Teorie & Modelli, n.s., XIII, 1-2, 2008 (XX-XX)

Experimental Phenomenology in contemporary perception science

Carmelo Cali[*] (Palermo)

Phenomenological issues in the perception science

Contemporary perception science attempts at laying down a common framework. Different disciplinary approaches, methods and research results about the questions in which perception could be decomposed are indeed deemed to converge. Hence, concerns over consistency and commensurability have been occurring. Besides, since Jackendoff (1987) a further request of phenomenological adequacy has been put forward. It runs as follows: a computational theory, though complete, definite and successfully tested may it be, can not by itself account for what marks off a perceptual experience as that particular one in the way it is instantiated in that environment and from that specified standpoint. Then a theory or a model of visual perception must explain those features that make up the sense of copying with objects located in the outer world, endowed with inner surface and orientation shape properties coupled with peculiar patterns of spread out qualia, if it is to recover the phenomenology for a definite class of observers. This adequacy request is in general assumed to mean the commitment to identify features of the perceptual states that characterize the phenomenal facts in the way they are experienced, to be mapped either in the theory's descriptive base or in the relevant model functions.

So far, this claim raised questions that differ a lot as their scope and implications. Anyway, they can be broadly summed up as follows.

The first question is dubbed since Levine (1983) the *explanatory gap* between a physical or physiological account of perception and its phenomenal experience. The relevant literature is inclined to capture a phenomenal feature under the concept of a *what it is like to be*-property. That is, to explain what the perception of x consists of is to explain what the x-experience is like for the perceiver *O*. Thus, the phenomenological description of what x looks like would amount to explaining what it is for *x* being one of *O*'s seemings given some to be specified constrains.

[*] Department of XXX, University of Palermo

Another question is the *experience measurement problem*. An imbalance between the detection of some perceptual mechanisms, by means of psychophysical methods or neurological imaging techniques, and the reliable accessibility to corresponding phenomenal experiences is presumed to obtain. Hence, most of the relevant research has tried to trade off the gains of third person methods for first person or intersubjective ones that would allow phenomenal experience data to be collected and brought into experimental design The theoretical literature addressed questions as: the description of protocols in reporting subject's experience during the experiment, the definition of criteria of objective reference point for sharing knowledge about experience between subjects and researchers, the methods for a triangulation of behavioural measurement, recordings of brain activity and description of phenomenal evidence to take place, the range of accountability of procedures for the identification of correlates across such different domains[1].

Many researchers who rely upon phenomenological tradition have been heavily debating these issues. As to the explanatory gap, different strategies were put forward. Borrett et al. (2000), Marbach (1999), Roy et al. (1999) argue for a *descriptive* way of satisfying the phenomenology adequacy request. Phenomenology should provide accurate descriptions for giving brain sciences complete and definite data. Horst (2005) argues that the all the mind sciences might profit from phenomenological stance. Percept features are to be taken not as theoretical posits, as particles may be taken to be for physics, but as *bona fide* properties that specify the appearing-thus of perceptual facts. The brightness step in Cornsweet illusion, and the shape inductions in the Kanizsa's figures are noteworthy instances of what a psychophysical or neurophysiological theory must explain.

As to the experience measurement problem, it is held that a solution of the conundrum may be possible, given that – as Zahavi (2004) points out – the qualitative dimension of experience is the intersubjectively accessible way in which things appear. Hence, the question itself should be reframed within the phenomenological description of what is representative of common experience. On the other hand, Roy et al. (1999) and Varela (1996) emphasize that phenomenological methods do not involve uncritical introspection but rigorous and careful descriptions of phenomenal invariances.

