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# Perceptual Spaces Are Sense-Modality-Neutral

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**Abstract:** The paper presents and discusses phenomenological facts about perceptual spaces and percepts, but ends with a few thoughts about possible causal explanations of such spaces. The overarching double-sided hypothesis claims that – from a phenomenological point of view – each individual animal has at each consciously perceived moment of time a sense-modality-neutral perceptual space, and that these perceptual spaces are so-called container spaces. This means, to be concrete, that blind persons, deaf persons, and all perceptually non-handicapped persons have the same kind of phenomenological perceptual space, a sense-modality-neutral container space. The causal reflections bring in James J. Gibson’s work on such matters.

**Keywords:** Perception; Sense-modalities; Space; Phenomenological facts; Percepts and qualia

## 1 Perceptual container spaces – what are they?

This paper puts forward the idea and double-sided hypothesis that – from a phenomenological point of view – perceptual spaces are sense-modality-neutral and are container spaces. The latter notion is explained in this section. Sections 2–4 introduce a number of concepts and distinctions that are necessary for the argumentative defense of the hypothesis. Sections 5–6 contains the defense, and Section 7 complements the earlier phenomenological reflections with some reflections on possible underlying causal processes.

In order to come to conceptual grips with the world in which we live and perceive, we need to posit at least two kinds of spaces, physical space and perceptual spaces. The expression ‘physical space’ is in the singular, since I take the liberty of neglecting the many-worlds interpretation of quantum mechanics. On the other hand, the expression ‘perceptual spaces’ is in the plural, since I take it for granted that perceptions of different persons (and of perceiving animals in general) are *numerically* different.

The question whether perceptual spaces of different persons can overlap is not touched upon. Neither is the question of how perceptual spaces are related to physical space discussed. In my opinion, the answers to these questions depend on how perceptual spaces are regarded. This means that lively issues such as those of embodied cognition, cognitive penetration, and disjunctivism are left unexplored.

In ordinary conscious visual perception, one of the most striking features is that things, events and processes are perceived as being spatially located and as having spatial distances between them. But without a space there are neither spatial positions nor spatial distances. Therefore, in some way or other, there must be something that deserves the label ‘perceptual space’. This paper is devoted to the question how the referents of this label are best described.

Physical space has received much more theoretical attention than perceptual spaces have, but it is not by accident that in both cases the notion of space is used. Therefore, I will first present some distinctions made in the philosophy of physical space, and then import them into perception theory. The main generic distinction in the philosophy of physical space is the one between *relationist* (or relational) and *substantialist* conceptions of space.

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According to the relationists, physical space is a web of relations between material relata, be the relata things, events, point-properties of fields, or some other possible kind of material entities. According to the substantialists, physical space exists in itself in addition to material objects. The term ‘substantialist space conception’ subsumes various specifications. I will only present the one that I think is of importance for perception theory, and I will call it *the container conception of space*.<sup>1</sup> It is not especially popular in today’s philosophy of physics, but that is of no importance for this paper, which at bottom is concerned only with perceptual spaces.

The container conception of space has a grandiose past. It is the space conception of Newtonian mechanics. Here, space is regarded as a receptacle that might in principle have been empty, but as a matter of fact contains material entities. Furthermore, first, it is homogeneous; all spatial regions are, although numerically different, qualitatively exactly alike. Second, it extends in all directions indefinitely.

From a metaphysical point of view, Newton himself found it hard to regard space as being ontologically on a par with his material corpuscles. He thought of space as “God’s sensorium.” The Kant of the critical period, in a similar vein, argued that space is a form of intuition created by a transcendental faculty. On the other hand, the physicist Leonhard Euler and the philosopher Anton Marty (both from Switzerland) claimed that the space of Newtonian mechanics should be regarded as having a mind-independent existence.<sup>2</sup> For the purpose of this paper, the answer to the mind-dependence question may be as it may. I will only discuss perceptual spaces that persons (and perhaps some animals) are conscious of, and these spaces are by definition mind-dependent.

The container conception of space aligns well with our conception of ordinary rooms, except the fact that ordinary rooms have definite boundaries. Since normally we do not perceive air and electromagnetic fields, we perceive rooms as to a larger or lesser extent containing a void, and usually we think of the rooms as existing prior to the things that have been put into them. A room is regarded neither as some kind of relations between the things in it, nor as a contingent structure inhering in the properties of the things there. Also, rooms can always easily be thought of as being completely empty, as three-dimensional holes so to speak; and some of them are also so perceived. Such a room is homogenous in the sense that all its different parts are regarded as exactly similar in their emptiness.

Most discussions about the container conception of space have been centered round around whether or not motion in relation to such a space can be detected. As I will show, the best argument in favor of a container conception has a different character. I call it *the handedness argument*. It was first put forward by Kant in his pre-critical period, but he used it a couple of times also in his critical period.<sup>3</sup>

Kant asks his readers to think of a lonely hand, and then note that, surely, it must be regarded as being either a left hand or a right hand. On a relationist conception of space, a lonely hand could be neither, since there is nothing to compare it with. This raises the question: how then to explain this handedness fact? And Kant’s answer is: there must be something distinct from the hand to which the hand has a relation, even if not an ordinary material thing. In fact, the hand is contained in a space that is distinct from the hand, and handedness is a relation between the shape of the hand and the space that contains it. In other words, where a handedness shape is possible, there must be a container space, too. Let it be noted, before I proceed, that the feature I call handedness is a feature of all shapes that, like hands, lack a center-point, line of symmetry, and plane of symmetry. For example, so-called chemical enantiomers and chiral molecules do by definition have this feature.

<sup>1</sup> Barry Dainton distinguishes between three kinds of substantialism: *relational substantialism*, *container substantialism*, and *super-substantialism*; Dainton, *Time and Space*, ch. 9.4. The first makes spatial locatedness a primitive relationship, and the third holds that spatial objects are identical to or “adjectival” on regions of space. The variety of container substantialism that I will present differs in one important respect from Dainton’s. According to him, “there is space only outside and between material things,” whereas in “my” variety there is space also where there are material objects. That is, objects and spatial regions are regarded as *co-located*; an object is always *located at* a specific spatial region, and this region is, in turn, *located in* a certain place in the space that contains all the regions.

<sup>2</sup> Euler, “Reflections,” and Marty, *Raum und Zeit*.

<sup>3</sup> See Kant, “First Ground” and *Inaugural Dissertation*, and Broad, *Kant*, 40–1. What I am next briefly going to say can be found spread out in Broad, *ibid.*, ch. 2.2.3, Dainton, *Time and Space*, ch. 14.4–5, Nerlich, *Shape of Space*, ch. 2, and Nerlich, “Incongruent Counterparts.”

I think the essence of the argument comes out more easily if, as Kant also did, one considers two equally large shapes that have the feature of handedness. Before I bring in hands again, look at the two two-dimensional shapes *b* and *d*. If they are confined in a two-dimensional space, a surface, they cannot, despite their obvious similarity, by any kind of movement *in* the surface be made to occupy exactly the same spatial region where one of them earlier was. Figures that can so occupy the same space are, with a classic geometrical term, *congruent*. In the surface in which they exist, *b* and *d* are *incongruent*. Kant would call them incongruent *counterparts*, stressing the fact that they are incongruent despite having the same size and an obvious similarity in shape; in a mirror, a *b* becomes a *d*. However, in a three-dimensional space they are congruent. Rotate *b* 180 degrees in a perpendicular third dimension and place it down again, and then you will have the shape of *d*. The shapes *b* and *d* are *necessarily two-dimensionally incongruent*, but they are congruent in all spaces that have more than two dimensions. This fact, by the way, also eloquently shows that handedness cannot possibly be a brute intrinsic feature; such features stay the same independently of the space in which they exist.

Think now again of a right hand and a left hand. They are in a three-dimensional space what *b* and *d* are in a two-dimensional. In whatever way they are moved in a three-dimensional space, they cannot possibly be made to occupy exactly same region where the other hand earlier was. So: how best to explain this peculiar similarity, dissimilarity, and necessary incongruence between the two hands? It cannot be explained by the intrinsic features such as part sizes, part shapes, and angles between different parts of the hands. Therefore, the most reasonable explanation is to say that the hands are located in a container space to which they have different relations. Metaphorically speaking, they have been differently inserted in space. Literally speaking, the shapes *b* and *d* have been differently inserted on the surface in which they exist. In a mirror image, the shape of a left hand becomes the shape of a right hand, and vice versa; a mirror changes the mirrored thing into, in Kant's terminology, an incongruent counterpart.<sup>4</sup>

If a fourth dimension is allowed, then the left hand can by being "rotated" in the fourth dimension be turned into a right hand. However, since our human perceptual spaces are three-dimensional, such a move, although worthy of discussion in physics, is here out of the question.<sup>5</sup>

Let me summarize. A container space is a particular that neither is nor is an analogue of property-bearers, properties, or systems of relations; it is an analogue – and only an analogue – of the interior of ordinary empty rooms as ordinarily conceived. The handedness argument shows that where space is regarded as three-dimensional, and where handedness is possible, i.e., where three-dimensional shapes that lack a center-point, line of symmetry, and plane of symmetry are possible, the space in question must be a container space. In Section 5, I will in each of the seven subsections ask the question whether handedness is possible in the kind of perceptual space under investigation.

## 2 Phenomenological facts – what are they?

Percepts and perceptual spaces can be investigated from at least two perspectives: how they are best phenomenologically described and how they may be caused. The causal perspective presupposes the phenomenological. Now, importantly, it is a mistake to think that the phenomenological task is an easy one and is infallible. It can by no means be equated with introspection, since it can also include describing what we take to be the opposite of introspection, namely perceptions of the external world. Everything we consciously experience, be it a thing, a property, an event, or a process in the world, or be it an illusion, a hallucination, or a dream, is a possible object for a phenomenological description. As I am using the terms

<sup>4</sup> It should be noted that if an outside-inside distinction is allowed for the shapes discussed, then, to take an example, a right glove can be made into a left glove by being turned inside out. This qualification becomes relevant in section 5.3. In geometric topology, surfaces are regarded as infinitesimally thin, i.e., it makes no sense to speak of them as having two sides such as an outside and an inside.

<sup>5</sup> Graham Nerlich defends a container conception even in modern physics; for a brief presentation see Nerlich, "Incongruent Counterparts," and for a longer one his *Shape of Space*. I find his arguments conclusive; see Johansson, *Ontological Investigations*, ch. 10 and "Presentation and Defense of Marty's Conception."

‘percept’ and ‘conscious experience’, there are when we are in dreamless sleep no percepts or conscious experiences at all.

