
ANDREA PACE GIANNOTTA
University of Florence
andreapacegiannotta@gmail.com

COLOR RELATIONISM AND ENACTIVE ONTOLOGY*

abstract

In this paper, I present the enactive theory of color that implies a form of color relationism. I argue that this view constitutes a better alternative to color subjectivism and color objectivism. I liken the enactive view to Husserl's phenomenology of perception, arguing that both deconstruct the clear duality of subject and object, which is at the basis of the other theories of color, in order to claim the co-constitution of subject and object in the process of experience. I also extend the enactive and phenomenological account of color to the more general topic of the epistemological and ontological status of sensory qualities (qualia), outlining the fields of enactive phenomenology and enactive ontology.

keywords

qualia, perception, enactivism, phenomenology, internalism and externalism

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1. Epistemology and ontology of color

What is the nature of colors? Are they properties of mind-independent objects, as common sense leads us to believe? Alternatively, are they merely subjective appearances, “internal” to a perceiver’s mind? These questions regard the specific case of color in a more general inquiry concerning the epistemological and ontological status of the sensory qualities that appear in perception (colors, sounds, smells, etc.). This inquiry is motivated by the reflection on some features of ordinary experience, which give rise to the so-called “problem of perception” (see Crane, 2015): perceptual relativity, illusion and hallucination.

For example, consider the perception of a lemon. One can be aware that the color of the lemon appears differently when moving around it, or in relation to changes in the environmental light. One could also be aware of having had an illusory perception or even a hallucination of the lemon, perhaps caused by the ingestion of a psychedelic drug. These phenomena lead us to question the relationship between perceptual appearance and an “external”, mind-independent reality beyond it.

The two main options concerning the epistemological and ontological status of sensory qualities are *internalism* and *externalism*. In the case of color, these options become *color subjectivism* and *color objectivism*. In the following, I shall discuss these views, in order to allow the enactive theory to emerge as an alternative to both.

1.1 Qualia externalism and color objectivism

The externalism of sensory qualities (*qualia externalism*) claims that, notwithstanding the problem of perception, in veridical perception we are acquainted with mind-independent objects, whose intrinsic properties are exactly what they appear to be in perceptual experience. This view – *direct* or *naïve realism* – is the philosophical account of perception that is more faithful to the common sense of the man in the street, who believes that “yellow” is a property of ripe lemons and not something “in the mind”. In the case of color, *qualia externalism* becomes *color objectivism*. According to it, colors are objective properties of things in the environment.

A motivation for color objectivism is *color constancy*: the fact that even if perceptual appearances continuously change, we usually believe that a certain region of an object has a certain color (for e.g. a precise shade of yellow in the surface of the lemon, which remains constant over time and across different viewing conditions). Therefore, according to color objectivism colors are *monadic* properties of objects, which do not depend on a relation with a perceiver.

There are two versions of color objectivism: *physicalism* and *primitivism*.

Color physicalism claims that colors are objective properties of material bodies and light sources. According to this view, we can discover the true nature of colors through scientific investigation, thus establishing an *identity* between colors and certain physical properties. This *identity theory* of color is analogous to the identity theory between mental states and physical states in the philosophy of mind. In particular, concerning physical surfaces, colors are conceived of as identical with their *reflectance profile*, i.e. the capacity to differentially reflect wavelengths from different regions of the incident illumination. However, each color turns out to be associated with many reflectance profiles. In order to account for the problem of “multiple realization” of colors (analogous to the same problem in the philosophy of mind), some authors argue for a version of color physicalism that claims an identity between colors and *types* of reflectance profiles (*type-identity*).

The other form of color objectivism is color primitivism. This view denies that there is a relation of identity between colors and physical properties such as reflectance profiles. On the contrary, it argues that colors are *new, sui generis* properties of material objects. This view is analogous to non-reductive theories in the philosophy of mind, such as Chalmers’ *naturalistic dualism of properties* (Chalmers, 1996), which claims that phenomenal properties are new properties of physical systems (*strong emergence* or *natural supervenience*).

Color objectivism comes across an obstacle when accounting for perceptual relativity, illusion, and hallucination. All these phenomena seem to point to a distinction between the way things appear in perception and what they “really” are. A classic option for facing the problem of perception consists in giving up the naïve realism of the man in the street, by distinguishing between qualitative properties such as colors, sounds, smells – conceived of as merely subjective appearances in the mind – and physical-mathematical properties such as shape, mass, energy, etc. – conceived of as objective properties of mind-independent objects. This is the view that was first developed in ancient atomism and that was later adopted by modern philosophers such as Galilei, Descartes and Locke, among others. This internalism concerning sensory qualities (*qualia internalism*), conceives of them as sensations that are merely “in the mind” and that are caused by objective processes in the physical world.

In the case of color, *qualia internalism* becomes *color subjectivism*. In particular, the received view in the philosophy of color is *color dispositionalism*. According to it, “objective colors” are dispositions to cause certain effects (“phenomenal colors”, i.e. color sensations) in the visual system of a perceiver in certain conditions (for e.g., the objective “red” is the disposition, defined in physical terms, to cause sensations of red in a perceiver’s mind). According to color subjectivism, colors are not monadic but *relational*, since they involve a relation between perceivers, objects and circumstances.¹

Color subjectivism is developed as an answer to the problem of perception. In particular, it accounts for different forms of perceptual relativity: intrapersonal, interpersonal and interspecies.

For example, I can become aware that a single region of the lemon that is in front of me appears differently in different conditions, for e.g. under different environmental lights, or in relation to changes in my physiological conditions (e.g. after ingesting *santonin*, which makes everything to look yellowish; see Husserl, 1989, pp. 62 ff.). These are forms of *intrapersonal relativity*.

1.2 Qualia internalism and color subjectivism

1.3 Perceptual relativity and color relationalism

¹ Color subjectivism presupposes that perceivers, objects and circumstances can be defined independently from the relation in which they enter into perception. I shall later present the enactive view as a stronger form of relationalism, which denies the independent existence of subjective and objective poles of perceptual relation.

Various experiments point to forms of *interpersonal variation* in color vision. In relation to the same object and the same circumstances, the experiments show that different perceivers might have different color experiences. This is argued by referring to the concept of *color space*: the structure of the appearance of colors in the dimensions of hue, saturation and brightness. In fact, we can express phenomenal judgments that refer to the structural features of our experience of colors. In particular, we can distinguish between *unique hues*, which do not contain other chromatic components (in specific shades of blue, yellow, green and red) and *binary hues* (for e.g. orange, which contains both yellow and red). The point is that in an experimental setting, different perceivers, that are presented with a certain range of stimuli, might pick up different ones when asked to point out unique hues. For e.g., whereas one person recognizes a “unique green”, another person might recognize a “bluish green” (see Cohen, 2004, p. 464). The difference in the phenomenal judgments of different people in front of the same objects in the same circumstances, shows that they have different color experiences.² This claim leads us to the central thesis of color subjectivism: “phenomenal colors” are not objective properties of material objects; they are subjective sensations that arise in a subject’s experience as a consequence of certain events in the physical world (i.e., the world that is described by mathematical physics).

The classic version of color dispositionalism defines the “objective” color (e.g. red₁₉) as the disposition to cause certain sensations to *normal observers* in *normal circumstances*. A different version of color dispositionalism is J. Cohen’s *color relationalism* (Cohen, 2009). Cohen highlights the fact that the definition of what counts as a normal observer in normal circumstances is somewhat arbitrary. For this reason, he develops a stronger form of *relationalism* regarding color. By considering the different forms of relativity in color vision (intrapersonal, interpersonal and interspecies), Cohen argues that there is no independent and well-motivated reason to pick one of the variants as the veridical perception of a certain color. For this reason, we must reconcile the apparently incompatible variants by relativizing colors to different values of certain parameters (Cohen, 2004, p. 454).

For e.g., consider the phenomenon of *color induction*: two grey squares with the same reflectance profile turn out to appear differently when placed against different backgrounds: darker when placed against a light background, lighter when placed against a dark background (see Cohen, 2004, pp. 455, 505). Which is the “normal circumstance” and therefore the true judgement concerning the perceptual appearance of the square? Is the perceived color of the square light grey or dark grey? Cohen’s proposal is to consider both judgements as true, conceiving of colors as relational properties that vary in relation to background configurations and to various other factors (viewing conditions, physiological conditions of the perceiver, etc.). According to Cohen’s color relationalism, “colors are not monadic properties like *red* or *green*, but rather relational properties like *red for S₁ in C₁*, or *green for S₂ in C₂*” (Cohen, 2012, p. 293).

Cohen’s relationalism is still a form of color subjectivism. In fact, it is based on the distinction between “experiences of red/green/etc.” (Cohen, 2012, p. 293), which are “type of mental states of subjects” (Cohen, 2012, p. 293) and the physical causes of these experiences: visual systems, objects, circumstances.³

² This conclusion must leave aside the possible doubt concerning the presence of any phenomenal experience in another person. In the words of Chalmers (1996), the other person could be a “phenomenal zombie”.

³ For this reason, this view leaves open the so-called “hard problem” of consciousness (Chalmers, 1995), i.e. the difficulty found in explaining how and why certain physical processes give rise to our “colourful” experience.

So far, we have seen the two main options in the philosophy of color: subjectivism (classic dispositionalism or Cohen's relationalism) and objectivism (physicalism or primitivism). In turn, these views constitute the application to the case of color of two more general strategies concerning the epistemological and ontological status of sensory qualities: qualia internalism and qualia externalism. These views are opposed to each other and they each play on the difficulties of the other. Qualia internalism tries to account for the problem of perception (relativity, illusion, hallucination), but it enters into conflict with the naïve realism of common sense. Qualia externalism is more faithful to common sense, but has difficulties in accounting for perceptual relativity, illusions and hallucinations. However, internalism and externalism have something in common: they are both based on the duality of subject and object, conceived of as independent and pre-constituted poles of the cognitive relation. In particular, in both views, the "external" world is conceived of as an ontological domain that is mind-independent and that is known, directly or indirectly, in perception. According to externalism/objectivism, the external world is faithfully described by common sense. According to internalism/subjectivism, it is described by mathematical physics. In the following, I shall argue that the enactive view of color challenges the common presuppositions of both internalism/subjectivism and externalism/objectivism, deconstructing the clear duality of subject and object that they both presuppose.

The investigation of color vision has a central role in the development of the enactive approach, being conceived of as "a case study in the foundations of cognitive science" (Varela & Thompson, 1990). From this analysis, the proponents of the enactive view draw some radical consequences concerning the nature of cognition in general. F. Varela and E. Thompson (Varela & Thompson, 1990; Thompson *et al.*, 1992) develop their enactive theory of color in the context of a new paradigm for the cognitive sciences, which is especially developed in *The Embodied Mind* (Varela *et al.*, 1991). At the base of this framework there is a *comparative argument*, which is based on the analysis of the *interspecies* variation in color vision. The comparative argument starts by distinguishing the *color space* (the structure of the appearance of colors, constituted by the dimensions of hue, saturation and brightness, as we have seen) from the *chromatic domain*, which is the physiological basis of color vision and is relative to the embodiment of a perceiver. In human beings, the chromatic domain can be represented in a mathematical space with three independent variables, which result from the combination of the sensitivity curves of the photopigments in the retinal cones, giving us a *trichromatic domain*. The comparative argument unfolds in two steps. Firstly, it establishes a correspondence between the structure of the chromatic domain and the structure of the color space. Secondly, it claims that "since chromatic domains are relative to the embodiment in a given perceiver class, so too is color space." (Varela & Thompson, 1990: 134). In fact, the physiological basis of color vision varies amongst different classes of animals, which range from dichromats to even pentachromats (in certain diurnal birds like pigeons and ducks). By detecting these physiological differences, we can infer radical differences in the respective experience of colors. An important point is that there is a *radical incommensurability* between color spaces with different *dimensions*. We cannot imagine of a tetrachromat perceiver as one that can make finer distinction between, for e.g. red and yellow hues, because this would only be an increase in *resolution* within our own chromatic domain. On the contrary, the difference between trichromatic and tetrachromatic vision consists in the fact that there is a completely new dimension in the color space. Therefore, we cannot map one color space into the other (see Varela & Thompson, 1990, p. 135).

The consequence of the comparative argument is that different animals have a different experience of colors. For example, a tetrachromat perceiver can see a difference between certain items, whereas we see a perceptual match. They can see qualitative discontinuities,

2. The enactive theory of color

whereas we see a homogeneously colored region of space. For this reason, these animals perceive “novel hues” within “color hyperspaces” with four or five dimensions.⁴ At this point, in order to appreciate the specificity of the enactive account of color, we must compare it with color subjectivism and color objectivism.

2.1 Not subjectivism

The comparative argument could seem to imply a form of color subjectivism, which conceives of colors as subjective sensations that vary between different classes of animals. However, the enactive account of color is explicitly developed as an alternative to color subjectivism, criticizing “the ‘internalist’ view that perceptual content is provided by subjective qualities (qualia)” (Thompson *et al.*, 1992, p. 401). The internalist view is based on the distinction between “primary properties” of objects, investigated by mathematical physics and secondary properties, which are merely subjective appearances. In contrast with this distinction, the proponents of the enactive approach argue for the *interdependency between color vision and spatial segmentation* (Thompson *et al.*, 1992, p. 402).⁵ In fact, the segmentation of a visual scene, which allows one to detect different surfaces and objects, presupposes the ability to perceive qualitative discontinuities, i.e. chromatic differences. We can visually perceive an object with a certain shape, that emerges as a salient object of perception, by perceiving its boundaries, which differentiate it from the background and from other objects and we perceive these boundaries by detecting chromatic differences. Therefore, spatial properties such as shapes and boundaries cannot be conceived of as objective properties of a pre-constituted, mind-independent world, since they depend on the perception of colors. This perception, in turn, is relative to the embodiment of a perceiver. According to the enactive view, both “primary” and “secondary” properties must be conceived within a process of co-emergence of perceiver and environment in reciprocal dependence.

The latter thesis is explicitly stated in the framework of *The Embodied Mind*: “Knower and known, mind and world, stand in relation to each other through mutual specification or dependent coorigination.” (Varela *et al.*, 1991, p. 150). As we will see below, this thesis implies a deconstruction of the clear duality of subject and object, in order to investigate their co-emergence in the process of experience.

2.2 Not objectivism

The enactive view of color is also different from color objectivism. In order to highlight this difference we can compare the enactive approach with J. Gibson’s ecological theory of perception. In fact, there are significant affinities but also differences between these views. Varela and Thompson agree with Gibson’s “deep insight that perception must be understood within the ecological context of guided activity” (Thompson *et al.*, 1992, p. 399) and his account of perception in terms of sensorimotor coupling between organism and environment. Furthermore, the notion of *affordance*, which is central to Gibson’s view, involves a complementarity of animal and environment and, for this reason, is *relational*. Affordances are properties of objects in the environment that appear to a certain animal in virtue of its sensorimotor capacities (for e.g. a handle affords holding for an animal that can hold it, a chair affords sitting for an animal that can seat on it, etc.). However, the relational notion of affordance goes together, in Gibson, with a form of direct or naïve realism (see Gibson, 1967, p. 168). According to Gibson, perception consists in the direct picking up of information that is

4 See Thompson *et al.*, (1992) for the mathematical details of the kind of incommensurability that we must admit between different color spaces. The consequence of this incommensurability is that we cannot have any idea of the different hues that are perceived, for e.g., by a pigeon or a duck (Thompson *et al.*, 1992, p. 377).

5 These authors refer to Berkeley’s critique to the distinction between primary and secondary properties (see Thompson *et al.*, 1992, p. 387 n. 13).

enclosed in the environment, without involving any sensation or sense datum (Gibson, 1972, p. 77). However, on this point Thompson et al. (1992, p. 399) criticize “Gibson’s belief that the only alternative to the mistaken sense-data view of perception is direct realism”. In contrast to Gibson’s direct realism, these authors consider the environment that is inhabited and perceived by an animal, not as a pre-given ontological domain, endowed with certain objective properties and directly grasped in perceptual activity, but also as “something determined by that very activity” (Thompson et al., 1992, p. 399).

The latter passage could be interpreted as just referring to the fact, which is crucial for the enactive view, that an animal’s activity modifies the environment and, in turn, the environment modifies the animal’s behaviour. Concerning color vision, Varela and Thompson stress its ecological dimension by referring to examples that point to a co-determination and co-selection of sensory-motor capacities of animals and environmental features. For example, the trichromatic color vision of bees, which is shifted towards the ultra-violet, seems to have been “co-evolved with the colors of flowers, which often have contrasting patterns in the ultraviolet light” (Thompson et al., 1992, p. 392). This thesis could be read as still presupposing an objectivist view of the environment, conceived of as an ontological domain that is pre-constituted and independent from the cognitive relation. However, as we will see below, the enactive view is more radically *relationist*, since it conceives of the enactive relation between perceiver and environment as a “dependent co-origination”, which does not presuppose the independent and substantial existence of the two poles of cognition.

For this reason, the original formulation of the enactive approach must be distinguished from some other strands of “enactivism” in the contemporary debate that are more near to Gibson’s direct realism.⁶ In particular, the so-called “sensorimotor enactivism” of K. O’Regan and A. Noë (O’Regan & Noë, 2001; Noë & O’Regan, 2002) takes from the enactive approach the understanding of cognition in terms of sensorimotor activities. For these authors, seeing is an exploratory activity of the animal that is mediated by its mastery of rules of interdependence between stimulation and movement (Noë & O’Regan, 2002, p. 568). By being “attuned” to the structure of sensorimotor contingencies, the animal is “*perceptually coupled* with its environment” (Noë & O’Regan, 2002, p. 569). However, the notion of *environment* that comes into play in the sensorimotor approach seems to refer to an objective pole of the cognitive relation that is pre-constituted and directly perceived. When raising the issue of the ontological status of “qualia” and, specifically, the ontological status of colors, these authors express an objectivist/externalist position: “when you see a red wall there are just the different things you do when you interact with the *redness of the wall*” (Noë & O’Regan, 2002, p. 572, emphasis added). In this view, red turns out to be an objective property of the environment that is directly perceived: “you have access to the redness by the most minute of eye movements or attentional shifts. The redness is there, in the environment. The slightest eye, head, or attention movement reveals further information about its character [...] you have continuous *access* to the redness in the environment.” (Noë & O’Regan, 2002, p. 580).

On the contrary, the enactive view argues for a stronger correlation between perceptual contents and ecological properties: “the contents of perceptual states are to be type-identified by way of the ecological properties perceived, and these ecological properties are to be type-identified by way of the states that perceive them” (Thompson et al., 1992, p. 401). On this point, one could object that this definition of ecological properties and perceptual states is

⁶ See Vörös et al. (2016) for the differences between the non-metaphysical framework of *The Embodied Mind* and some subsequent forms of “enactivism” that are characterized by a “*shift towards realism*” (Vörös et al., 2016, p. 194).

circular. However, the enactivist answer is that it is exactly this *fundamental circularity* that is expressed in the concept of *enaction*.

2.3 Enaction as dependent co-origination

The enactive view of color is at the basis of a general framework that constitutes a new paradigm for the cognitive science. This framework is centred on the rethinking of the relationship between subject and object. In the enactive view, subject and object are not pre-constituted, substantial domains that somehow enter into cognitive relation. On the contrary, they are conceived of as co-emergent or co-dependently arising in the process of experience. The concept of co-dependent arising is taken from the Madhyamaka (Middle Way), which is one of the classic schools of Buddhist philosophy (see Varela *et al.*, 1991, p. 221 ff.). Nagarjuna – the founder of this school of thought – developed a radically relationist view that denies the substantial and independent reality of subject and object. Nagarjuna argues that in our experience we cannot find anything that is substantial and not dependent on something else. Every moment of experience is related to something other than itself and every object of cognition is related to mental processes. For this reason, neither of the poles of cognition can be conceived of as independent from the other. Subjects and objects are non-substantial poles of a process of dependent co-origination. In the words of M. Bitbol, in Nagarjuna’s view “The duality of subject and object, of perceiving and perceived, is not denied; but it is shown to be empty, namely to arise from a symmetric relation of mutual dependence.” (Bitbol, 2003, p. 339). Bitbol likens the relationism of the Middle Way to Kant’s philosophy, that also conceives of subject and object not as pre-given substances but as functional poles of a correlation. In Kant’s view, the object of knowledge is not independent from the cognitive relation, being the correlate of a process of *constitution* in which the subject itself comes to be constituted (see esp. Kant, 1781-87/1998, A158/B197). In both Kant’s philosophy and the Middle Way, the two relata of cognition do not pre-exist as independent domains but co-arise in the process of experience.⁷ This form of relationism constitutes the theoretical core of the enactive approach in its original version.

3. Enactive phenomenology and ontology

At this point, I would like to show that enactive relationism converges with some central aspects of Husserl’s phenomenology. I shall do so by considering, firstly, Husserl’s theory of perception, with special reference to color vision.

The phenomenological analysis of perception is centred on the concepts of *intentional form* and *sensory matter*. The act of perceiving consists in the intentional animation (*morphè*) of sensory matters (*hyle*), through which the object of perception is *constituted*. This analysis of perception in terms of constitution is aimed at accounting for two aspects of perception, which we have already seen in regard to color vision: perceptual *relativity* and perceptual *constancy*. For e.g., the lemon appears to me as endowed with certain constant properties, such as shape and color (e.g. a specific shade of yellow in a certain region of its surface). However, I perceive these objectual properties *through* a continuous flow of experiences that constantly changes. For e.g., the yellowness of the lemon appears through a continuous multiplicity of *adumbrations* of yellow. For this reason, Husserl distinguishes between color as objectual property (the yellowness of the lemon) and color as sensation, which is a component of consciousness:

The color of the seen physical thing is, of essential necessity, not a really inherent moment of the consciousness of color; it appears, but while it is appearing the

⁷ Bitbol refers to the development of Kantian philosophy in the Marburg school and especially to Cassirer, who “recommended that one not construe subject and object as a pair of ontologically closed entities” and stated “after Cohen, the idea of a ‘reciprocal co-belonging’ of the concepts of subject and object’.” (Bitbol, 2003, p. 340).

appearance can and must, in the case of a legitimating experience, be continually changing. The same color appears 'in' continuous multiplicities of color adumbrations (Husserl, 1983, p. 74).

It must be borne clearly in mind that the Data of sensation which exercise the function of adumbrations of color, of smoothness, of shape, etc. (the function of 'presentation') are, of essential necessity, entirely different from color simpliciter, smoothness simpliciter, shape simpliciter, and, in short, from all kinds of moments belonging to physical things. The adumbration, though called by the same name, of essential necessity is not of the same genus as the one to which the adumbrated belongs (Husserl, 1983, p. 75).

This analysis of perception is centered on the distinction, and *correlation*, between sensations (which are *immanent*, i.e. "internal") and sensory properties (which are *transcendent*, i.e. "external"). In this way, this account constitutes an alternative to the two opposite views that we have already seen in the philosophy of mind and the philosophy of perception: qualia internalism and qualia externalism. As a criticism of qualia internalism, Husserl criticizes the hypostatization of the "physical thing", i.e. the object of mathematical physics, which conceives of it as an absolute reality "in itself" that would be the "real" cause of subjective appearances (metaphysical realism). In the phenomenological view, the so-called primary properties are the result of a theoretical abstraction from the concrete phenomenon that is constituted as the correlate of intentional acts (see esp. Husserl, 1970, pp. 30 ff.). The phenomenological account of perception as constitution through the intentional animation of hyletic contents is also different from qualia externalism (and direct realism, such as Gibson's), because of its denial of the role of sensations in perception and its idea of the object as a mind-independent and pre-constituted reality (see Gibson, 1967, p. 67).⁸

Concerning the epistemology and ontology of color, the phenomenological account of perception is an alternative to both color subjectivism and color objectivism, since it admits both color as sensation (e.g. the adumbration of yellow) and color as objectual property (e.g. the yellowness of the lemon). However, one could object that this account, which does not overlap with neither internalism nor externalism, also implies a problematic duplication of properties. In particular, according to K. Mulligan (1995, p. 47) Husserl's claim that between sensations and sensory properties there is a relation of "similarity" remains "obscure" (Mulligan 1995, p. 47).⁹ In my opinion, in order to shed light on this difficulty we must take into account the distinction between two levels of the phenomenological inquiry: *static* and *genetic*. Static phenomenology conceives of the experiences as "unitary temporal processes" (Husserl, 1983, p. 171) and investigates their correlation with objects. As we have seen, this correlation is conceived of in terms of the intentional animation of sensory contents. However, when developing this analysis, Husserl also states that it must be considered as *preliminary* to a genetic "deepening".¹⁰

⁸ See Zhok (2013) for a comparison between Gibson's direct realism and Husserl's phenomenology. Zhok stresses affinities but also important differences between them concerning the ontological status of percepts.

⁹ Mulligan also claims that Husserl "remained attached to the thesis without ever explaining just what it is supposed to involve." (Mulligan, 1995, p. 47).

¹⁰ The explicit distinction between the two levels of the phenomenological inquiry, static and genetic, was at the heart of Husserl's philosophy after publishing *Ideas I*. However, this distinction was implicitly present also before, especially in the lectures on time-consciousness (Husserl 1991; see also Husserl 1999) and in some passages of *Ideas I* (see Husserl, 1983, p. 171).

Genetic phenomenology investigates the temporal micro-structure of experiences. In the light of this inquiry, experiences turn out to be constituted by a continuous flow of *primal impressions* (*Urimpressionen*) that are interlaced with two forms of proto-intentionality: retention and protention.¹¹ In this way, genetic phenomenology investigates the “genesis of constitution” (Husserl, 2001, p. 644), i.e. the micro-genesis of the process through which experiences come to constitute objects.

An important implication of the genetic broadening of phenomenology is that it reveals the genesis of both *subject* and *object* of experience, i.e. their *co-constitution* in reciprocal dependence. In fact, the process through which an object is constituted as the correlate of perceptual experiences is at the same time the process through which the subject itself comes to be constituted as a subjective pole of cognition. The process of perceiving consists in the intentional “animation”, through retentions and protentions, of primal impressions. From the static point of view, these impressions constitute the phenomenal contents of perceptual “states”, which ground the constitution of perceptual “objects”. However, the genetic inquiry deconstructs this static duality of “states” and “objects”, revealing a process of co-emergence of experiences and objects in reciprocal dependence. At the basis of this process, there is a primary qualitative process: the flow of primal impressions in inner time-consciousness and their proto-intentional animation through retentions and protentions.

The process-oriented and relationist account of experience in genetic phenomenology converges with the enactivist notion of cognition as dependent co-origination of subject and object. It also converges with the enactive approach in revealing the essentially embodied character of consciousness, acknowledging the essential role of bodily features in shaping the experience of a perceiver.¹² This closeness between the original version of the enactive approach and Husserl’s phenomenology is particularly evident in Varela’s project of *neurophenomenology* (Varela, 1996), which is continuous with the enactive framework. In fact, Varela argues that the phenomenological inquiry “does not sustain the basic subject-object duality but opens into a field of phenomena where it becomes less and less obvious how to distinguish between subject and object (this is what Husserl called the ‘fundamental correlation’.” (Varela, 1996, p. 339).¹³

The combination of the enactive approach and phenomenology leads us to define the fields of *enactive phenomenology* and *enactive ontology*, which investigate the constitution of objects in terms of the correlation and co-emergence of subject and object in reciprocal dependence.¹⁴ This approach can investigate the constitution of different domains of empirical reality, or *regional ontologies*, by accounting for their emergence from a primal process of co-constitution of subject and object in reciprocal dependence.

Concerning the epistemology and ontology of color, enactive phenomenology and ontology gives support to *color relationism*, i.e. the thesis that colors are relational properties in a strong sense. According to this view, the experience of color is to be found in the process of co-emergence of the perceiver and the perceived. When asked the questions “where is the color?”

11 Here I must leave aside the details of Husserl’s analysis of inner time-consciousness, in order to focus on some of its central aspects.

12 See especially the analyses developed by Husserl in *Ideas II* (Husserl, 1989) and further developed by Merleau-Ponty (2005).

13 C. Petitmengin (2017: 146) stresses the continuity between Husserl’s genetic phenomenology and Varela’s neurophenomenology, arguing that they both investigate the “*process of co-constitution*” (ibid: 142) of the “objective and subjective poles [...] within lived experience” (ibid: 141). On the relationship between Husserl’s phenomenology and Varela’s neurophenomenology see also (Bitbol, 2008, 2012; Pace Giannotta, 2017).

14 I pointed out some lines of development of an enactive ontology in (Pace Giannotta, 2016).

and “is it internal or external?” the relationist answer is that there is not a monadic property such as “phenomenal property” or “quale” (for qualia internalism and color subjectivism), or objectual property (for qualia externalism and color objectivism). The experience of color emerges from the process of dependent co-origination of the perceiver and the perceived.

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