At the intersection of these two questions, there are different strategies to implement phenomenology in theoretical model or experimental design. According to Gallagher, Sørensen (2005), the first one consists of uploading the phenomenological method to experimental design by training the

[1] See Jack & Roepstorff (2002), Frith (2002).

subjects. Lutz et al. (2002) trained the subjects, asked to fuse a tridimensional shape from two autostereograms, to recognize some recurrent states of attention, preparedness and correlate their values to their own visual experiences. The reports they were asked to elicit were on these grounds grouped post hoc in phenomenological clusters of intersubjective phenomenal states. Finally, these clusters were used to describe subjects visual experiences while performing the visual task under EEG and ERP detection. The second one consists of "front-loading"phenomenological concepts in experimental design. No training in scrutinizing one's own experience is sought after. Instead, the results of phenomenological analyses are used as guidelines to inform the experimental design. Both the upload and front-load implementation of phenomenology involve what Bayne (2004) called a *bridging strategy* that is more substantive than the descriptive one in that it tries to close the gap experimental design and direct experience.

Phenomenal relations variety and manifold

These questions address clearly different likely explanation levels, which can boil down to dissimilar, if not divergent, sort of strategies. The experimental phenomenology might provide it with deep assumptions about the phenomenal world, along with tested conjectures about its relevant features, and insightful notions, which may prove to be very useful for a chance to face such controversial issues about perception research.

A common phenomenological ground can be sketched by the following assumptions:

(1) the perceptual world can not narrow down to a disperse distribution of *qualia*; instead, it is a perceptual reality which is made up by shapes, colours, sounds and many other perceptual features that end up in objects, events, space and time relations;

(2) what is shown by perception is neither an undistinguished piecemeal patch nor a uniform continuum of sensory qualities; it corresponds to separate phenomenal units that hold connection and belongingness relation at different scales and degrees of complexity and definiteness;

(3) every type of perception let a particular section of the phenomenal world come emerge, which can not be exhausted by the occurrent perceptual scene, because it involves many potential features that unfold progressively and from different standpoints; conversely, every phenomenal section is composed by contents distributed along nesting, gerarchic relations, which give rise to different degree of extension or perceptual density calling ever for further inspections;

It can be said that experimental phenomenology provides a systematical, empirical analysis of the perceptual world as it is given. It aims at discovering the necessary conditions of phenomena, their strengthening or facilitatory and hurdling factors, the connections holding among them *at their face value*. It is possible to group the inner constrains of perception empirically discovered in the following fundamental relations.

The continuity - discontinuity variety. This is a fundamental variety that can be found at different scales in every section of the perceptual field, which account for the very appearance of phenomenal features, properties and units[2]. In fact, for something to appear there must be a continuous spreading of qualitative features into neighbour points of a given section of the perceptual field, bounded from the contiguous points by a qualitative break. Therefore, the continuity might be considered of as a quality merging or a continuous variation, which is differentiable in that every segmentation leads to an overlapping part of the phenomenal quality, be it a colour instance, a surface curvature, a shape border. The discontinuity may be thought of as a finite and not too small a gap that breaks the uniform covering of adjacent region of the perceptual field, where it brings in abrupt transitions. The fundamental relations of aggregation *vs*. segregation, unification *vs*. segregation, fusion *vs*. detachability, which build up the perceptual field as partially ordered and articulated, pertain to this variety domain.

The dependence variety[3]. A dependence holds whenever for *x* to occur, it is necessary that there exist *y* with phenomenal properties not shared by *x*, such that if *x* appears then *y* must be given. A dependence holds between a colour quality and at least a surface percept[4]. The dependence va-

---

[2] This basic relation defines the minimal requirement for perception to take place. They have been discussed in various guises: the non homogeneity in the stimulus condition and the minimum/maximum principle in Koffka (1935); the maximal homogeneity and minimum eterogeneity principle in Musatti (1931) and Arnheim (1974).

[3] This notion dates back at the very beginnings of experimental phenomenology as early as Stumpf's analyses of the perceptual world. Husserl gave an explicit formal treatment of this notion, which is discussed with reference to perceptual instance cases as well. This notion is being widely discussed in some recent attempts at building a conceptual intertheoretical framework for the common sense world structure with meaningful reference to perceptual issues. See Smith (1988), (1994).