I will now state as clearly as I can what I mean by the expression ‘descriptions of phenomenological objects and facts’, or ‘phenomenological descriptions’ for short.<sup>6</sup> In such, by definition, descriptions of presumed diachronic causal processes behind the perceptions, as well as descriptions of presumed for the perceiver strictly unobservable synchronic causes, are not allowed. I am well aware of the vagueness in the expression ‘strictly unobservable’, and I regard this expression as being definable only by means of examples. Below follow two kinds of examples of what is and what is not to my mind a phenomenological description, and then some further words of clarification are added.

First kind of examples: moving closer to the perceived object. The well-known saying “He can’t see the forest for the trees” makes a phenomenological point. Looking at a small forest from a hill, one sees a forest. However, asked about what one sees, one may perhaps go down the hill and move close to the forest, and then say “I see a number of trees.” The latter answer is *not* a phenomenological description of what one sees from the hill. Similarly, one may from a distance see a surface as uniformly grey, but when one comes close to it see a pattern of white and black dots. To say that the perceived grey color consists of white and black dots is *not* a phenomenological description of the perceived greyness. In both cases, however, a causal account of the first perception may have to bring in non-conscious physical-physiological-neural apprehensions of trees and white-and-black spots, respectively.

Second kind of examples: perceptual illusions. Without phenomenological descriptions perceptual illusions cannot possibly be described. Three such examples. In the Ebbinghaus illusion the “really” equally large circles must by the perceiver be seen and described as being of unequal size. In the Müller-Lyer illusion the “really” equally long shafts of the arrows must be seen and described as being unequal. In the Hering illusion the “really” parallel lines must be seen and described as being bowed outwards. In all three cases, however, a causal explanation of the illusion may have to bring in non-conscious physical-physiological-neural apprehensions of equally large circles, equally long shafts, and parallel lines, respectively.

But there is more to say about these illusions. After having seen the illusion and realized that it is an illusion, one can take on an analytic attitude and try to see the circles and the lines as they “really” are. Then, after a while, the first simple illusions disappear in favor of perceptions whose best phenomenological descriptions are, in turn: “the circles are neither of equal nor of unequal size,” “the lines are neither of equal nor of unequal length,” and “the lines are neither parallel nor not parallel.” As far as I know, this indeterminacy fact was first noted by Merleau-Ponty.<sup>7</sup> Many reading and speech-listening acts contain indeterminacies. To answer a question such as “Will you come?” with “Maybe” is to give an indeterminate answer; the question is answered with neither a yes nor a no. To read or hear out of context a statement such as “The blade fell to the ground” is to find the term ‘blade’ indeterminate as to whether it refers, say, to a leaf (belonging to a tree) or to a sheet (of paper). Merleau-Ponty’s observation shows that also non-linguistic perceptual acts can contain straightforward indeterminacies.

Conclusion: illusions of the kind mentioned can come in two different forms, and they require separate phenomenological descriptions. The Ebbinghaus illusion, for instance, can by one person be described as “the circles are of unequal size,” and by another as “the circles are neither of equal nor of unequal size.”

Some philosophers of perception use the term ‘see’ in such a sense that in visual hallucinations and dreams one does not *see* anything at all, one is only having a *visual experience*.<sup>8</sup> This way of speaking is *not* in conformance with what I mean by a phenomenological description. If a person who is hallucinating a rat sees the percept in question as being a mind-independently existing rat, then the adequate first-person *phenomenological* description is “I see a rat.” That is, the phenomenological description is the same as the one that would be given of a veridical perception.

<sup>6</sup> I take my definition to come close to what the early naturalist Husserl meant by “descriptive psychology.” In such descriptions our natural object- and fact-oriented attitude is put within parenthesis in order to make the very perceptual act as such describable. Husserl’s later idealism-embedded “phenomenological-transcendental reduction” is something partly different.

<sup>7</sup> Merleau-Ponty, *Phenomenology of Perception*, 6 and 11.

<sup>8</sup> For instance, Searle, *Intentionality and Seeing Things*.

However, as in the case of illusions, hallucinations can come in two different forms. Some people have *pseudohallucinations*, i.e., they spontaneously see the hallucinations as being hallucinations. In such cases, the adequate phenomenological description would be “I have a visual rat hallucination” or “I see a rat, but equally spontaneously know there isn’t one.”

Also to be noted is that, trivially, what phenomenological descriptions one can make depends on how rich one’s vocabulary is. For example, those who do not have recourse to the notion of container space cannot possibly describe perceptual spaces as being container spaces. An adult who sees a uniformly colored orange spot and is asked “What color do you see?” can answer “Orange.” But a child who has learnt to master the words ‘red’ and ‘yellow’, but not yet ‘orange’, may well creatively answer “Red-yellow.” This does not mean that the child is actually from a phenomenological point of view seeing two colors or a mixture of two colors. The child sees one determinate color, but needs two concepts in order to describe it.

There are, though, philosophers with an advanced color vocabulary who has argued that some seemingly simple colors are in fact mixtures of some other and truly simple colors. To my mind, they have not thought enough about the distinction between phenomenological descriptions and causal explanations.<sup>9</sup> When one paints with watercolors, one can produce orange by mixing red and yellow, but the perception of orange is nonetheless a perception of only one determinate color hue. Simple color percepts cannot be treated as if they can have unobservable color percepts. Percepts are appearances, and in such, by definition, appearance and reality are identical. The fact that even appearances can be *wrongly described* is quite another thing. Therefore, one may even in phenomenology have to argue for the application of certain notions; as in Section 4 I will do with respect to ‘present-in-absence’, and in Sections 5 and 6 with respect to ‘container space’.

In order to be able later to defend my hypothesis about perceptual spaces, I need to, I am sorry to say, introduce still another concept. Above, I have only spoken of what might be called *phenomenological identity descriptions*. Of course they contain implicit comparisons with other similar and dissimilar situations. This follows from the mere use of concepts; there is no concept that cannot be contrasted with some other concepts. However, for the purpose of this paper, phenomenological identity descriptions must be kept distinct from *phenomenological difference descriptions*. In the latter, a difference between two or more phenomenological objects or facts are explicitly described. Let me briefly explain.

Assume a perception psychologist makes you first look at one color spot, then at a second, and at last at a third. Whereupon the experimenter asks you which of the last two colors is most similar to the first. Your answer will be an example of a phenomenological difference description. The same is true even if you see all the three color spots at the same time, and are then asked to describe the difference order between them. By systematically iterating such comparisons so-called *quality spaces* have been constructed. In section 5.3 I will return to them, but then use the term ‘*symbolic qualia spaces*’ in order more precisely to delimit what I have in mind.<sup>10</sup> Just now, I only want to fasten attention to the distinction between phenomenological identity and difference descriptions, respectively, and point out that the kind of quality spaces I will later talk about contain phenomenological descriptions of quite a specific sort.

Phenomenological notions can be – and often are – fused with causally explanatory notions. If not noted, this semantic possibility can easily distort what I want to say. Therefore, in order to be able to argue my point

<sup>9</sup> A recent such paper is Sundström, “Are Colors Visually Complex?” According to G.E. Moore’s lecture notes, Wittgenstein did in the early 1930s entertain similar ideas. I quote Moore: “a difference which he also expressed by saying that whereas an orange can be properly called a ‘mixture’ of yellow and red, red cannot possibly be called a ‘mixture’ of orange and purple”; Moore, *Philosophical Papers*, 317. Astonishingly, to my mind, even Brentano entertained such ideas; see Massin and Hämmerli, “Brentano on Color Mixtures.” Even though these authors criticize Brentano, I think their own proposed “mixture view” does not take the problem of delimiting phenomenological facts seriously enough. Often, the view I reject is simply in passing taken for granted: “Binary hues like orange and purple have the phenomenal characteristic of appearing as mixtures of primary hues—red and yellow, or red and blue, respectively”; Chirumuuta, *Outside Color*, 59.

<sup>10</sup> Here is one proposed definition of quality spaces: “A *quality space* is an ordering of the qualities presented by a sensory modality in which relative similarities among those qualities are represented by their relative distances”; Clark, *Theory of Sentience*, 1. For my purposes the definition is both too narrow and too wide. Too narrow, since it does not allow purely ordinal (non-distance) orderings; and too wide since the term ‘quality’ is allowed to refer to non-phenomenological entities, too.

that all perceptual spaces are of the same kind and are container spaces, I must say something about the fluidity of language and some subtle differences between superficially qualitatively identical perceptions.

When talking about actions and behavior, everyday language often makes use of concepts which combine descriptions and explanations. For instance, the expression ‘he has got an adrenaline kick’ gives both a vague description of a person’s behavior and an indication of the assumed un-observable cause of it. Such connections, however, can be broken; the causal explanation can become obsolete but nonetheless the old word be used descriptively. In ancient times, the word ‘melancholy’ (in Greek ‘*melaina kholé*’, black bile) referred just like ‘adrenaline kick’ both to a kind of behavioral temperament and to the presumed cause of it, an excess of black bile; today, it only refers to a kind of temperament.

The point just made about descriptions and causal explanations of behavior, is equally relevant for perception theory. Long ago, David Katz wrote: “The description of these phenomena [lustre] is often confused with considerations of the conditions of their production” and “Apparently, even [the famous] Hering can fall into the error of sacrificing observable fact to a physical-physiological purism.”<sup>11</sup> In my opinion, this error still haunts much perception theory.

Many perception theorists move so fast back and forth between descriptions of phenomenological facts and of the causal mechanisms that give rise to them, that it becomes unclear to me what claims they in the end have put forward. They fuse phenomenological descriptions and causal explanations in the same way that in ordinary language we fuse descriptions and explanations of behavior. This may well have great internal-scientific advantages. After all, investigations of the causal processes behind perceptions have paved the way for remarkable inventions that help people with impairments of vision (e.g., artificial lens implants) and audition (e.g., cochlear implants). And such perception-related inventions seem not to belong only to the past. There is reason to think that also in relation to taste and smell disorders there are revolutionary inventions waiting around the corner. Surely, however, even if the kind of semantic fusion mentioned can be positively functional among scientists of a certain specialty – and I do not want to legislate about their conceptualizations – it cannot be allowed in my undertaking.

Let me at last stress one thing. Even if it is hard, or even impossible, to find clear explicit criteria for how in *all* cases to distinguish between phenomenological descriptions and causal explanations of conscious perceptual experiences, perception theory cannot possibly delete the distinction. If there is no link at all between studies of physical-physiological-neural processes and conscious experiences of some kind of percepts, then the research in question cannot be called perception research. I regard my delineation of the notion ‘phenomenological description’ as being enough for the purpose of this paper.

