese*) and credited to Brentano and Joseph Plateau, both of whom are usually regarded today as the pioneers of Stevens’ power law.²⁰

Of course, Brentano’s law directly contradicts Weber’s and Fechner’s laws. It is important to note that, unlike these latter, Brentano’s law *does not rule out direct proportionality*. But this does not mean that Brentano finally came back to the direct proportionality thesis, which instead, according to him, still remained to be empirically demonstrated. The direct proportionality thesis, he said in his *Psychology*, “has not yet been proved, either. Our law does not require that, whenever the stimulus increases by a certain number of times, the sensation increases by *the same* number of times.”²¹

Direct proportionality means that, when the stimulus intensity is multiplied by n , the intensity of sensation should also increase by a factor of n . But Brentano says no such thing. This is the reason why I have suggested that Brentano occupies an intermediate position between Herbart’s direct proportionality thesis and the indirect proportionality thesis advocated by Weber and Fechner.

2. FURTHER OBJECTIONS

It is plain that Brentano’s ultimate purpose was not merely to rectify Weber’s equation, and that the issues just discussed are of somewhat secondary importance. This clearly appears in the same passage from the 1874 *Psychology*. A few lines further on, Brentano observes that, even when corrected according to his indications, the psychophysical law remains fundamentally unsatisfactory. His purpose, now, is to offer a more general diagnosis of the problems facing Fechner’s psychophysics, on the basis of the objections above. The main trouble with the psychophysical law, he thinks, lies in the fact that it is essentially incomplete.

First, he notes that Fechner restricts himself to sensations and, more specifically, to sensations correlated with external stimuli. Fechner thereby neglects not only psychic phenomena which are not sensations, but also the sensations whose causes are not external. Thus, according to Brentano, Fechner omits the psychic phenomena whose causes are internal stimulations or other

¹⁹ Fechner (1888: 174).

²⁰ See Stevens (1961).

²¹ Brentano (1973: 99 [68]).

psychic phenomena.²² Secondly, Brentano argues that the psychophysical law is flawed even in respect to the sensations due to external stimulation. Indeed, he says, the intensity of sensation depends not only on the intensity of external stimulation, but also on psychic factors and, in particular, as suggested earlier, on *the degree of attention*: a sensation obviously is more or less intense depending on whether the subject is more or less aware of it. The objection seems relevant, because it is dubious that it suffices to add a constant to the logarithmic law to take into account the degree of attention. By the way, this objection very much resembles the one made by Delboeuf barely one year later, in 1875, in his *General Theory of Sensibility*. Delboeuf proposed to complete the logarithmic law by a new law allowing to determine what he called the “effort,” the “deterioration,” or the “strain” of sensory organs when exposed to strong stimulation.²³

Fechner point by point responded to Brentano’s first objections three years after the appearance of *Psychology from an Empirical Standpoint*. First, in his 1877 essay *The Case for Psychophysics*, Fechner rightly replied that he actually never had neglected the influence of internal stimuli on the intensity of sensation.²⁴ He recalled that internal stimulation is studied in that science which he himself had founded under the name “internal psychophysics” — and to which no less than eleven chapters are devoted in the second volume of his *Elements of psychophysics*.

Then, Fechner does not accept Brentano’s view that the degree of attention could significantly influence the intensity of sensation.²⁵ He strongly affirms, with reference to Chapter 42 of his *Elements*, that both must be mutually independent: “Everybody can immediately observe that a white or gray sheet of paper does not look brighter, that a sound does not hear louder according to whether the attention paid to them is more or less intense.”²⁶ Most interestingly, Brentano quite ingeniously replied to Fechner that this argument contradicted his rejection of the distinction between *gleich* and *gleichmerklich*. In order to affirm that attention does not affect the intensity of sensation, one first needs to acknowledge that there is a conceptual difference between equal and equally noticeable increase.²⁷

Another objection raised by Brentano later in the same passage concerns Fechner’s view that the logarithmic law is a *psychophysical* law. This objection, as I have already noticed, was quite usual at that time. Brentano expresses some doubt as to whether the logarithmic law really allows to measure the psychic, and asks whether it does not rather measure only physical magnitudes. For example, one may think that, even when opposed to the intensity of physical stimulation, the *felt*

²² Brentano (1973: 100).