[4] The color *Erscheinungsweisen* in Katz (1911) are instances of dependency between cromatic and surface properties. This dependency is what counts for the influence of microstructure and marginal gradients on colour appearances studied by Kanizsa (1980a).

riety allow unilateral and mutually sided variants. The mutual dependence obtains if *x* and *y* depend upon each other, as it is the case with hue, saturation and brightness in the perception of any colour instance as chromatic complementary parts. The unilateral dependence obtains if *x* is dependent upon *y* such that *y* is not. A basic example is offered by the phenomenal acquisition of unilateral margin function of boundaries and the pop up of two corresponding alternating figures in Rubin's display.

The separability variety[5]: this relation too allows a one sided and a mutual variant. It can be said that *x* is one-sidedly separable from *y* if *x* is a proper part of y and some discriminate *y*-part *w* is dependent on *x*, whereas *x* depends on no discrete part of *y*. For example, the topological arrangement x of n discs in the stereokinetic effect *y* is one-sideldy separable from the depth shape effect *w*.

Instead, *x* is mutually separable from *y* if there's a comprehensive part or a whole *z* in which they do not overlap in such a way that the occurring of *x* does not require y to obtain and conversely. For example, every row or column used by Wertheimer to explicate the function of proximity as unification principle may be cut off from another one, even though their adjacent alignment gives rise to a figure.

The foundation variety. Foundation relations hold predominantly among perceptual contents that may occur as autonomous phenomena. If *x* is perceptually picked up, every other *y*, *w*, *z*, *n*..., *n-1* in the field is either connected or cooperatively interpenetrated with *x*. Hence, this relation induces a fundamental partition, providing a phenomenal field section with a grid of not symmetrical relations by which it is disjointed from its perceptual complement. An outstanding example is the foundation linking modal completion, stratification, margin pop up, and brightness contrast, which Kanizsa (1980b) demonstrated to be the condition of the contours without gradients phenomenon.

The foundation may be mediate or immediate, according to there being more than two elements involved, and unilateral, but in any case it brings about a unitary character that singles out different features or parts of an aggregate as belonging on one another and not merely co-localized in adjacent points of space and time.

---

[5] In some respects, this is a converse relations group of dependence variety, whose definition is mainly due to Brentano, who tellingly used it in his attempt at building a phenomenologically analytical combinatorics of perceptual phenomena as well.See Brentano (1988).

The implication variety. This phenomenal relation does not correspond to entailment. But it amounts to a set of variables bringing to bear the conjoint value of another set, where the two set may differ in repletion of phenomenological features. Then, the implication can occur with various degrees of constraining, ranging from the relation between the apparent size of faces and their displacement in a Necker cube to that between occlusion, apparent overlaying and amodal completion in the phenomenal folding[6].

All these relation varieties give rise to perceptual structures that are both locally defined and detectable and globally spreading along chain of potential connections, which may be guiding the perceiver in his search of the perceptual scene. Hence, they allow a phenomenological manifold to take shape in correlation with the perceiver operations.

Gaps, bridges, and phenomenological experience

The empirical and theoretical contributes of experimental phenomenology may be indeed of a great importance for settling the controversial issues perception science is being faced with nowadays. If the phenomenological experience of perception is to be recovered, it can not be merely identified with qualia or with a particular feeling associated with perception. The question of what it is like for something to be perceived must be reframed in a question about the structure of the perceptual manifold, the relation varieties that gives perceptual world shapes and perceivers a wide range of accessible perceptual scenes. The hard question of perceptual awareness, which is linked with the perceiver's seemings and experience measurement problem, may hardly be solved if it is treated without envisaging the strict correlation among the phenomenology of the world and the affordances to the perceivers' inquiries.

Therefore, the experimental phenomenology may provide the demonstrations and observations of data that perception science must include to get successful explanation in a satisfactory way. But Kanizsa and Bozzi have repeatedly claimed that the experimental phenomenology is an autonomous and independent science. Closed as to neurobiological, physiological, physical facts, it seeks a justification in his own rules and axioms. A chance of a bridge across different domain couldn't be any harder. And the explanatory gaps are anything but to span.