### 3 Sense modalities – what are they?

The possible fusion of phenomenological descriptions and causal explanations that I mentioned in the last section, is of relevance for how to speak of sense modalities. As long as mainstream perception theory was still in the grip of the view that there are five different specific senses connected to one causal mechanism each, there was no practical need to distinguish between phenomenological sense modalities and causally explanatory sense modalities. Phenomenology and causal explanation very much walked hand in hand. However, already the early discoveries that smell and taste in the phenomenological sense are due to an interaction between the presumed mechanisms for smell and taste, implied that a distinction between phenomenological and explanatory sense modalities has to be made. Today, with the general acceptance of the existence of both amodal, multimodal, and cross-modal perceptions the need is urgent. We cannot in our everyday world stop talking about different sense modalities, but we should all the time be aware of the fact that from the point of view of contemporary causal perception theories, this talk must be considered (as I do) as only phenomenological or as relying on outmoded “folk theories” of perception. When, in what follows, I am talking about specific sense modalities, I am talking only about phenomenological facts, not about causal mechanisms.

<sup>11</sup> Katz, *World of Colour*, 23 and 222.

Some words also about my use of the general term ‘perception’. I will use it as a term that can be qualified in various ways in order to connect it to different phenomenological sense modalities – whatever the true causes behind the perceptions are. That is, I will use ‘perception’ in something like the way ‘-ception’ appears in the following terms: ‘ophthamoception’ (visual perception), ‘audioception’ (auditory perception), ‘gustaoception’ (taste perception), ‘olfacoception’ (olfactory perception), ‘tactioception’ (tactile perception), ‘proprioception’ (posture-and-self-movement perception), and ‘nociception’ (pain perception).

Hereby, I cut off the traditional link between the word ‘perceiving’ and the view that what is called perception must be causally grounded in some known well-defined sense modality, i.e., that through (= *per*) some kind of specific sense a person gets hold of (= *ceives*) a percept.

## 4 Present-in-absence percepts – what are they?

Crucial to this paper is what I refer to by means of the expression ‘present-in-absence percepts’. It is a generic term for a number of features that were first highlighted by Edmund Husserl, the early phenomenological tradition, and Gestalt psychology.<sup>12</sup> The Metaphysical poet John Donne (1573–1631) made the first part of the expression the title of a famous poem, and it occurs in the names of some contemporary art works, too. Donne’s poem ends: “In some close corner of my brain: There I embrace and kiss her; And so I both enjoy and miss her.” In Donne, the expression means vividly present in mind but absent in perception; in art works, it means vividly present in the perception of the art work but absent in reality. In this paper, it will mean vividly present in perception but absent in what has been called sensations, sense-data, hyletic data (Husserl), sensory quality, or qualia. In what follows, I will use only the term ‘qualia’.<sup>13</sup>

Let me present some classic examples of features in perception that cannot possibly be called qualia, and which *from a phenomenological point of view* cannot possibly be called mere thoughts, visual images, or phantasies associated with qualia.<sup>14</sup>

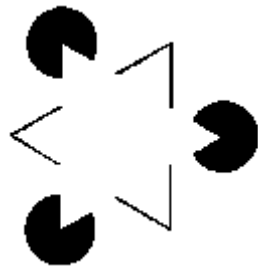


Figure 1. Kanizsa’s triangle

First, Kanizsa’s triangle (see Figure 1). It is a triangle where some spatially separated qualia give the perceiver the impression that there is a bright white triangle with sharp boundary lines, even though it is at the same time obvious that there are no qualia or percept lines. That is, the lines are vividly present in perception but absent in qualia. In my opinion, something can be present-in-absence only if there is something else

<sup>12</sup> The term is a close akin to the term ‘amodal completion’ coined by the famous perception psychologist Albert Michotte (see Michotte et al., “Amodal Completion.”), but it is neither in intension nor in extension identical with Michotte’s term.

<sup>13</sup> I want to avoid notions such as ‘sensations’, ‘sense-data’, and ‘sensory’, since they too easily bring with them associations to the notion of sense organs; even dreams can contain qualia in my sense. I regard ‘quale’ as a primitive term that can appear in questions such as ‘Are qualia necessarily mind-dependent?’, ‘Can qualia be representational?’, and ‘Are qualia properties of experiences or are they experienced properties?’ No connotation of the term ‘quale’ is for me dependent on how these questions are answered. I take my terminological decision to be in conformity with what the SEP entry “Qualia” calls “the very broad way” of using the notion ‘qualia’; Tye, “Qualia,” sect. 1. The term ‘quale’ is used in passing already by Ewald Hering and David Katz; Katz, *World of Colour*, 12.

<sup>14</sup> I here confidently side with Husserl’s arguments; Husserl, *Thing and Space*, §18.

that is so to speak *present-in-presence*, as qualia always are.<sup>15</sup> This view of mine is founded on the gestalt psychological belief that the basic perceptual datum is a figure-ground percept. Necessarily, a present-in-absence percept has some present-in-presence qualia or percepts as its ground.

Second, look at the dots that follow: ●● ●● ●●. The nine dots are not perceived as simply a number of dots. They are perceived as a pattern of three groups of dots, despite the fact that there are no qualia that are experienced as the group boundaries. It is a case of what some gestalt psychologists called the law of proximity. A mere aggregate of spots close to each other in space are automatically turned into a unity. In the same vein of law-talk, Kanizsa's triangle was seen as a case of the law of good form.

Third, when we see, say, a simple table with four legs nearby and in front of us, then we see in the qualia-containing sense only the upper side of the top surface and (in my example) two of the legs. Nonetheless, in some sense of seeing, we also see that the top surface has an underside and that the table has two more legs. Also, we can (in my example) see that there is on the other side of the table a partly hidden chair. Borrowing a term from the perception theorist James J. Gibson, I will say that the underside, the "unseen" two legs, and the hidden part of the chair exist in the perceptual field as *occluded*.<sup>16</sup> In my terminology, what is perceptually occluded is a present-in-absence percept. The table example can of course be generalized: "an object always occludes [parts of] itself and generally also occludes something else."<sup>17</sup> As far as I am concerned, the last statement might be dubbed Gibson's law of the omnipresence (in everyday perception) of occlusion.<sup>18</sup>

What is visually occluded is normally described by means of that-clauses: we say we simply see the upper side of the top surface and the front two legs, but we say we see *that* the top surface has an underside and *that* the table has two further legs. According to ordinary language, we do not only see objects, properties, relations, events, and processes, we see states of affairs, too. And I think this way of speaking is phenomenologically adequate, even though from a causal point of view some perception theorists would like to say that *seeing that* involves two processes, one of pure seeing and another that is cognitive (more about this in section 5.1).

That something is present-in-absence means, I repeat, that it is vividly present in perception but absent in qualia. Hallucinations such as seeing a rat are not in this sense present-in-absence. They are present-in-presence percepts, even though they present as real something that is in fact absent in ordinary reality. Less obvious is the fact that neither so-called *perceptions of absences* (or *perceptions of nothingness*) belong to the extension of my notion. Examples of such perceptions are: you can *see* that someone you expected to be in a room is not there, you can *feel* that something that ought to be in your pocket is not there, and you can *hear* that some noise is gone.<sup>19</sup> It exists even in olfaction; you can sometimes *smell* that there is no odor, only non-odoriferous fresh air.<sup>20</sup> This kind of percepts I call *absent-in-presence* percepts.

I have now introduced a distinction between three kinds of percepts: present-in-absence, present-in-presence, and absent-in-presence percepts. Combinatorial reasoning gives rise to a fourth expression: 'absent-in-absence percepts'. But this expression cannot possibly have a referent. For there to be a percept at all, and not only mere thinking, something has to be perceptually present.

<sup>15</sup> In my opinion, it is possible to have two perceptions in relation to which in retrospect it is possible truly to say that one contains Kanizsa's triangle and the other not, but the qualia involved are qualitatively identical.

<sup>16</sup> Gibson, *Ecological Approach*, 69–78.

<sup>17</sup> *Ibid.*, 74.

<sup>18</sup> Already Husserl, however, put forward the view, see Husserl, *Thing and Space*, §18. But let me add a quotation from Kevin Mulligan: "Unfortunately Husserl does not characterize positively the awareness in perception of the invisible house [or underside of the table]. [...] On Husserl's view, then, perception is entirely direct and necessarily incomplete"; Mulligan, "Perception," 194.

<sup>19</sup> For a recent searching comprehensive discussion of this kind of perceptions, see Sorensen, "Perceiving Nothings."

<sup>20</sup> See Roberts, "Breath of Fresh Air."



## 5 Spatial features of percepts and perceptual spaces

In this section, I shall present my views of some spatial features of percepts and perceptual spaces. The order of presentation is: (1) visual perception, (2) pain perception, (3) auditory perception, (4) tactile perception, (5) taste perception, (6) olfactory perception, and (7) posture-and-self-movement perception. With respect to each kind of perception I make the same four following claims:

- (I) Whenever there is in X-perception something that deserves the label X-qualia or X-percept, then this qualia or percept has a perceptual spatial *extension*. In other words, such perceptual entities “possess intrinsic spatial extension,” and “Arguably, every sense modality presents appearances that have some spatial character.”<sup>21</sup>
- (II) Between the kinds of perceptual entities mentioned, there can be, and mostly are, *spatial relations*; for instance, obviously and normally, both visual and auditory percepts are placed beside each other.
- (III) Normally, perceptual spaces contain perceived as present-in-absence three-dimensional *empty regions of perceptual space*.

These three phenomenological claims constitute the basis on which I will then put forward the claim:

- (IV) Perceptual spaces are container spaces.

The first three claims imply – when complemented by *the handedness argument* – the fourth. But some philosophers explicitly deny claim IV. Barry Dainton, for example, is in favor of claims I, II, and III, but opposes a container conception of perceptual spaces. He calls the empty regions mentioned in claim III *phenomenal voids*, and even creates a special term for spaces that contain them, ‘V-spaces’. About them he says: “V-spaces are *most naturally* regarded as relational.”<sup>22</sup> This is exactly the view I want to criticize. Most contemporary philosophers of perception seem not to be explicitly aware of this “space question”; but they seem implicitly to be of the same opinion as Dainton. In the philosophy of perception, unhappily, the notion of container space is a notion *non grata*.

Above, I have distinguished between four claims that will reappear throughout this section, but I will also *in each subsection* below refer to the first two of the following three questions:

- (α) *the container question*: is here claim IV true or false?
- (β) *the analogy question*: are the empty spatial regions analogous to the specific kind of qualia under discussion? When the answer is yes, one can call the perceptual space that contains visual qualia a visual space, the one that contains auditory qualia an auditory space, and so on.
- (γ) *the one-kind-of-space question*: do all the modal-specific, amodal, multimodal and cross-modal kinds of qualia and percepts exist in the same kind of perceptual space or not?

The last question will not be discussed until Section 6; the answer will be affirmative.