²³ See Delboeuf (1875: 19–20): $f = \log \frac{m}{m - E}$, where f represents the strain, m the available

“mass of sensibility,” and E the excitation.

²⁴ Fechner (1877: 26).

²⁵ Fechner (1877: 26–27).

²⁶ Fechner (1877: 27); cf. Fechner (1860: 452).

²⁷ Brentano (1989, Letter 52: 57).

intensity of the sound still is a physical phenomenon. It is the felt sound, and not the auditory sensation, that is more or less intense.²⁸ Yet, Brentano does not pursue this line of argument further. The reason for this lies in his own thesis, clearly stated in his *Psychology*, Book II, Chapter 2, according to which the intensity of sensation must necessarily be equal to that of its object. Indeed, this thesis entails that, if Fechner's law allows to measure the intensity of the sound, which is, according to Brentano, a physical phenomenon, then it must enable us, at the same time, to measure the corresponding sensation, which is psychic.

This latter thesis is most interesting for our purposes, because Brentano precisely attributes it to Weber and Fechner. But I shall return to this point subsequently. Another thing that makes this objection interesting is that it clearly shows how mistaken is Husserl's critique in the Appendix of the 6th *Logical Investigation*, where Brentano is accused of misleadingly conceiving sensations as physical phenomena. Here, Brentano very clearly attributes such a confusion to Fechner, as opposed to his own view of sensation as psychic. This, I think, suffices to show that Oskar Kraus was right in his attack on Husserl's line of argument in his notes to the 1924 edition of the *Psychology from an Empirical Standpoint*.²⁹

It is worth mentioning that Fechner responded to this objection in his 1874 letter, where he deplors that Brentano offers no real proof for his assertions, and again later in *The Case for Psychophysics*, where he highlights its lack of clarity.

We come now to Brentano's final diagnosis in the 1874 *Psychology*. In fact, Brentano's objections about the limitations of the psychophysical law plausibly intersect with another debate, which is perhaps more fundamental. The real question, as he puts it in Book I, Chapter 4, bears on the *exactness* of psychological knowledge. What Brentano intends to show is that Fechner's and Wundt's attempt to establish psychology as an exact science, to "make possible the scientific exactness (*wissenschaftliche Exaktheit*) of psychology,"³⁰ is bound to be a failure due to the inaccuracy and the limitations of the psychophysical law. Actually, he says, Fechner and Wundt have contributed to such an exact psychology only "to an infinitesimally small degree" (*zu einem verschwindend kleinen Teile*), and thereby done more harm than good to psychology.³¹

For Brentano, this deficiency of Fechner's approach must have far-reaching consequences at the methodological level as well. What is at stake, here, is no more nor less than the method of "psychic induction" which defines Brentano's descriptive psychology, that is, the view that the psychologist has to be satisfied with what Brentano calls "empirical laws," as opposed to the allegedly exact laws of experimental psychologists such as Fechner. In support of this view, Brentano invokes the impossibility to accurately measure the influence of non-sensory

²⁸ The same argument can be found in Meinong (1896: 115–116), with the difference that, for Meinong, the intentional object also is something psychic.

²⁹ Brentano (1973: 266–267).

³⁰ Brentano (1973: 101 [70]).

³¹ Brentano (1973: 101–102 [70]).

psychic phenomena and of physiological processes which are too complex or still not well known. It is interesting to note that here, by contrast with the famous passages devoted to the role of memory in psychology, Brentano does not present the impossibility of an exact psychology as an impossibility in principle, but as an impossibility due to our current state of knowledge.³² Another important thing to stress is that this line of argument is not meant to rule out the possibility of any mathematization in psychology, and that Brentano, in the same chapter, contemplates possible applications of statistic methods in psychology.³³

Before going on, I have to say a word about another polemical aspect of Brentanian psychology in which the dialogue with Fechner plays a salient role. I am thinking of Brentano's critique of the theories of the unconscious.³⁴ What is new here is that Brentano now views Fechner as an allied against a common enemy, namely against the notion of unconscious representation. Most importantly, Brentano's critique of the theories of the unconscious rests on a unique assumption, which, for the purpose of simplicity, I shall call the *law of intensive equality*. This law, according to him, governs the relations between psychic and physical phenomena. Thus, at least to some extent, namely, when applied to external perceptions, it is a *psychophysical* law. The law of intensive equality simply states this: The intensity of feeling (*Empfinden*) is always equal to the intensity of what is felt (*Empfundenes*). In other words: *the intensity of sensation is always equal to the intensity of its content*.³⁵

The argument is as follows. First, let us take seriously Brentano's definition of consciousness in terms of internal perception. Given this definition, it follows that an unconscious sensation is a sensation without internal perception, that is, a sensation to which corresponds an internal perception of a zero intensity. According to the law of intensive equality, the intensity of a sensation is always equal to the intensity of its content. Now, Brentano argues, this must also apply to internal perception, which has an external perception as its content. If the external perception has a certain non-null intensity, then the corresponding internal perception must have an equal, hence non-null, intensity. But it is assumed that all external perception has a certain non-null intensity. Therefore, all external perception is accompanied by an internal perception of non-null intensity. There can exist no unconscious sensation. All sensation is conscious, all external perception is the secondary object of an internal perception within a unique mental act.

In *Psychology from an Empirical Standpoint* Brentano does not offer much explanation as to the law of intensive equality. In fact, he provided a full explanation of it only much later, in mereological terms and on the basis of his

³² Cf. Brentano (1982: 69 [71]), in connection with the confusion between "equal" and "equally noticeable."

³³ Brentano (1973: 102 [70]).

³⁴ For what follows, see Brentano (1973: 169–170, 192–194 [120–121, 136–137]).

³⁵ Brentano (1973: 169 [120]); Brentano (1979b: 77).

theory of sensory spaces and “unnoticeably small gaps.”³⁶ What is important for our purposes is that, in the 1874 *Psychology*, he attributes this law to Weber and Fechner.³⁷ Oddly enough, Brentano considers that Fechner has never really believed in unconscious sensations, and that, where he explicitly talks of unconscious sensations, he actually understands this term in an entirely different way, as referring to unconscious *physical* phenomena.³⁸ Accordingly, he finally presents Fechner as an opponent of the theory of the unconscious and thus as an advocate of his own thesis that all psychic phenomena are conscious.³⁹

It should be noted in passing that this interpretation also occurs in a polemical context. Fechner’s logarithmic law – by contrast to Weber’s law properly so-called – involves, for certain values of stimulation, admitting sensations of negative intensity. At issue is whether it makes sense, and if so what kind of sense, to speak of negative sensory intensities. Now, some quite ambiguous developments in *Elements of Psychophysics* could suggest that Fechner solved the problem in terms of unconscious sensations. This was, notably, the interpretation favored by Delboeuf.⁴⁰ But Fechner himself denied having ever described negative intensity sensations as unconscious sensations strictly so-called. He stressed, in a paper on this issue posthumously published in 1890, that negative intensity sensations were better seen as “imaginary” sensations, by analogy with imaginary numbers.⁴¹

3. A POSITIVE CONTRIBUTION TO PSYCHOPHYSICS

I would like to conclude with some brief remarks on Brentano’s conception of sensory intensity, which, as it seems, has some interesting points of contact with that defended by Fechner. In what follows I shall focus on the writings of the 1890’s and 1900’s, in which the problem of intensity plays a central role. For lack of space, I shall confine myself to mentioning some aspects of this theory which are more relevant to the topic discussed in this paper.

A first point to be insisted on is that Brentano sharply disagrees with Fechner on the scope of the psychophysical law. He restricts the notion of intensity to sensation only, and protests against the Fechnerian “dogma” according to which all psychic phenomena – including higher-order activities such as conceptual thoughts, judgments, or volitions – should have an intensity.⁴² This critique is

³⁶ Brentano (1979b: 77 ff.).

³⁷ He also traces it back to Lotze in Brentano (1979b: 77).

³⁸ Brentano (1973: 145–146, 168n. [104, 120]).

³⁹ Brentano (1973: 145–146 [104]).

⁴⁰ Delboeuf (1875: 21–22).

⁴¹ Fechner (1890: 33).

⁴² Brentano (1979b: 87).

extensively developed in the text of his communication at the 3rd International Congress of Psychology held in Munich in 1896, but a note of *The Origin of the Knowledge of Right and Wrong* shows that it was already well in place almost a decade earlier.⁴³

Now, what about the measurement of the mental? As we have already noticed, the existence of psychic magnitudes is not at issue for Fechner, who takes up the observation by Kant and Herbart according to which sensations are susceptible to more and less. The real issue is that being quantifiable and being measurable are quite different things. That a sensation has an intensive degree being quantifiable in terms of “more” or “less” does not imply that this degree is measurable. It is at this level that real difficulties emerge. Since intensive magnitudes, by definition, have no parts, they *a fortiori* have no equal parts as well. But on the other hand, it may be agreed that the presence of equal parts is a necessary condition for measurement. Consequently, it seems that only extensive magnitudes can be measured.

Brentano rightly construes Fechner’s psychophysical law as an attempt to overcome this impossibility by boiling down the intensive differences between sensations to extensive differences between physical stimuli.⁴⁴ This reading is fully consistent with Fechner’s own views. However, Brentano also thinks that Fechner has failed to achieve his overall aim. The reason for this has already been mentioned. Fechner believed that the differences between extensive magnitudes on the side of physical stimulation would allow him — supposing that a functional relation between the two could be established — to specify equal parts, i.e., constant increases, within the intensive gradation of sensations. But he has not demonstrated that the differential thresholds really correspond to *equal* intensive differences between sensations. What he has actually established is, at best, that they correspond to “equally noticeable” differences. Brentano wrote in this connection, in 1896: “Fechner believed he had found out series of such equal parts in the just noticeable differences occurring when intensity increases. But he has never provided the proof that each barely noticeable difference is equal to the other ones.”⁴⁵

As Tanasescu (2003) has rightly pointed out, the difference between Brentano’s and Husserl’s treatment of sensation is that the latter is purely descriptive whereas the former is both descriptive and genetic. For Brentano, sensory contents are to be described also as “signs” referring to physical causes, i.e., to the corresponding stimuli. This view paves the way for a positive contribution to psychophysics. What is interesting here is that, far from rejecting the psychophysical project altogether, Brentano seems to consider his theory of sensory spaces as a better alternative to Fechner’s psychophysics, and thus as a

⁴³ Brentano (1889: 96, note 40).

⁴⁴ See Brentano (1979b: 81).

⁴⁵ Brentano (1979b: 81).

positive contribution to the problem of the measurement of the psychic. It is for this reason that I suggested, at the outset of this paper, that the dialogue with Fechner was strategically crucial for Brentano's theory of sensation.

Brentano's solution has at least two distinct aspects, which I shall only briefly sketch here. On the one hand, the theory of multiple qualities consists in equating sensory intensities with extensive wholes — with wholes which can, at least by analogy, be called *spaces* of sensation. On the other hand, Brentano lately developed a peculiar conception of intensity, in which the measurement scale is not space any longer, but time (which is, unproblematically, an extensive magnitude). These two approaches pursued by Brentano serve exactly the same purpose as the approach promoted by Fechner, namely, the purpose of overcoming the problem of psychic intensity by shifting from intensive to extensive magnitudes.

But more fundamentally, this line of thought also made it necessary to challenge the distinction between intensive and extensive magnitudes itself. In a 1916 text on Kant's theory of intensity which is now published in *Kategorienlehre*, Brentano even went so far as to state that the traditional opposition between intensive and extensive magnitudes is simply mistaken and can only lead to absurdities.⁴⁶ The main reason for this claim, I think, lies in the fact that psychic intensities are continuous magnitudes and hence, as he repeatedly emphasizes in his late writings, at least comparable to space and time.⁴⁷ But Brentano went a step further. In his late works on sensation, he appeals to Ockham's razor and proposes nothing less than to do without the concept of sensory intensity, precisely because intensity differences are reducible to spatial differences:

By such an assumption <namely by supposing that sensory spaces contain gaps>, one would completely abandon the received view on the intensity of sensation. According to this view, intensity is, like quality, spatiality, etc., a specific determining moment merging with the other ones into the *concretum* of the phenomenon. One can see that the assumption of such a specific moment is dispensable. (...) If intensity differences can everywhere be reduced to spatial differences, then intensity will vanish as a specific category, in a similar way as the color of sound vanished once it appeared to be reducible to different notes of the scale, etc.⁴⁸

Brentano started with the following two statements: first, there exist genuine qualitative multiplicities, that is, compound or "multiple" qualities which are not merely intermediate qualities between two other qualities; secondly, these qualitative multiplicities have to be described in terms of a spatial localization within "sensory spaces." For example, a chord composed of three notes, or purple

⁴⁶ Brentano (1985: 96).

⁴⁷ See, for example, Brentano (1979d: 176), where he observes that intensity, as a continuous magnitude, is "similar to extension" (*der Ausdehnung ähnlich*).

⁴⁸ Brentano (1979b: 73–74).

color as a combination of blue and red, are cases of “collocalization” (*Kollokation*), that is, cases where spatial distances between different qualities have decreased until they become unnoticeable and the qualities “fusion.”

In the 1896 text referred to above, Brentano gives no clear answer to the question of the nature of this sensory space, which he admits may be a space only “in an extended sense” (*in einem erweiterten Sinne*).⁴⁹ In particular, he thinks – in apparent contradiction to his critique of the empiricist conception of space in other texts of the same period⁵⁰ – that his conception by itself commits one neither to nativism nor to empiricism, and that the sensory space may result from associations as well as be originally present in sensation.⁵¹

What interests us here is that, according to Brentano, the problem of the intensity of sensation can and should be resolved the same way, in terms of spatial determinations. It is possible, he believes, to explain the “more” and “less” degrees of the psychic intensity by appeal either to multiple qualities or to “unnoticeably small gaps” (*unmerklich kleine Lücke*) within the sensory space. On the one hand, for example, when the painter mixes blue and red in equal proportion to make purple, the intensity of the two primary colors decreases and looks lower than the intensity of the purple obtained. This, Brentano says, is explained by the fact that the multiple quality has an intensity which results from the *summation* of the intensities of the partial qualities it is composed of.⁵² If the original pure blue has an intensity of 1, then the intensity of the blue color within the (equally intense) purple color obtained must be 1/2. On the other hand, the space of sensation, as an extensive whole, has parts which can be full or empty, and it is the proportion of these full and empty parts that makes sensation more or less intense.

This brings us to the second point, which concerns time. The analyses I am referring to can be found in a small undated text published by Chisholm in *Untersuchungen zur Sinnespsychologie*, under the title “Critique of the traditional theory of intensity.” In this text, Brentano first observes, with Gauss, that all magnitude proper has parts, and that an intensive magnitude, therefore, can be a magnitude only “in an improper sense”.⁵³ But he then raises an interesting problem. There are good reasons, he notices, for calling intensity a “magnitude” (in an improper sense). If we do, it is because there appears to be something similar

⁴⁹ Brentano (1979b: 70).

⁵⁰ See Brentano (1979c: 167).

⁵¹ Brentano (1979b: 70).

⁵² Brentano (1979b: 76); Brentano (1979d: 182).

⁵³ Brentano (1979d: 177 ff.). A similar conception was also held by Meinong (1896). According to Meinong, sensory intensity is not really measurable because it has no parts (1896: 163). Nevertheless, he admits the possibility of a “surrogate” measurement referring to *Distanzen* or *Verschiedenheiten* between sensations. “Distances” are not increases of sensation intensity, but partless changes which can function as “very imperfect surrogates for intensity” (1896: 132). The “distance” between two sensations is a relation (as opposed to the complex relational whole formed by the two sensations) and, as such, it is simple and not really measurable (1896: 22–23).

between the intensive degrees of more and less and magnitudes proper. Accordingly, what we have to do now is to “identify the magnitude proper by reference to which intensity is, in an improper sense, called” a magnitude.⁵⁴

Now, Brentano thinks that there is only one possible answer to this question: the genuine magnitude in question must be the magnitude of time. His argument is that an intensity A is greater than another intensity B if and only if, when both intensities decrease at an equal speed, A reaches the zero-point of intensity after B:

If one considers the case where intensity steadily decreases with a certain speed, then the greater intensity reaches the absolute zero-point later, and the smaller intensity earlier. The magnitude of time which is required for them to reach the zero-point at an equal speed is therefore what provides the measure for the relative magnitude assigned to intensities.⁵⁵

In my view, it is highly illuminating that Brentano here uses the term “measure.” The magnitude of time, as he says, “provides the measure” (*das Maß abgibt*). The aim, for Brentano just as for Fechner in his *Elements of Psychophysics*, is to guarantee the possibility of a measurement of sensory intensity.

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⁵⁴ Brentano (1979d: 178).

⁵⁵ Brentano (1979d: 178).

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