dox but rather an observation that should be taken to be at the heart of knowledge of colour perception,[1] coloured shadow and colour contrast are revealing something about the nature of our colour vision. Coloured shadow or colour contrast would appear as "correct" perceptual experience if, according to and in agreement with the author's definition, these phenomena are "in correspondence with the relevant enactive condition of the perceiver and its environment" (§41). Likewise, the search for properties in an independent pre-given world that would register with the uniqueness of the unique hues or the boundary of our colour categories is vain and their neurophysiological bases are still elusive (see Wuerger, Atkinson & Cropper 2005 for the former and Bachy et al. 2012 for the latter). These observations taken together are one of the very arguments (comparative argument excepted as not developed here) that called for an enactive approach, between objectivism and subjectivism views, where "colours are properties of the world that result from animal-environment codetermination" (Thompson, Palacios & Varela 1992: 21).

« 5 » The second argument concerns the question of the comparability of perceptual experience between individuals. Because of the idiosyncratic nature of enaction, where a living and autonomous organism dynamically enacts its lived environment, perceptual experience is conceivably bound to be itself idiosyncratic. Palacios, Escobar and Céspedes judge this thesis counter-intuitive and appeal to the language communality on which their intuition relies. I would argue that the idiosyncrasy of our phenomenological experience is not counter-intuitive, and evidence of shared experience, if it exists, is probably not to be found in language.

« 6 » Take the following example: instead of Susan, who is perceiving red, let us ask John, who is daltonian.[2] Pointing out a red object, John might quite rightly name its colour despite the fact that his colour vision is limited to a gamut of yellow to blue tones as judged by normal trichromats. It has been known by ophthalmologists that colour naming was of little help in colour vision assessment; Daltonians are far better at naming than ordering colours. The paradox is that unless the task explicitly requests it, daltonians will not use their better naming abilities to optimise their performance in colour ordering tasks (Jameson & Hurvich 1978). Experiments have further revealed that daltonians' colour categorisation by naming is very similar to that of normal trichromats, while their perceptual colour categorisation is impaired and contains mismatches typical of their deficit (Bonnardel 2006). Daltonians' colour perception is qualitatively and radically different from that of normal trichromats, and these differences are not limited to colour appearance but also impact multimodal sensory integration, aesthetic judgments, communication, etc. In other words, daltonians enact a world from their dichromatic embodied cognition that shares little with that of normal trichromats. Despite this world of difference, it is exceptional for daltonians to make themselves identifiable through their behaviour or their language. The assumption of comparable perceptual experience between individuals put forward by the authors to account for the observed coherence in behaviours in a given context does not appear correct nor is it necessary for a theory of perception.

« 7 » It is understandable that the notion of representations at the heart of early computer vision is still important in the development of contemporary artificial systems, but its value, even in its weak form, for an enactive approach of perception is questionable, as

> "[…] cognition is no longer seen as problem solving on the basis of representations; instead, cognition in its most encompassing sense consists in the enactment or bringing forth of a world by a viable history of structural coupling." (Varela, Thompson & Rosch 2016: 205)

1| In the DVD "Monte Grande" by Franz Reichle.

2| "Daltonian" refers to the X-chromosome linked condition involving either the loss or the alteration of the gene encoding for medium or long wavelength cone pigments. Phenotypically, the hereditary condition is known as dichromacy (loss of one class of cones) or anomalous trichromacy (when one class of cone is altered in its spectral sensitivity). Incidence varies with race, its being most common among Europeans, and with gender (7.4% in males vs. 0.5% in females).

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Received: 23 October 2017
Accepted: 26 October 2017

The Lackluster Role of Misperceptions in an Enactivist Paradigm

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> Upshot • While the objectivist view of perception provides us with a commonsensical starting point, it quickly gives rise to unsolvable puzzles. The enactivist view, on the other hand, starts by challenging common sense, but it does not lead to the same unsolvable puzzles of the objectivist line of thought. Enactivism does not deny perceptual illusions or individual differences; it simply strips them of the status of perennial philosophical puzzles.

« 1 » From a naïve perspective, colors do not immediately pose philosophical problems. The colors of objects, just like their shapes or edges, appear to be perceptible attributes. They can be experienced by us, but they do not depend on us. The naïve perspective also gives us a criterion for deciding whether a color perception is illusory or veridical. Namely, an instance of (subjective) color perception is veridical only if the perceived color exists out there, so to speak, objectively.