<sup>21</sup> The first quotation is from Dainton, *Phenomenal Self*, 35, and the second from Clark, *Theory of Sentience*, 40. The view that color qualia and spatial extension are necessarily connected has a history that dates back to Berkeley. I here trust Stumpf, *Psychologie und Erkenntnistheorie*, 484, who also held this view. Husserl generalized it: “no [perceptual] res materialis is conceivable which would not be a res extensa”; Husserl, *Ideas*, 361 and §150.

<sup>22</sup> Dainton, *Stream of Consciousness*, 76; italics added.

## 5.1 Visual perception

I find it obvious that we never can see or create a visual image of a spatially non-extended point in isolation (= claim I is true).<sup>23</sup>

Also, I find it obvious that there is in visual perception something that can be called spatial relations between the parts of what we see (= claim II is true), whether the parts are ordinary things, properties of such things, events, parts of processes, or mere visual spots.

Thirdly, I find it clear that normally we see things and events as being at a distance from us. For instance, sitting in an otherwise empty room, we are aware of the fact that there are no things between us and the seen wall in front of us. *The spatial region between us and the wall is present-in-absence*. There are no visual qualia in the empty region; there is a phenomenal void but not a perceptual void, since there are present-in-absence percepts. Therefore, the question to ask is not whether there is in such perceptions an empty spatial region or not, for there is indeed one (= claim III is true).<sup>24</sup> However, as a present-in-absence percept it has to have some present-in-presence percepts as its ground, and these are of course the non-empty regions.

It should be noted, that there is a difference between the empty-region case just mentioned, and the cases I used when introducing the notion of present-in-absence percepts. In those cases, we are *looking at* what is present-in-absence; but in the case of empty space regions we are *looking through* what is present-in-absence.<sup>25</sup> Nonetheless I think the expression is apt.

As mentioned in Section 4, what is present-in-absence is in ordinary language often described by means of that-clauses, and in ordinary language it also makes good sense to say that we see *that* the room is empty. To me, this linguistic observation only means that ordinary language comes close to a purely phenomenological description. What happens, then, if someone tries to connect our phenomenology to a causal explanation of visual perception?

At the beginning of the seventeenth century, Kepler discovered that the two-dimensional retinal image is an inverted projection of the three-dimensional world outside the eye. His ensuing conclusion, that we do not really see a three-dimensional world but a two-dimensional retinal image, made quite an impact. On Kepler's view, just as the brain corrects the orientation of the inverted picture at the retina, it also constructs visual depth and empty spatial regions. Accepting this causal story, and accepting ordinary language's fusion of phenomenological descriptions and causal explanations, it became natural to say that we do not really see visual depth.

At the beginning of the eighteenth century, Berkeley could, when presenting the contents of his book *An Essay Towards a New Theory of Vision*, confidently say:

It is, I think, agreed by all that DISTANCE, of itself and immediately, cannot be seen. For DISTANCE being a Line directed end-wise to the eye, it projects only one point in the fund of the eye, which point remains invariably the same, whether the distance be longer or shorter.<sup>26</sup>

<sup>23</sup> For the purpose of this paper, it is not necessary to try to answer the question whether in the middle of a square consisting of four equally large but differently colored sub-squares we can see a non-extended point or not. Whatever the answer is, the point in question exists only as part of a spatially extended visual entity.

<sup>24</sup> Mac Cumhaill says: "empty space does, after all, have a phenomenal appearance and, so, is not best cast as a species of absence perception"; Mac Cumhaill, "Perceiving Immaterial Paths," 687 and *Seeing Through*, ch. v. What she calls *absence perception*, I call *absent-in-presence perception* (not present-in-absence; see Section 4); and with this terminology made clear, I agree with the last part of her statement. However, since she does not distinguish between phenomenal appearances that are *present-in-absence* and *present-in-presence*, I cannot without qualifications agree with the first part. Husserl says: "What we see are bodies, and together with the seen, we grasp the 'between,' which phantasy can then populate with bodies in this or that way. Thus, space is rather co-seen"; Husserl, *Thing and Space*, 223. 'Co-seen' is the translation of the German "mitgesehen," i.e., what is co-seen is regarded as in some sense secondary to what is seen.

<sup>25</sup> Compare Mac Cumhaill's distinction between *see* and *see-through* in "Perceiving Immaterial Paths" and *Seeing Through* as well as the discussion in Massin, *L'objectivité du toucher*, 102–13.

<sup>26</sup> Berkeley, *An Essay*, sect. 1, point 2.

Berkeley claims that visual depth is a construction that relies on earlier tactile sensations. That is, he does not deny the fact that from a phenomenological point of view there is in perception awareness of visual depth. His point is that we do not *see* it.

The view that we see only two-dimensional surfaces, and that visual empty regions are some kind of constructions which does not belong to the receptive visual sense modality was to become the mainstream view among philosophers and psychologists up to the present day.<sup>27</sup> The story is told in more words in Matthen, “Introduction”, sect. I–II. He calls the view RIM, the Receptoral Image Model.

From my perspective on language fluidity, one can retain RIM, but nonetheless use the word ‘see’ in such a way that we can say that we see depth. This is done by John Searle in his book *Seeing Things as They Are*. He says:

What about the perception of depth? I can literally see from where I sit that the couch is further from me than the chair. [...] The subjective visual field is not a visible object having two dimensions. But what I mean by that is this: whatever you get in the subjective visual field by way of depth you can get from a two-dimensional stimulus. [...] The visual system has nothing to go on except the impact of light on the retina, together with such Background dispositional capacities and Network intentional states as the agent may possess.<sup>28</sup>

But even RIM can, *pace* Searle and his forerunners, be questioned. The first to do so (but not mentioned by Matthen) was the famous perception theorist J.J. Gibson, who did it already in 1966 in *The Senses Considered as Perceptual Systems*. According to him, the visual system has much more “to go on” than the impact of light seen from a physical point of view. He intended the book to replace “theories of sensation-based perception” (= RIM) with his own “theory of information-based perception.”<sup>29</sup> Despite everything that has happened in perception theory since the mid-1960s, I think the book is still in radical opposition to most contemporary perception theories even if some of these do not regard receptors as passive, as they were regarded when Gibson lived.<sup>30</sup> The important points for present purposes, however, are two other claims.

That empty regions of perceptual space can exist as being present-in-absence is a fact that: (i) has been connected to both RIM-explanations and Gibson-explanations, and (ii) has been linguistically combined with both the view that we do not see and the view that we see visual depth and empty spatial regions.

What, then, should we say about perceptual spaces that contain visual qualia and/or percepts with spatial extension (claim I), contain spatial relations between such qualia or percepts (claim II), and contain empty regions between many of the qualia or percepts (claim III) – are they relationist spaces or container spaces?

This is *the container question*; and the answer to it is simple. Since we can see the peculiar similarity and asymmetry between our right and our left hand, we can by means of the handedness argument presented in Section 1 draw the conclusion that the seen hands are necessarily incongruent, which, in turn, implies that the perceptual space in which they exist must be a container space (= claim IV is true). The visually perceived handedness is a relational property between a hand and the perceptual space in which it exists. In two of the subsections below, I will introduce some non-visual such necessary incongruences.

The answer to the analogy question is more complicated. If, contrary to the last paragraph, the perceptual space discussed were a relationist space grounded in visual qualia and/or percepts, then it could be called a visual space. But regarding it as a container space is consistent *both* with regarding the empty regions that are present-in-absence as being analogous in quality to visual qualia and percepts *and* as not being analogous. The question can also be put this way: should the empty spaces we *see through* be called visual or not? If not, one could for example – taking a cue from Berkeley – claim that all visual qualia and percepts are placed within a non-visual perceptual space, which from a causal point of view is created by the tactile sense modality.

<sup>27</sup> Some Husserl experts interpret even Husserl as having had this view, see Moran and Cohen, *Husserl Dictionary*, 303.

<sup>28</sup> Searle, *Seeing Things*, 138–9.

<sup>29</sup> Gibson, *Senses as Perceptual Systems*, 266.

<sup>30</sup> This view is convincingly argued for in Costall and Morris, “The Textbook Gibson.” They claim, with many references, that the famous and “known” Gibson is not the true Gibson. The claim is further substantiated in Costall, “1966 and All That.” I return to Gibson in Section 7.

When I have commented on all the different kinds of perception presented in the subsections below, I will in Section 6 return to vision and discuss the issue whether there is a special visual perceptual space or not. My answer will be that there is not.

## 5.2 Pain perception

There is now and then talk about spatially localized punctual pains, but then the word ‘punctual’ does not mean what it means in this paper, namely spatially completely non-extended, i.e., mathematically punctual. Ordinary language does not bother about mathematical infinitesimals, and what is called punctual is regarded as having some small extension. Therefore, I claim without further ado: there are no completely non-extended pains, and we cannot even imagine such (= claim I is true).

Equally obvious is the fact that often there are in perceptions spatial relations between different pains (= claim II is true). Normally, pains are located somewhere within the perceived three-dimensional body, and there are only a few body regions such as the hair and the nails that seem to be exempt from the possibility of hosting a pain. Sometimes one can even feel a pain move, just as one can see a color spot move.

Moreover, when we simultaneously perceive a number of differently located pains there is normally a pain-empty spatial region in-between them. If you hurt both your hands but nothing else, there is pain in both but none in-between. If you have a toothache and something heavy is dropped on one of your feet, there is pain in both a tooth and a foot, but a non-painful spatial region present-in-absence in-between. Therefore, I confidently state: perceptual spaces containing pains also contain pain-empty regions of the space in question (= claim III is true). As present-in-absence percepts these regions have to have some present-in-presence percepts as their ground, and these are the regions where there are some kind of qualia or percepts.

No one has claimed, that the physiological and neurological mechanisms that create pains also create a specific nociceptional space the way it has been claimed that seeing and touching give rise to perceptual spaces. Therefore, I see no reason to discuss even from a phenomenological point of view the possibility of an exclusively nociceptional perceptual space, i.e., a space whose empty regions are analogous to pain qualia and percepts. Therefore, the answer to the analogy question for pain perception is negative: there are no perceptual pain spaces.

This, in turn, means that the container question, whether the space in which pains appear is a relationist space or a container space, cannot be discussed until we know more about the perceptual space that houses them; the container question has to be postponed to Section 6.

Nonetheless there is a space issue of importance that can, and ought to be, highlighted by reference to the phenomenology of pains.

Mostly, it is taken for granted that the distal physical cause of a pain is located where the pain is located. If you have a toothache there is some kind of malfunctioning in a tooth, and if you have a stomach ache there is some kind of malfunctioning in the stomach. There are, however, two main kinds of exceptions to this usual correlation. First, a pain can phenomenologically be placed inside the perceived body, but no physical cause internal to the body can be found. In such cases, the pain is often classified as being a *psychosomatic pain*; I will say no more about this. Second, the pain is placed outside of the perceived body. It is then often called a *phantom pain*. Such *outside-the-body pain perceptions* are of interest for this paper.

A phantom pain is, just like the visual objects of veridical perceptions, perceived outside of the perceived body; remember that my term ‘perception’ subsumes ‘proprioception’. But unlike the visual objects of veridical perceptions, we nonetheless do not regard them as having a mind-independent existence; we regard them as being only subjective experiences. In all probability, the commonsensical reason is that the pain moves with us when we move; after-images, by the way, behave in the same way and are regarded by common sense as being subjective, too.

The existence of phantom pains shows that it is not enough to bring in talk of a perceptual body image in order to make sense of the way pains are placed within a perceptual space. Perceptual spaces cannot possibly be made identical to the spaces occupied by the perceived body; perceptual spaces contain the

perceived body and much more outside of it. In my opinion, we perceive as present-in-absence not only a space in front of us, but also that this space continues behind our back.

In circles in which one does not bother about the homunculus problem, it is sometimes said that visual hallucinations and illusions are *projections* from the brain. On such a view, phantom pains are projections. What is subjective, and so should from a commonsensical perspective really be inside the body, is perceived as existing among presumably objective mind-independent entities outside the perceived body. In my opinion, these facts support the view I have assumed from the start: a distinction has to be made between perceptual spaces and physical space.

### 5.3 Auditory perception

As just noted, hallucinations and phantom pains are sometimes called projections. Something that “really” is inside the body is said to be projected into the perceptual space outside the body. Let me call it *inside-out* projection. If one puts music on in headphones, and put them on one’s ears, then there is a sound pattern stretched out in the whole upper part of the spatial region where one perceives one’s head. If projection talk is to be used here, one would have to speak about an *outside-in* projection. Music that “really” exists outside our ears becomes projected into a spatial region inside our head. This shows that in serious discussions within perception theory, all projection talk ought to be deleted. I have for myself since long done it, and will continue to do so.

Most of my auditory experiences should, from a phenomenological point of view, be described as the hearing of *events* (a knock on the door, a hello, etc.) or *parts of processes* (listening to some music, a conversation, etc.). Using the ontological distinction between perduring and enduring entities, this means that my auditory world is very much populated by perdurants. However, now and then endurants appear as well. A sound that originates from a continuously blowing whistle appears as an in itself for a while existing enduring property-bearer; the sound may change in loudness and pitch but still be experienced as being the same sound.<sup>31</sup> Such perceptions are the auditory counterparts of the visual perceptions of enduring things.

When I hear events or parts of processes that are external to my perceived body, then I find it phenomenologically adequate to say that I simultaneously hear both sounds and a sound source. But when I am listening to music in headphones, I hear only sounds, no sound source.<sup>32</sup> It would be odd to say that I have a sound source in my head. When I am listening to music live, I not only hear the sound source, I see it as well. However, when I am listening to music in my stereophonic loudspeakers, I only hear the sound source; I can see no sound source in-between the loudspeakers.

These my claims, and the questions they are answers to, are in fact of no importance for this paper. What is important here is instead that I have never met an auditory percept that has been truly punctual. Furthermore, I can’t even imagine one and haven’t heard of anyone who can (= claim I is true). The fact that the spatial edges of auditory entities are much fuzzier than those of visual entities should not be allowed to hide this fact.

When I am writing this, I hear sounds coming from the left of me (music), some sounds coming from the right (neighbors on the other side of the wall), some right in front of me (computer noise), some further away in front of me (from outside of the window), and I even hear some noise coming from the back of me (on the other side of the wall). Between the auditory percepts mentioned there are spatial relations (= claim II is true).

Next, and equally obviously, an empty perceptual space is present-in-absence between my perceived body and the auditory percepts that I have mentioned (= claim III is true). As present-in-absence percepts

<sup>31</sup> Here, then, I am denying the view of that *all* auditory objects are events; Casati and Dokic, “Sounds.”

<sup>32</sup> Here, then, I am denying the view that *all* “auditory experience represents both sounds (and their acoustic properties) and the sources of sounds”; Nudds, “Audition,” 274. Let it be noted, that just as I have with respect to vision ignored the seeing of pictures, I do here ignore what might be called auditory pictures, i.e., that one spontaneously hears some music as being a recording.

these empty regions have to have some present-in-presence percepts as their ground, and these are the regions where there are auditory or other kinds of qualia or percepts.

Obviously true as my three claims may seem, they have nonetheless been contested.

Thus Peter Strawson, in *Individuals*, puts forward an aspatial theory of auditory experiences. As Berkeley claims against common sense (and phenomenological descriptions) that vision is only two-dimensional, Strawson makes the non-commonsensual (and phenomenologically false) claim that in themselves auditory percepts are not spatial at all. This contradicts all my claims I to III. He writes:

Sounds seem to come from the right or the left, from above or below, to come nearer and recede. [...] But from this fact it does not follow that where experience is supposed to be exclusively auditory in character, there would be any place for spatial concepts at all. I think it is obvious that there is no such place. The only objects of sense experience would be sounds. Sounds of course have temporal relations to each other, and may vary in character in certain ways: in loudness, pitch and timbre. But they have no intrinsic spatial characteristics: such expressions as 'to the left of', 'spatially above', 'nearer', 'farther' have no intrinsically auditory significance. Let me briefly contrast hearing in this respect with sight and touch.<sup>33</sup>

In my opinion, Strawson – and others who subscribe to the aspatial theory<sup>34</sup> – conflates thinking about auditory qualia abstracted from everything else with having purely auditory perceptions. As said at the beginning of Section 1, I take a distinction between *physical* and *perceptual* spaces for granted. Both these kinds of spaces, however, must be kept distinct from a third kind of spaces, which I call *symbolic* spaces, and which I hinted at in Section 2 when using the more common notion of *quality* spaces. I will first introduce the new notion by means of examples, and then suggest that Strawson conflates perceptual and symbolic spaces.

Mathematical representations of physical space are symbolic spaces in my sense, more precisely, symbolic *physical* spaces. This is true both of mathematical spaces with three orthogonal length dimensions that represent Newton's assumed container space, and of four-dimensional mathematical manifolds where each point in the manifold is assigned a numerical mass-energy value as in the space-time manifold of General relativity.

Other examples of symbolic spaces are all the various constructions that try to represent difference and similarity relations between qualia of different kinds. Such spaces are sometimes called quality spaces, but the label 'symbolic *qualia* spaces' fits my purposes better.

Several symbolic spaces for phenomenological colors have been constructed. One such is the *Munsell color system*.<sup>35</sup> In this, all the colors of uniform color spots are placed at one specific point in a finite space with three orthogonal axes, which represent hue, chroma (saturation), and intensity, respectively.<sup>36</sup> Chroma and intensity allow linear similarity representations, but hue does not. When differences and similarities between hues are represented by closeness on a line, the line has to be turned into a circle; some shades of red are closely similar to some shades of blue.<sup>37</sup>

<sup>33</sup> Strawson, *Individuals*, 65.

<sup>34</sup> For presentations, see Casati and Dokic, "Sounds," sect. 4 and O'Callaghan, "Auditory Perception," sect. 3.1.

<sup>35</sup> Some others are the H-B, the H-B-S and the NCS systems; see Hardin, *Color for Philosophers*. All these symbolic color spaces must be kept strictly distinct from symbolic spaces that represent how some colors can be produced by some other colors. For instance, by superposing electromagnetic waves (the RGB system), by combining dots of three or four colors in a printer (the CMY and CMYK systems), or by mixing by hand, as in traditional painting, some so-called primary colors.

<sup>36</sup> It must be noted that the system is concerned with color *spots*. If the colors of surfaces of ordinary things is to be represented, then three dimensions is not enough; phenomena such as shaded colors and lustre bring with them further dimensions. Because of this fact, Katz distinguishes in *The World of Colour* between *surface color* ("Oberflächenfarbe") and *film color* ("Flächenfarbe"). In his terminology, the colors of color spots are specific cases of film color.

<sup>37</sup> This means, by the way, that color hues cannot possibly be identified with frequencies of electromagnetic light waves. What by similarity relations has to be ordered on a circle cannot be identified with something that by similarity relations has to be ordered on a straight line. The distances between the hues in the circle was originally meant to represent perceptual similarity *distances*, but even if they do not, the Munsell system can still lay claim to be true as a merely ordinal ordering of the hues. Furthermore, the system contains no claim that colors that can be connected by a diameter should be regarded as contrary opposite colors. Contrast this with H. Ebbinghaus' double pyramid or octahedron (from 1902). Here the hues are placed in a square, and the diagonally opposed corners (red-green and yellow-blue) are regarded as opposites; the hues in the corners are also regarded as in some sense more fundamental than the others; Hardin, *Color for Philosophers*, 203n18.

Attempts have been made to create similar similarity representations of both flavors and smells, but they are so far much less successful; in all probability because of more complex similarity relations.<sup>38</sup>

In smell classification, there is continuous work on the so-called *fragrance wheel* for the classification of perfumes, which started in the early 1980s; see Michael Edwards, “Fragrances of the World.” The wheel comes close to being a chart like that of the hues in the Munsell system. Therefore, it differs significantly from classical taxonomical systems of plants and animals; they contain no circles. I regard the fragrance wheel as a *symbolic smell qualia space*.

With respect to taste, there was for a long time said to be four taxonomically *basic* tastes: salty, sour, bitter, and sweet, and then umami (savory) was added; and perhaps we have not yet seen the end of this list. However, the term ‘basic’ indicates that the classification in question is not purely phenomenological; it also brings in causal views about receptor functioning. Closer to phenomenological classifications come flavor charts such as the “Handy Beer Flavor Chart” and the “Cigar Flavors Wheel,” which can be found on internet. To both, just like in the fragrance wheel, a circular representation is central. These charts I regard as examples of *symbolic taste qualia spaces*.

In the sense just explained, the auditory space constructed on the basis of the three dimensions pitch, timbre, and loudness is a *symbolic auditory qualia space*. Each simple sound has a punctual location in such a space, but this does not mean that a simple sound lacks extension when it is actually heard. In relation to audition, to repeat, the great philosopher P. Strawson – astonishingly – has to be accused of having conflated perceptual and symbolic spaces.<sup>39</sup> He says, as already quoted: “Sounds of course [...] may vary in character in certain ways: in loudness, pitch and timbre. But they have no intrinsic spatial characteristics.”<sup>40</sup>

The tri-partition between *perceptual*, *physical*, and *symbolic* spaces that I work with should ontologically be understood in the following way. Physical space predates in evolution animals. Perceptual spaces are mind-phenomena that can arise in certain kinds of animals. Different individual animals have numerically distinct perceptual spaces, even though these spaces are (if I am right) of the same kind. I find it reasonable to think that a perceptual space of one individual remains numerically the same (i.e., endures) as long as the animal in question is continuously perceiving. Symbolic spaces are only conscious abstract constructions made by humans.<sup>41</sup>

Having now rejected all aspatial theories of auditory experiences, I turn to the container question. Perceptual spaces that contain auditory qualia and percepts are, I claim, container spaces. The proof is that there can be auditory shapes that are necessarily incongruent, which by means of the handedness argument implies that they exist in a container space. Let me present such necessary incongruence by means of an imagined situation.

Think of yourself as looking at the fingertips of a relaxed *right* hand of someone in front of you, the palm pointing upwards. Thus you have this person’s little finger to the right, and the thumb to the left a bit above the other fingers. Move this structure to a musical podium and create a band in the following way: put a drummer where the thumb is, a guitarist where the index finger, a vocalist where the middle finger is, another guitarist where the ring finger is, and put a pianist where the little finger is. Think next of yourself as looking at the fingertips of a relaxed *left* hand of someone in front of you. Put then this structure on a podium and create a band where fingers and band members are associated exactly as in the former case.

<sup>38</sup> Let me quote one author on smell classification: “It seems fair to conclude from this survey of a large number of published classifications of odors that all studies indicate a weak structure of the olfactory space. The dimensionality of olfactory space, as defined by the data and methods used to establish it, appears to be rather high, and the nature and significance of these dimensions remain unclear”; Chastrette, “Classification of Odors,” 109.

<sup>39</sup> Tyler Burge has also criticized Strawson’s aspatial view, *Origins of Objectivity*, 428–30. To my mind, his criticism suffers from a conflation of a descriptive phenomenological perspective (which by definition is confined to *perceptual* spaces) and a causal-explanatory perspective placed in *physical* space.

<sup>40</sup> Strawson, *Individuals*, 65.

<sup>41</sup> That is, I do not regard them as explanatory hypotheses in cognitive science the way the conceptual spaces of Gärdenfors’ *Conceptual Spaces* are so regarded. On the other hand, nor do I deny that some of them may be put to such explanatory use.

Visually, the right-hand-band and the left-hand-band have necessarily incongruent shapes in perceptual space. When the bands play the same melody, the sounds are at each moment both similar and dissimilar. As far as I can understand, at each moment the two bands produce auditory shapes/patterns that are necessarily incongruent in perceptual space. Therefore, the perceptual space in question must be a container space (= claim IV is true).

It might be objected, that since a right-hand-band can be turned into a left-hand-band by continuous movements of the band members, my conclusion must be false. But this movement of the auditory sources is to the auditory shapes/patterns what the turning inside out of a glove is. Such transformations are irrelevant to the notion of necessary incongruence (as explained in footnote 4).

Now the analogy question: what kind of space is the perceptual container spaces in which our auditory qualia and percepts appear? Should it be called an auditory space, i.e., should its empty regions be regarded as being analogous to auditory qualia or not? To posit a purely auditory space seems to me as reasonable or un-reasonable as to posit a purely visual one. Blind people place auditory qualia in a perceptual space just as much as people who see.

Thomas Nagel managed in the 1970s to put the (then in some reductionist philosophical circles forgotten) question of the existence of consciousness on the philosophical agenda again. He did this by means of the unusual question ‘What is it like to be a bat?’ Of course we don’t know, but we can guess. And I think some imaginative guesswork can cast light on the perception of sounds.

Let us assume that microbats have consciousness (but exempt them from reflective self-consciousness). They navigate by means of echo detection instead of visual perception, and my assumption means that they consciously hear sounds more or less as we do. Since we sometimes can literally and veridically hear sounds of events and enduring sounds at a distance, I take it for granted that microbats can, too. But more than that, I can see no reason why their conscious auditory percepts must be as fuzzy and indeterminate as ours are for us. What for a near-sighted person is the difference between seeing without glasses (things have fuzzy edges) and seeing with glasses (things have distinct edges), may perhaps in the auditory realm be a difference between humans and microbats. Microbats may have auditory counterparts to our visual percepts. The fact that vision dominates the perceptions of seeing humans, does not imply that there cannot be animals in which hearing is as clearly structured by three-dimensional endurants as our seeing is.

Having, in this speculative way, put perceptual spaces with auditory qualia and percepts on a par with perceptual spaces with visual qualia and percepts, I end this section the way I ended that on visual perception. After commenting on all the different kinds of perception listed, I will, in Section 6, answer the analogy question: is there a special wholly auditory perceptual space? My answer will be the same as in the visual case: no.<sup>42</sup>

## 5.4 Tactile perception

Before I continue in this subsection with my section project of describing the essence of perceptual spaces with different kinds of qualia and percepts, I need to make sure that my discussion is not confused with another topic of relevance for the philosophy of tactile perception. Tactile perception, like visual and auditory perception, often gives the impression that there are veridical perceptions of features that have a perception-independent existence. Or, to use a term that has become more and more frequent in the philosophy of perception, tactile perceptions seem to be able, just like visual and auditory perceptions, to *track* perception-independent features in the world.

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<sup>42</sup> Young, ‘Hearing Spaces,’ argues that we can directly *hear* empty space. The author makes good comments on the phenomenon on hearing reverberations (in contradistinction to hearing sounds and sound sources) from both a phenomenological and a causal point of view, but I think he works on two false presuppositions. He seems to presuppose an aspatial theory of sounds, which makes him move too easily from the spatial extendedness of reverberations to a corresponding empty space, and he seems to take it for granted that auditory percepts must belong to a sense-modality-specific auditory space.



On the view just stated, the following question arises: what are the features that tactile perceptions can track? One to me plausible answer is: it tracks pressures and tensions understood as pairs of antagonist forces.<sup>43</sup> But this question is not the topic of this paper.

Let me now ask you, the reader, to perform an experiment. Close your eyes and put the fingers of one of your hands on some somewhat smooth surface in front of you. You will then have five tactile percepts, all of which have some extension (in accordance with claim I) and you perceive spatial relations between them (in accordance with claim II). In my opinion, you cannot even imagine a spatially located but non-extended touch qualia; and nor that there are two simultaneous different touch qualia but no spatial relation between them.

Therefore, I regard claims I and II as true for tactile perceptions.

Also, you perceive empty spatial two-dimensional regions as being present-in-absence between the tactile qualia (in accordance with claim III). Move now your hands forward, and you will perceive also a third spatial dimension with empty spatial regions. This is good evidence for the truth of claim III. As present-in-absence percepts the experienced empty regions have to have some present-in-presence percepts as their ground, and these can be the regions where there are tactile qualia.

The container question is as easy as answer here as it was in relation to visual percepts. Since we can by means of touch feel and distinguish the difference between a left hand and a right hand, the handedness argument implies that the perceptual spaces in which tactile qualia and percepts exist must be container spaces.

On the other hand, the analogy question is as hard to answer for tactile perception as it is for visual and auditory perception. Therefore, I postpone the final discussion of it to Section 6. But there are some interesting things about the empty regions of the perceptual spaces in which touch qualia and percepts appear that should be mentioned here.

The phenomenon of touch-transparency was brought to perception theorists' attention by, among others, David Katz.<sup>44</sup> His introductory example (taken from H. Lotze) is the white cane of blind people. Blind people do not centrally feel the cane pressing at the palm of the hand, they feel the thing the cane is touching. And the same goes for people that are not blind. When you write with a pen you sometimes feel the pen against the paper, if you play a game with a stick (hockey of all kinds) you often feel the ball or the puck against the stick, even though you also often feel the stick against your palm. General practitioners use the phenomenon when they diagnose diseases by means of palpation.

Even though the percepts of tactile perception often are located at the surface of the body, this is far from always the case. Touch transparency is an everyday phenomenon. I regard the empty space regions that occur in touch-transparency as being present-in-absence percepts.

The white cane can be regarded as an extremely simple kind of prosthetic, and the phenomenon of touch-transparency has become quite important in the contemporary development of various kinds of prosthetics. The ability to perceive at the tip of a tool instead of in the hand that touches and holds the tool, is for people with prosthetic limbs turned into an ability to perceive at the tip of the prosthetic hand, not at the place where the non-artificial body is connected to the prosthetic. Nowadays, this is often called *extended physiological proprioception*, but that label takes the focus away from what I want to stress. For my theoretical purposes, the phenomenon had better be called *outside-the-body tactile perception*; the word 'body' meaning as before the perceived (non-artificial) body.

I will return to tactile perception in the section on posture-and-movement perception (5.7). If a container conception of perceptual spaces is allowed, then tactile perception naturally overlaps with posture-and-self-movement perception.

<sup>43</sup> This view is defended in Massin, *L'objectivité du toucher* and de Vignemont and Massin, "Touch."

<sup>44</sup> Katz, *World of Touch*, sect. 25. For a somewhat recent discussion, see Massin, *L'objectivité du toucher*, 423–46. And for a history of the notion of active touch, see Wagner, "Pre-Gibsonian Observations."

## 5.5 Taste perception

I have never had, or heard someone else report that they have had, a taste perception that is truly punctual; and I cannot even imagine one (= claim I is true).

Normally, I happen to perceive only one kind of gustatory qualia or percept at a time, even though I have heard other people report otherwise. However, to test myself I made the following experiment. I put salt on the taste buds on the sides of the tongue (which long ago were said to contain specific salt receptors) and sugar on the taste buds on the tip of the tongue (which long ago were said to contain specific sugar receptors). What happened? Answer: from a phenomenological point of view I had one kind of gustatory qualia in the middle of the tongue and another kind on the sides. That is, even I could experience coexisting gustatory qualia spread out in space with spatial relations between them (= claim II is true).

Phenomenologically, just as we do not see our eyes, or hear our ears, we do not taste our taste buds. We taste what is in our mouth or what we lick on; our tasting never finds a percept that is at a distance from the perceived body.<sup>45</sup> This phenomenological truth is not modified by the fact that from a causal point of view even the olfactory perceptual systems can contribute to what something tastes like; taste can in this *causal sense* be multimodal. At least in my experience, gustatory qualia and percepts never fill the whole of my perceptual space, which means that I can perceive as present-in-absence empty regions of my perceptual space (= claim III is true). As present-in-absence percepts they have to have some qualia or present-in-presence percepts as their ground, and such can be found in the regions where there are gustatory qualia.

I have never heard or read any reports about gustatory percepts that are perceived to be outside of the perceived body. What is called phantom tastes are gustatory percepts that are placed in the mouth despite the fact that there is no food in the mouth. But as far as I can see, the existence of *outside-the-body taste perceptions* cannot be ruled out on any a priori grounds. If such tastes there are, they would vividly show that claim III is true.

No one has claimed, that the causal mechanisms that create taste qualia and percepts also create a specific perceptual taste space. Therefore, I see no reason to discuss even from a phenomenological point of view the possibility of perceptual spaces whose taste-empty regions are analogous to taste qualia and percepts. In other words, the answer to the analogy question for taste perception is negative: there are no perceptual taste spaces.

This answer has, as in the similar cases before, the consequence that the container question, i.e., whether the space in which tastes appear is a relationist space or a container space, cannot be discussed until we know more about the perceptual space in question. My answer to this question is presented in subsection six.

## 5.6 Olfactory perception

Before I start this subsection, let me once again stress that I am only concerned with what perceptual spaces are like, not how they causally arise, and nor what perception-independent features the percepts within them may be able to track.<sup>46</sup> This being made clear, let me say some brief words about olfactory qualia and percepts, and the kind of perceptual space they exist in.

<sup>45</sup> Touching is often said to have *bipolarity*, which means that the toucher is at one and the same time aware of both the object touched and a subjective feeling of touching. I think this is often but not necessarily the case. In my opinion, tasting is bipolar in the very same sense.

<sup>46</sup> For a good philosophy of science overview and discussion of the main different causal theories of olfactory perception, see Barwich, *Making Sense of Smell*. The traditional view of olfaction scientists is that olfactory percepts track different kinds of molecules, but Barwich (“Measuring the World”) “argue[s] for the need to abandon a stimulus-centered point of view where we think of smells as stable percepts that are computationally linked to external objects such as odorous molecules. Perception here is presented as a measure of changing signal ratios in the environment informed by expectancy effects from top-down processes.” Philosophers have often regarded smells as purely subjective, but Mizrahi (“Sniff, smell, and stuff”) argues that odors track properties of stuffs.

First, I have never had olfactory perceptions that are spatially non-extended, and I have never heard anyone report such. Moreover, I cannot even imagine them (= claim I is true).

Second, I have never perceived more than one kind of olfactory qualia or percept at a time. I have, as I did with taste, tried to find an unusual kind of situation where this happens, but I have not succeeded. That is, I have never smelled two different olfactory qualia or percepts simultaneously, which, in turn, means that I have never perceived any spatial relations between different olfactory percepts. However, I have heard other people claim they can, and I see no reason to contest this, since I think that such perceptions are possible (= claim II is true). In fact, I think dogs have this kind of olfactory perceptions; more about this soon.

Third, sometimes our olfactory qualia and percepts are placed in the nose the way taste qualia and percepts are placed in the mouth. On other occasions, however, they become placed outside our perceived body the way auditory percepts normally are placed at a distance from our body.<sup>47</sup> For instance, when we are on the brink of entering a room that smells badly, the bad smell appears to be outside us but inside the whole room. It might be called *outside-the-body olfactory perception*.

Normally, neither the inside-of-the-nose nor the outside-of-the-nose case involves olfactory qualia and percepts which fill the whole of one's perceptual space. Always when smelling, we seem to perceive as present-in-absence some smaller or larger smell-empty regions of our perceptual space (= claim III is true). As present-in-absence percepts they have to have some present-in-presence percepts as their ground, and these are to be found at least in the regions where there are olfactory qualia.

No one has claimed, that the causal mechanisms that create olfactory qualia and percepts also create a specific perceptual olfactory space. Therefore, I see no reason to discuss even from a phenomenological point of view the possibility of perceptual spaces whose smell-empty regions are analogous to olfactory qualia and percepts. In other words, the answer to the analogy question for olfactory perception is negative: there are no perceptual olfactory spaces.

This implies that the container question, whether the space in which smells appear is a relationist space or a container space (claim IV), cannot be discussed until we know more about the perceptual space in question. The container question of this subsection is answered in Section 6.

In order to widen our view of what perceptual spaces may be like, I did in subsection 5.3 speculate about what the perceptual spaces of microbats might be like. Now I will with the same intent speculate about what the perceptual spaces of dogs might be like. As with microbats, I shall take it for granted that they can have qualia and percepts, i.e., be conscious.

As is well known, dogs have a remarkable capacity for olfactory navigation, even though it has become clear from new experiments and better knowledge of history and non-Western cultures that even we humans have this kind of navigation capacity.<sup>48</sup> So-called detection dogs can be trained to smell their way to a long list of substances, different kinds of explosives or drugs, and much else. My very speculative hypothesis is, that they can smell olfactory percepts at a distance in a three-dimensional space the way we can see distinct things at a distance. When, for example, they find something a bit down in the ground, they start to dig on that place. If we combine the assumption that they have conscious perceptions with their undeniable ability to smell substances at a distance from them, an inference to at least the simplest explanation is: their olfactory percepts are placed in a three-dimensional perceptual space dominated by olfactory percepts.<sup>49</sup>

<sup>47</sup> This distinction is not meant to be the same as the classic one between true odor (“Gegebenheitsgeruch”) and object-smell (“Gegenstandsgeruch”) made by Henning in “Der Geruch.” I regard the “Henning-Prisma” as a symbolic space for true odors.

<sup>48</sup> See Check, “People track scents” for the experiments, and Classen et al., *Cultural History of Smell* for non-Western cultures.

<sup>49</sup> Compare my speculation with the following quotation: “Interestingly, whereas in the West sight is considered *the* distance sense, smell often outdistances sight in the experiences of forest dwellers like the Umeda. They know that smell can give them knowledge of things hidden to the eye”; Classen et al., *Cultural History of Smell*, 98.

## 5.7 Posture-and-self-movement perception

“We can,” says Mac Cumhaill, “enjoy tactual awareness of empty space when dancing,” which to me is a good phenomenological description.<sup>50</sup> It is not the case that, when dancing, we perceive (or proprioceive<sup>51</sup>) only the way the different parts of our body are momentarily and over time differently related to each other. There is an awareness of a space outside the perceived body, too. This is meant, I repeat, only as a phenomenological description.<sup>52</sup>

In relation to posture-and-self-movement perception, it is by definition true that there are no non-extended percepts (= claim I is true), and that there are spatial relations between some percepts (= claim II is true). A posture is a posture of a whole body, and it contains different kinds of spatial relations between the parts discerned. Similarly, self-movement means movement of the whole body, and this involves relations between the parts of the body.

In analyses of tactile perception, Katz has made a distinction between surface touch and *immersed touch*, the point being that they are phenomenologically different.<sup>53</sup> When some part of you (a finger, a hand, or whatever) touches an *object* that is external to you, then you feel surface touch; but when you move some part of your body (a finger, a hand, or a foot) in a surrounding *medium* such as a liquid or a dense gas, then you feel immersed touch. Katz once calls it *space-filling touch*, which would fit my views better, but I will stick to the common term.

Immersed touch is of interest also (but not discussed by Katz) in relation to posture-and-self-movement perception. The whole body can be immersed in liquids and gases. When we swim wholly under water, the whole body experiences immersed touch, and the same goes for walking in a really dense fog. In both these cases, as in traditional examples of immersed touch, there is some kind of felt resistance between the body or body part and the surrounding stuff.

In this terminology Mac Cumhaill claims, as I understand her, that if there is no consciously felt resistance when moving, as normally is the case indoors, then we should say that there is immersed touch of empty space. I agree, but I will of course add that the empty space in question is perceived as absent-in-presence. This means that even posture-and-self-movement perception can contain empty regions of space (= claim III is true). As present-in-absence percepts they have to have some present-in-presence qualia or percepts as their ground, and these are to be found in various qualia and percepts inside the perceived body.

Mac Cumhaill also says: “Hence, even while it may be linguistically false that we ‘touch’ empty space, it may yet be philosophically true.”<sup>54</sup> With the notions I work with, one should from a philosophical-phenomenological point of view say that our touch of empty space is a touch that is a present-in-absence percept.

The analogy question is easy to answer. No one has claimed that the perceptual spaces that surround posture-and-self-movement percepts are analogous to the percepts. And I see no reason to take another stand.

This means, since there is no specific posture-and-self-movement perceptual space, that the container question with regard to perceptual spaces that contain posture-and-self-movement qualia and percepts cannot be answered in this subsection. The answer, however, is presented already in the next section.

<sup>50</sup> Mac Cumhaill, *Seeing Through*, 166. I will not, however, discuss the details of her sixth chapter, “Touching Empty Space.” The reason is that “the template model of touch,” which she takes her departure from, does not keep phenomenological descriptions of perceptual spaces distinct from causal explanation of how these spaces are possible. I take, though, her statement that “there can be tactual awareness without the sensation of contact” (ibid., 166) to be phenomenologically correct.

<sup>51</sup> This subsection could also be called *proprioception*. Traditionally, proprioception has been regarded as distinct from perception. I think this is due to the fact that perception has been connected only to apprehensions of what is *external* to the body. The Latin ‘proprio’ means one’s own; in proprioception one gets hold of (= *ceives*) oneself. However, my generic term ‘perception’ is wider, as stated in the last two paragraphs of Section 2.

<sup>52</sup> A causal-explanatory narrative can of course try to bring in non-conscious apprehensions of air resistance as a causal factor. Or, try a Gibsonian explanation in which – in time extended – complex visual information can be explanatory; see Section 7.

<sup>53</sup> Katz, *World of Touch*, sect. 6.

<sup>54</sup> Mac Cumhaill, *Seeing Through*, 173.

## 6 The phenomenological one-kind-of-space thesis

I am now in a position finally to answer all the container questions, analogy questions, and the one-kind-of-space question. Let me first repeat that the contemporary general acceptance of the existence of both amodal, multimodal, and cross-modal perceptions, gives the positing of one common perceptual space for all sense modalities a certain immediate plausibility.

The conclusions of the subsections of the last section can be summarized thus:

- (i) Perceptual spaces that have visual, auditory, or tactile qualia and percepts must be container spaces.
- (ii) The question whether or not their empty regions of space are analogous to their qualia and percepts *was postponed to this section*.
- (iii) Perceptual spaces that have pain, taste, olfactory, or posture-and-self-movement qualia and percepts do not have empty regions of space that are analogous to such qualia and percepts.
- (iv) The question whether or not the last-mentioned spaces are container spaces *was postponed to this section*.

The container question in statement (iv) can now easily be answered. Since, as statement (iii) says, the perceptual spaces that have pain, taste, olfactory, or posture-and-self-movement qualia and percepts do not have empty regions of space that are analogous to such qualia and percepts, these perceptual spaces must – it is reasonable to think – be of the kind that houses either visual, auditory, or tactual qualia and percepts. However, since according to (i) all these (possibly) three kinds of perceptual spaces are container spaces, even the perceptual spaces for pain, taste, olfactory, and posture-and-self-movement qualia and percepts must be container spaces. Briefly put: *the perceptual spaces for all kinds of qualia and percepts must be container spaces*.

Next, how to answer the one-kind-of-space question? As indicated a number of times, I think the answer is that there is only one kind of perceptual space, which, consequently, is modality-neutral. My phenomenological argument goes as follows.

Clench your hands so hard that you feel them, hold them out in front of you and look at them. You will then both see and feel two hands and perceive as absent-in-presence an empty spatial region in-between them. Close your eyes, and you will still feel the hands and an empty spatial region between them. Moreover, from a phenomenological point of view, it is *the same* hands and *the same* spatial region. Since the empty region does not present itself as being both visual and tactual, it must be neutral between these modalities.

The same conclusion follows from the fact that people who lose their sight does not lose their awareness of a three-dimensional space, and they seem to regard it as the same kind of space as before.

Still another example. Listen to music that comes from an orchestra you can see. You then both see and hear a sound source in your perceptual space. Close your eyes, and you will still hear the same sound source at the same place. Open your eyes but hold your hands before your ears so you cannot hear anything, and you will still see the spatial region from which the sound comes. Since this region does not present itself as being both visual and auditory, it must be neutral between these modalities. Furthermore, in the experiment one experiences the perceptual space as enduring, i.e., as being numerically the same during the experiment. And where there is numerical identity, it makes no sense to speak of qualitative difference.

At last, how to answer *the analogy question* contained in statement (ii)? Now things have become simple. Since the answer to the one-kind-of-space question is positive, the answer to the analogy question has to be negative. If there is only one kind of perceptual space, then there cannot possibly also be three different kinds of spaces, one visual, one auditory, and one tactual. In other words, all modal-specific, amodal, multimodal and cross-modal kinds of qualia and percepts exist in the same kind of perceptual space.

My overall conclusion can be stated thus: there is only one kind of perceptual space, it can contain all the kinds of qualia and percepts we know of, i.e., it is a sense-modality-neutral space, and it is a container space.

## 7 The causal substrate of perceptual spaces

In isolation, the last overall conclusion may look, hear, smell, and taste like Kantianism; since, like Kant, I claim that all percepts of all kinds exist in one and the same container space, but this is a false appearance. He discussed the physical space of Newtonian mechanics; this was both the starting point and the end point for his analysis of space. I have discussed individual perceptual spaces of animals with material bodies located in physical space. Furthermore, I am against all kinds of transcendentalism, whether of a Kantian or a late-Husserlian brand. I am a naturalist in the sense that I am convinced that everything that exists exist in the physical space of our spatiotemporal world, but with respect to consciousness I am a non-reductionist. I think that conscious perceptions cannot possibly be reduced to functional or strictly material structures. Therefore, to me, perceptual spaces are ontologically unreducible entities.

So far, I have mainly stayed within a phenomenological perspective of perceptual spaces, but now I will briefly bring in some possible material substrata-explanations of perceptual spaces. When perception theorists started to search for the physiological and neurological substrates of vision, they already had recourse to the notion of conscious seeing. Similarly, when they started to search for the substrates of audition, they already had recourse to the notion of conscious hearing. Trivially, one cannot with a prior intention search for something that one lacks an idea of. Therefore, since perception theorists have lacked a notion of sense-modality-neutral perceptual container spaces, they have had no reason to start to look for a specific space cortex in the brain the way they once started to search for visual and auditory cortices. Neither, and for the same reason, have they started to look for a multimodal material substratum of perceptual spaces.

There is, as so often, an exception to the rule. One perception theorist who talks at least a little about a material perceptual system that is a necessary condition for something like perceptual spaces is the already mentioned J.J. Gibson (see section 5.1). In the next paragraph I summarize his main views; the specific view which is important here is italicized.

Human natural perception, Gibson thinks, has as its locus the whole human body. The human body is a huge perceptual system, even though the functioning of the brain is the most crucial part of it. Our perceptual system contains a number of different perceptual subsystems, and *all of these subsystems are connected to a basic orienting system*.<sup>55</sup> Input for perception consists of stimulus information, not receptor stimuli. For instance, reflected light surrounding the perceiver contains at each point of time structures not studied by physics, which then over time can function as stimulus information; it is such time-extended stimulus information (affordances) that interacts with the visual system (and some others) and thereby produces visual perceptions. Moreover, normally perceiving organisms do not just first passively receive stimulus information, and then interact with it; they often actively search for new stimulus information. Perception is always also self-perception; there is a kind of ego-point or ego origin even in the perceptions of non-linguistic organisms such as animals and human infants. In veridical perceptions we *directly* detect information internal to the external world.<sup>56</sup> Having subjective conscious sensations and obtaining direct information about the world are different processes; even though they often co-occur.

Gibson's hypothesis that our perceptual subsystems are connected to a basic orienting system, can be related to the view about perceptual spaces that I have put forward. Of course, in a – apart from oneself – completely empty space, there is no need for any spatial orientation, only for body part orientation. I have, however, merely been arguing that the notion of a *partially* empty container space is needed in perception theory. Gibson claims that spatial orientation is a multimodal achievement. I take him to mean that just as vision today is regarded as an interaction between five different parts of the visual cortex (V1–V5), spatial orientation depends on an interaction between what was once regarded as several distinct modalities. He says:

<sup>55</sup> Gibson, *Senses as Perceptual Systems*, ch. IV. In his other great book, *Ecological Approach*, which is only about vision, Gibson does not use the term 'the basic orienting system', and he does not stress its existence. However, he does write: "The five perceptual systems correspond to five modes of overt attention. They have overlapping functions, and they are all more or less subordinated to *an overall orienting system*" (italics added); Gibson, *Ecological Approach*, 233–4.

<sup>56</sup> I comment on this specific part of Gibson's views in "Searle on Perception," sect. 4.

Geographical orientation [...] is a product of many perceptual systems in cooperation. The basic orienting system is at the root of it, but the haptic system, the olfactory system, the auditory system, and the visual system all contribute information, some of it unique, but much of it redundant. The sensory control of maze-learning in the rat, the ability of a rat to run a maze when blinded, or deafened, or anosmic, or without vibrissae, or even partially paralyzed, shows that orientation does not depend on any one “sense.”<sup>57</sup>

To orient oneself is to orient oneself in a space or pre-given spatial framework. He also says:

In this chapter, we will consider the simplest kind of orientation, to the direction up-down and to the plane of the ground. Along with this goes a basic type of perception on which other perceptions depend, that is, the detection of the stable permanent *framework* of the environment. This is sometimes called the perception of “space,” but that term implies something abstract and intellectual, whereas what is meant is something concrete and primitive – a dim, underlying, and ceaseless awareness of what is permanent in the world.<sup>58</sup>

In Sections 4 and 5.3, I made a distinction between physical, perceptual, and symbolic spaces. In the quotation above, I take Gibson to be making a similar point: we have to distinguish between symbolic spaces, which are “abstract and intellectual,” and perceptual spaces, which are “concrete and primitive.” This distinction reappears in his later book:

The notion of space of three dimensions with three axes for Cartesian coordinates was a great convenience for mathematics, I suggested, but an abstraction that had very little to do with actual perception.<sup>59</sup>

Note that I am not saying that Gibson *explicitly* defends the existence of a perceptual container space. I am claiming that it is possible to connect such a view to his theoretical framework, which (as noted in Section 5.1) radically differs from those of other perception theorists. This I dare to claim in spite of the fact that Gibson a couple of times writes as if we do not even perceive a “concrete and primitive” space. I will present and comment on three such quotations.

I have argued that the perception of the layout of surfaces is the perception of space [...]. Completely empty space is unperceivable.<sup>60</sup>

First impressions notwithstanding, these sentences do not contradict my views. I am of the opinion that (i) perceptions of empty regions of space are present-in-absence percepts, and that (ii) such percepts have as a necessary condition for their existence the simultaneous existence of qualia or present-in-presence percepts. Together, (i) and (ii) imply that a “completely empty space is unperceivable” – just as Gibson says. The quotation above continues as follows:

There are dimensions or axes of empty space, to be sure, but they are embodied in a solid environment having a north-south, an east-west, and an up-down. This is the space to which an individual is oriented, with respect to which the posture and equilibrium of his body is maintained. The body itself, with its main axes of right-left, front-back, and head-foot, must never be confused with it.<sup>61</sup>

I think one should say that the body-located axes of right-left, front-back, and head-foot can ground an apprehension of the surrounding partly filled empty perceptual container space as having three corresponding but conventionally chosen axes, be they called east-west, north-south, and up-down, or whatever. The third quotation chosen runs as follows:

Objects do not *fill* space, for there was no such thing as empty space to begin with. The persisting surfaces of the environment are what provide the framework of reality. The world was never a void. As for the medium, the region in which motion

<sup>57</sup> Gibson, *Senses as Perceptual Systems*, 73–4.

<sup>58</sup> *Ibid.*, 59.

<sup>59</sup> Gibson, *Ecological Approach*, 140.

<sup>60</sup> Gibson, *Senses as Perceptual Systems*, 112.

<sup>61</sup> *Ibid.*, 112–3.

and locomotion can occur, where light can reverberate and surfaces can be illuminated, this might be called *room* but it is not *space*. Surfaces and their layout are perceived, but space is not, as I have long been arguing.<sup>62</sup>

I find the “for” in the first sentence odd.<sup>63</sup> Even if “there was no such thing as empty space to begin with,” it makes nonetheless sense to claim that there is a relation of space filling. What Gibson here calls *room* seems at one and the same time to be both a region of physical space and a perceptual space. This brings me back to the beginning of the paper where I said: in order to come to conceptual grips with the world in which we live and perceive, we need to posit at least two kinds of spaces, physical space and perceptual spaces. Because of his unusual direct realism, Gibson can without contradicting himself write as he does.

Let it therefore be noted, I have been neutral on the issue of representative realism versus direct realism and disjunctivism. Even dreams contain perceptual spaces, and I have not anywhere discussed whether in veridical perceptions there are only representations of perception-external entities, or whether in some way or other some objects of such perceptions can also be said to be located in physical space. My reason for bracketing the issue is, that I think perception theory can reconsider its conception of perceptual spaces quite independently of the question of representative realism.

Of course, though, one can say that *if* both physical space and perceptual spaces are regarded as container spaces, then representationalists can claim that a perceptual space can literally *represent* a region of physical space, and direct realists can claim that perceptual spaces can be *co-located* or *overlap* with regions of physical space.<sup>64</sup>

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<sup>62</sup> Gibson, *Ecological Approach*, 93.

<sup>63</sup> Here are two similar quotations from two other great thinkers. “It must be noted, however, that a given empty space is necessarily an empty space between given things or phantom of things. If nothing spatial at all is given, then neither is any space”; Husserl, *Thing and space*, 323n1. “It is impossible to picture empty space”; Poincaré, *Science and Method*, 93.

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