It is not possible here either to solve or to discuss all the arguments.

---

6 Massironi (1988).

However, something may be said about a reasonable way to build a common explanatory framework. On the one hand, the naturalization in perception science may be intended as only claiming that the likelihood of a perceptual explanation increases with the interdisciplinarity and not that every statement about phenomenology must be reduced in a neurobiological one. This does not imply any identification theory between perceptual and neurobiological facts. Nor is a necessary reduction of a science domain to an allegedly fundamental one requested. The same phenomenon may be studied at different scales, just as it is the case with physical structures at different energy levels, and there is no an a priori implication about the nature of the concepts and terms of a perception theory[7]. On the other one, how to link the data of experimental phenomenology with other perception sciences depends upon the way they are intended to be used. The experimental phenomenology as an elementary science of the phenomenal structures still keeps its closure under the perceptual definition of the relation varieties. It can fix an independent domain of cartesian propositions with their epistemic and psychological experience explanation[8]. As an abstract science, it identifies sets of phenomenological invariances as properties that must be preserved across the appropriate mappings in different scientifical domains[9] . Hence the experimental phenomenology may thus serve as a constrain. But perception science can goes abstract as well, defining the class of all relation varieties across the different closed science that it involves, be they anatomical pathways or functional mechanisms, psychophysiologic response pattern, phenomenological relations. This way, experimental phenomenology may be taken as a model, that is the science of structures wherein the fundamental relevant abstract properties are phenomenologically justificated[10]. Indeed, the proposal risks to be only tentative. However, it could be a way to satisfy the adequacy request in perception science and, at the same time, to realize Bozzi's (2002) claims that the experimental phenomenology is a branch of natural sciences, of the naturalized conception of knowledge, without losing the closure that assures its richness.

---

7 For these epistemological assumptions see Gold & Stoljar (1999).

8 On the relation between these expressions see Bozzi (1976).

9 The invariances classes must be expressed in formalizable language as shown by Musatti (1957).

10 It is at this level that a mapping might be thought of among phenomenal formalized variety and functional mechanisms. As an example of the search for adequate candidates see Spillmann & Ehrenstein (2004), Spillmann &Werner (1996).

References

Bayne, T. (2004). Closing the gap? Some questions for neurophenomenology. Phenomenology and the Cognitive Sciences, **3** (4), 349–364.

Borrett, D., Kelly, S. & Kwan, H. (2000). Phenomenology, dynamical neural networks and brain function. Philosophical Psychology, **13** (2), 213–228.

Bozzi, P. (1976). Esperienza fenomenica, esperienza epistemica ed esperienza psicologica. Appunti per l'epistemologia del metodo fenomenologico sperimentale. In G. Siri (ed.), Problemi epistemologici della psicologia. Milano: Vita e Pensiero, pp. 73-87.

Bozzi, P. (2002). Fenomenologia sperimentale. In S.C. Masin (ed), I fondamenti della fenomenologia sperimentale, Teorie e Modelli, **7**, 2/3, pp. 13-48.

Brentano, F. (1988). Philosophical Investigations on Space, Time and the Continuum, London - New York -Sydney: Croom Helm.

Frith, C. (2002). How can we share experiences. Trends in Cognitive Sciences, **6** (9), 374.

Gallagher, S., & Sørensen J. B. (2006). Experimenting with phenomenology. Consciousness and Cognition, **15**, 119–134.

Gold, I., & Stoljar, D. (1999). A neuron doctrine in the philosophy of neuroscience. Behavioral and Brain Sciences 22 (5), 156-194.

Horst, S. (2005). Phenomenology and psychophysics. Phenomenology and the Cognitive Sciences , **4**, 1–21.

Jack, A. I., & Roepstorff, A. (2002). Introspection and cognitive brain mapping: from stimulus-response to script-report. Trends in Cognitive Sciences, **6**(9), 333–339.

Jackendoff, R. (1987). Consciousness and The Computational Mind. Cambridge (Mass.) and London: MIT Press.