« 2 » Although the naïve perspective does not immediately appear to be problem-

atic, it is nonetheless pregnant with at least two sets of philosophical problems; First, given the subject-object divide, it seems impossible to confirm whether color perception is veridical, because any further attempt to test the veridicality of a percept would be another subjective experience. Second, it seems impossible to compare the subjective experience of color among different observers. From this perspective, misperceptions and disagreements among observers, e.g., the controversial image of The Dress (§20), acquire a special status by making the case for the ever-present nature of these two puzzles, and the impassable divide between experience and the world. In their target article, Adrián Palacios, María-José Escobar and Esteban Céspedes argue that these two puzzles stay with us, in some form or other, even if we adopt an alternative, enactivist paradigm of perception. In contrast to their position, I argue that cases of misperception or disagreement – although intelligible within the enactivist paradigm – no longer retain their special status.

« 3 » My plan is to, first, focus on the notion that any instance of perception is embedded within a spatiotemporal structure, sustained in part by the observer's implicit sensorimotor understanding (Varela 1996). Next, based on the assumption that different modes of interaction with the same object can confirm or contradict their corresponding perceptual attributes, I defend a conception of illusory attributes as those attributes that do not survive transition from one activity to another. Thus, sustained misperceptions or individual differences in many cases depend on depriving the observers of those activities that test a particular perception. Finally, I argue that the same logic applies to the debate over the modularity of perception.

« 4 » Most of us are familiar with illusory contours, such as the ones perceived with Kanizsa's triangle. Illusory contours demonstrate how the perception of a *part* is determined by the perception of the *whole* or, put differently, how the perception of a part is caught within a structure. Although illusory contours are grounded in spatial structures, a similar principle applies to the temporal structure of experience (Varela 1996: 342). Perception of an object at a given moment is caught within a stream, extending into the past and the anticipated future (e.g., Husserl 1999; James 1892; Noë 2012). What sustains the spatiotemporal structures of perception is not only the environment, but also the perceiver's implicit understanding of sensorimotor contingencies.

« 5 » I can confirm that the contours of Kanizsa's triangle are illusory by covering a portion of the display with my hand and watching the contours disappear. In the same way, I can confirm that the two squares in Figure 3 in the target article have the same color by covering the surrounding squares. What I do in both cases is to place the object within different streams of experiences, i.e., within different ways of interacting with the displays, and to test whether the attribute of interest (illusory contours; difference in colors) persists within the new activity. In each case, an illusory attribute is one that does not survive transition from one activity to another.

« 6 » Thinking about illusory attributes as those that do not persist in transition from one activity to another would face the following objection: we can always find an activity that removes from experience an attribute that is "veridically" perceived. Although the red color of a tomato persists under a range of illuminations (color constancy), it will not persist when taken into a completely dark room or if I close my eyes. Therefore, we need to modify the above conception: an illusory attribute is one that does not survive a transition from one activity to another, *presuming that such a transition would not remove a veridically perceived attribute*. Knowing how an attribute persists, changes, or disappears across transitions is part of the implicit understanding of sensorimotor contingencies, which is emphasized within the enactivist approach.

« 7 » I agree, in this sense, with the authors' reference to illusions as *anomalies* (§40). An illusory attribute is experienced within a relatively limited range of activities. Unlike the authors, I am hesitant to regard an activity in which the illusion exists differently from the activities in which the illusion is removed. Palacios, Escobar and Céspedes refer to the latter as normalized perceptual contexts, suggesting that there is something anomalous about the activity that gives rise to the illusion (§40). It is, however, possible that the same activity is paired with either an illusory or a veridical perception. The activity of observing Kanizsa's triangle – which sustain the illusory contours – is not inherently different ("anomalous") from the activity of observing a modified version of Kanizsa's triangle in which the contours are physically present. What is the sense in which an illusion can be characterized as an anomaly?

« 8 » What is typically anomalous about the contexts that sustain misperceptions is that the observer is deprived of engaging in forms of interaction that test or remove the illusion. That is, indeed, the typical situation in which most empirical work on visual perception is conducted, often with brief presentations of static images that are insensitive to the observer's own movement. Under such circumstances, it becomes possible to fall back into a view that regards perception as a process that begins with an external stimulus. Francisco Varela's (1996) emphasis on the inseparability of any experience from the temporal structure, within which it is embedded, and the way in which the temporal structure is itself shaped by the observer's embodied-sensorimotor understanding, aims to prevent precisely such a return to the objectivist view of perception (Varela, Thompson & Rosch 1991).

« 9 » If I were somehow unable to cover a portion of Kanizsa's triangle, or the same-color squares of Figure 3, I would not be able to confirm that the attribute is illusory. In that case, the characteristic structure of perception, the temporal extension, and the possibility to initiate different explorations aimed at seeing the figures would be taken away. The same applies to the famous case of disagreements over the colors of The Dress (§20). Observers of the image of The Dress are deprived of many activities, e.g., being able to gauge the brightness of the room, that might eliminate our individual differences. This should not, however, be taken as a demonstration that perception ordinarily begins with a stimulus, whose presentation is strictly circumscribed (§22).

« 10 » The limits over the range of activities are also imposed in special cases used in defense of modularity (Firestone & Scholl 2016). Researchers who defend the separation between thought and perception rely on the premise that a veridical belief about an attribute (e.g., two squares have the same

color) does not eliminate an illusory perceptual attribute (e.g., two squares have different colors). They tend to neglect the fact that

a the conflict is not between a belief and a percept, but between two beliefs (and, correspondingly, between two percepts) and
b observers are deprived of interactions with the image that would resolve the conflict between the two sets of beliefs/percepts.

Thus, the illusory attributes typically provide strong ground for the supposedly incorrect belief, which is in conflict with the supposedly correct belief. Not only do these cases not support the notion of modularity, in some examples – when the incorrect belief is one that is supported by memory, and contradicts the physical properties of the image – they even contradict modularity (e.g., Hansen et al. 2006). In contrast to illusory attributes, when a percept does not provide strong ground for a particular belief, i.e., when the perceptual state is ambiguous, then the perceiver's thought can influence perception (e.g., the case of intentionally switching between two states of a bi-stable image). That is to say, in the case of perceptual ambiguity, an observer can engage in the activity of switching between multiple beliefs that could be associated with the image.

« 11 » In sum, the enactivist perspective offers a broader and more inclusive paradigm in which the common-sense view of color perception – with its associated puzzles – remains intelligible. The common-sense view of veridical perception is one based on the match between subjective experiences and objective states of affairs. Once we recognize that "objective" is a shorthand for an infinite possibility of other activities (different ways of interacting with an object of perception), and recognize the "subjective-objective match" as a shorthand for a coherence among those activities (including interaction with other perceivers), we arrive at different conceptions of misperception and individual differences. As I tried to argue, the enactivist view of an illusion might be best characterized in terms of attributes that do not survive transitions across different modes of activity. A sustained illusion, therefore, might be best characterized in terms of a sustained deprivation from activities that would otherwise test/remove the illusion. These new conceptions no longer pose the same paradoxes and unbridgeable gaps as they did within a naïve model of color perception.

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Received: 21 October 2017
Accepted: 26 October 2017

Authors' Response
Is a Weak Notion of Representation not Compatible with a Contextualist and Enactivist Account of Perception?

Adrián G. Palacios, María-José Escobar & Esteban Céspedes

> Upshot • We argue that the notion of basic perception could help to develop a general enactivist account of perception, without compromising the compatibility between our approach to this theory and the notion of weak representation. To support this, we elaborate on the contextual and normative aspects of our enactivist proposal, on perception, and on how these aspects may be crucial for understanding misrepresentation and comparability.

« 1 » We respond to the inspiring and challenging comments our article about the enactive account of perception sparked, mainly clarifying the compatibility between that account and a weak notion of representation. Such a notion may help to explore different ways of associating enactivism with related approaches and research proposals. We also focus on the importance of the contextual and normative aspects of our enactive approach to perception, responding to challenging cases related to misrepresentation and comparability.

A radical notion of perception could form the basis for a broader and more flexible enactivism

« 2 » Laura Nascimento and Erik Myin argue that the notion of contentless interaction should be considered to understand color perception. We cannot disagree with this suggestion. Actually, this might be one of the best ways to arrive at a non-circular definition of the notion of contentful representation. However, we find it hard to accept that this idea could ground an argument against our claim that enactivism and a non-objectivist version of representationalism are compatible, as they seem to do. As we try to show, we can account for different features of color perception without dismissing entirely the concept of representation. We do not have to provide a naturalistic definition of that concept within an account of color vision. But if that were necessary, the radical enactivist account defended by Nascimento & Myin would help.

« 3 » The authors further point out that our proposal can be confronted with the hard problem of content, i.e., the challenge of providing a scientifically adequate explanation of how representations occur (§4). We agree that such a problem is crucial if we want to arrive at a general theory of cognition and color perception. Nascimento & Myin characterize basic color perception on the basis of the idea that "organisms tend to show similar perceptual reactions to similar stimuli" (§9). With this characterization, we can account for color perception mainly in terms of how organisms interact with their environments. The notion of contentful representation should be characterized at the non-basic level of human communication, by considering linguistic and cultural interactions between individuals and their environment.

« 4 » Nascimento and Myin dismiss the idea that all cases of perception involve contentful representation (§11). The fact that they mention this thesis in the com-

http://constructivist.info/13/1/117.palacios