Kanizsa, G. (1980a). Tipo di margine e colore di una superficie. In Kanizsa, G. Grammatica del vedere. Saggi su percezione e gestalt. Bologna: Il Mulino, pp. 211-221.

Kanizsa, G. (1980b). Contorni senza-gradiente o contorni cognitivi?. In Kanizsa, G. Grammatica del vedere. Saggi su percezione e gestalt. Bologna: Il Mulino, pp. 271-308.

Katz, D. (1911). Die Erscheinungsweisen der Farben und ihre Beeinflussung durch die individuelle Erfahrung. Zeitschrift für Psychologie, 7; (1935) The World of Colour. London: Kegan Paul.

Koffka, K (1935). Principles of Gestalt psychology. New York: Harcourt, Brace & World.

Levine, J. (1983). Materialism and qualia: The explanatory gap. Pacific Philosophical Quarterly, **64**, 354–361.

Lutz, A., Lachaux, J.-P., Martinerie, J., & Varela, F. J. (2002). Guiding the study of brain dynamics using first-person data: Synchrony patterns correlate with ongoing conscious states during a simple visual task. Proceedings of the National Academy of Science USA, **99**, 1586–1591.

Marbach, E. (1999). Building materials for the explanatory bridge. In F. Varela and J. Shear, The View from Within. Exeter: Imprint Academic, pp. 252–257.

Massironi, M. (1988). A new visual problem: phenomenic folding. Perception, **17**, 681-694.
Musatti, C.L. (1931). Forma e assimilazione. Archivio Italiano di Psicologia, **9**, 61-156.
Musatti, C.L. (1957). I caratteri percettivi degli oggetti e la teoria matematica dei gruppi. Rivista di Psicologia, **51**, 331-341.
Roy, J.-M., Petitot, J., Pachoud, B. & Varela, F. (1999). Beyond the gap: An introduction to naturalizing phenomenology. In J. Petitot, F. Varela, B. Pachoud & J.-M. Roy, Naturalizing Phenomenology. Stanford (CA): Stanford University Press, pp. 1–80.
Smith, B. (1988). Foundations of Gestalt Theory. Munich - Vienna: Philosophia.
Smith, B. (1994). Topological Foundations of Cognitive Science. In C. Eschenbach, C. Habel & B. Smith, Topological Foundations of Cognitive Science. Hamburg: Graduiertenkolleg Kognitionswissenschaft.
Spillmann, L., & Ehrenstein, W., Gestalt factors in visual neuroscience. In Chalupa, L.M., Werner J.S. (ed), The visual neuroscience. Cambridge (MA): MIT Press, pp. 1573-1589.
Spillmann, L., & Werner J.S., Long-range interactions in visual perception. Trends Neuroscience, **19**, 428-434.
Varela, F. J. (1996). Neurophenomenology: A methodological remedy to the hard problem. Journal of Consciousness Studies, **3**, 330–350.
Zahavi, D. (2004). Phenomenology and the project of naturalization. Phenomenology and the Cognitive Sciences, **3**(4), 331–347.

Abstract

Some issues heavily debated in perception sciences are presented: the explanatory gap and the experience measurement problem. The experimental phenomenology is said to provide substantive contribution to settle controversy over the phenomenological adequacy of perception theory and models. An interpretation of experimental phenomenology as explanation of the perceptual manifold, and definition of relation varieties to eventually map onto other perception sciences' domains is sketched.

Riassunto

Questo articolo presenta alcuni questioni fortemente dibattute nelle scienze della percezione: l'*explanatory gap* e il problema della misura dell'esperienza. Si sostiene che la fenomenologia sperimentale possa contribuire a risolvere le difficoltà connesse alla richiesta di adeguatezza fenomenologica delle teorie e dei modelli proposti, una volta che la si intenda come spiegazione della varietà fenomenica

e definizione di classi di relazioni che potrebbe essere fatte corrispondere a altri domini disciplinari interessati alla percezione.

Addresses: