An Enactivist Critique of the NonConceptualist Argument for the Richness of Perception and Its Model of Perceptual Content

Uma revisão enativista do argumento não-conceitualista da riqueza experiencial e seu modelo de conteúdo perceptual

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Abstract: In this article, we will critically analyze the nonconceptualist argument for the richness of perception from the sensorimotor enactivist tradition. According to nonconceptualists, the content of perception is far richer and more detailed than the content of our beliefs. The nonconceptualist model of perceptual content assumes that we possess an internal, detailed representation of the environment. The enactivist approach, however, rejects the idea that we construct internal representations of the environment in order to perceive it. The fact that we have immediate access to the environment through sensorimotor skills makes the reconstruction of the environment in the form of mental representations unnecessary. If this is the case, the argument for the richness of perception is inadequate for defending a nonconceptualist approach. Our suggestion is that

enactivism provides a better explanation of the nonconceptual nature of perception without postulating the need for internal, detailed representations of the environment.

Keywords: Enactivism; Perception; Nonconceptualism; Cognitivism; Mental Content.

Resumo: Neste artigo, buscaremos analisar criticamente o argumento não-conceitualista da riqueza da percepção a partir da tradição enativista sensório-motora. De acordo com os não-conceitualistas, o conteúdo da percepção é muito mais rico e detalhado do que o conteúdo das nossas crenças. O modelo de conteúdo perceptual não-conceitualista assume que possuímos uma representação interna e detalhada do ambiente. A abordagem enativista rejeita a ideia de que construímos representações internas do ambiente para percebermos. O fato de que possuímos acesso imediato ao ambiente por meio das habilidades sensório-motoras torna dispensável a reconstrução do ambiente na forma de representações mentais. Se esse é o caso, o argumento da riqueza da percepção não é adequado para defender uma abordagem não-conceitualista. Nossa sugestão é que o enativismo explica melhor o caráter não-conceitual da percepção sem postular a necessidade de representações internas e detalhadas do ambiente.

Palavras-chave: Enativismo; Percepção; Não-conceitualismo; Cognitivismo. Conteúdo-mental.

Introduction

Nonconceptualism, in the theory of perception, is a thesis that holds that the content of perceptual states can represent the world without being structured by concepts. In other words, we are capable of representing the

world in a nonconceptual way[1]. The most common way to define the non-perceptual content of perception is through an internal, topographic model in which objects and events are assigned their respective properties. Perceptual content is thereby understood as a kind of internal "mapping" of the external environment.

One of the most well known arguments in favor of the nonconceptualist thesis of perception refers to the idea that sensory content is richer and more detailed than the content of our propositional attitudes, such as beliefs. In other words, it is not possible to capture, conceptually and linguistically, the full richness of perceptual experience. This argument serves as an objection to conceptualist proposals, according to which sensory content is conceptually structured. For their supporters, perception could only fulfill its epistemic role of grounding empirical beliefs if it were a conceptually structured mental state. Otherwise, it could not maintain inferential relationships with propositional attitudes. Along with other arguments, the nonconceptualist thesis seems to be in better position than the conceptualist one.

In this article, we aim to analyze, specifically, the argument of perceptual richness in nonconceptualist proposals alongside their typical model of perceptual content, that is, the scenario-content. We will explore this proposal from a sensorimotor enactivist point of view, according to which perception is a form of active exploration of the world through sensorimotor skills, without the need for internal

1 Nonconceptualism contrasts with conceptualism, according to which our perceptual states are conceptually or propositionally structured (MCDOWEL, 1996. BREWER, 1999). We will not recapitulate the historical debate between both positions. You can find it in Schmidt (2015), Bermúdez (2009) and Carvalho (2016). Our focus is solely in one main argument supporting nonconceptualism.

representations of the sensory environment. Our thesis is that the perceptual richness argument is not a good one in favor of nonconceptualism. This argument assumes that we capture information of our sensory field in a detailed and relatively full manner, much like a photograph or a painting captures the details of a scene. According to enactivism, this is an incorrect way to describe both the phenomenology of experience and the nature of the cognitive processes underlying perception. The world is not given in a pictorial, internal model, or map-like form. Its content is virtually accessed through the skilled exploration of the environment, where the organism's movements modulate its sensory stimulation flow. The pictorial conception mentioned is strongly suggested by the scenario-content proposal, according to which perceptual content is an internal representation of the environment that serves as a model for the spatial and temporal relationships of the external environment. The idea that cognition functions based on internal representations has been questioned in recent decades. We aim to show that nonconceptualism can abandon the representationalist tradition and adopt an enactivist standpoint on perception. This entails abandoning the pictorial conception of the argument for the richness of experience and, furthermore, the idea that perceptual content involves the construction of representations, especially a kind of model, map, or internal copy of the external world. There are other forms to conceive nonconceptual perceptual states. In the final part of the article, we aim to address some possible representationalist objections to the enactivist model of perception.

1. The Argument from the Richness of Perceptual Experience

One of the oldest and most cited arguments in favor of the nonconceptualist thesis is the argument from the richness of perceptual content. This argument tries to show that the phenomenology of perceptual states is not, or does not need to be, explained by the exercise of conceptual capacities on that content. The idea is to demonstrate that concepts do not capture the richness of details in experience. If our beliefs (and other propositional attitudes) are composed of concepts, then they are not capable of capturing the full richness of experience, or perceptual content. An analysis of the phenomenology of perception makes it very clear that the content of experience is rich in detail, as Schmidt (2015), Peacocke (2001, 1999), and Bermúdez (2003) argue. Let us take, for example, the experience of navigating the university during a typical day in the academic semester. While observing the campus, we come into contact with a myriad of objects with certain properties and relations to each other. We perceive the library a few meters ahead. Several students are walking toward the restaurant to my left. I hear a group of gardeners pruning a tree behind me. I perceive various shades of color in the flowers to my right. As Heck highlights, "it seems hard to imagine that your perceptual state [...] has any specific articulation corresponding to the conceptual articulation of a particular one of the many different Thoughts that might capture its content" (2000, p. 489). In sum, it seems impossible to capture, in thought, all the elements that combine in the perception of an event like the one mentioned. In Kelly's words:

> They [the nonconceptualists] typically think that the content of experience is in some way richer, more complicated, or more fine-grained than the content of thought, and therefore that perception ought not to be characterized in terms of the elements of thought at all (2001, p. 401).

We would not be able to describe, in words and sentences, everything we see, hear, and feel in our experience. Our conceptual and linguistic resources do not fully capture the details we represent through perception[2]. Tye follows the same line of argument to defend his non-conceptualist position on perception:

> First, in typical cases, visual experiences are rich. This is to be understood as the thesis that typically visual experiences contain more information than their subjects are able to extract cognitively (in belief or judgment). Second, visual experiences are fine-grained. This is usually formulated as the thesis that visual experiences represent the world with a determinacy of detail that goes beyond the concepts possessed by the subjects of those experiences" (2006, p. 519).

If this is the case, the content of perception is richer than the content of thought, beliefs, or propositional attitudes (TORIBIO, 2007). Therefore, the perceptual content is nonconceptually structured.

Another emblematic example involves color perception. Nonconceptualists highlight the fact that we are able to discriminate more shades of color, via perception, than we are capable of characterizing them through concepts or linguistic resources, suggesting that we have some kind of information about the environment that exceeds our conceptual repertoire. Peacocke is emphatic in this argument: "our perceptual experience is always of a more determinate character than our observational concepts which we might use in characterizing it (1983, p. 11). Much of the concepts we regularly use to categorize an object in our visual field with a certain hue

2 We do not intend to discuss the relationship between concepts and language, such as whether concepts are necessarily tied to linguistic abilities. We emphasize that, at least in this context, the type of conceptual ability that concerns us is the one related to linguistic and propositional capacities.

involves only general concepts like RED, BLUE, or YELLOW. However, the variability of shades found in the environment exceeds the limits of these more general concepts. One phenomenon that illustrates this observation is known as *color constancy* (KELLY, 2001). When we visually confront an object, for example, a white wall, although we categorize this surface under a single hue (using the concept of WHITE), in reality, the surface has various differences in intensity and lighting, involving subtle differences in how we experience it. If this wall is relatively far from the window, it appears to have a darker shade due to shadow and low illumination. On the other hand, the region closer to the window appears more yellowish or orange due to the sunlight. Still, we do not hesitate to categorize this surface under the concept of WHITE (PEACOCKE, 1983, p. 12). This example attempts to demonstrate the difference between the content of perceptual experience and the way concepts capture this experience. In summary, this argument, along with others that will not be discussed in this article[3], presents reasons to support the view that perception is a form of nonconceptual and nonpropositional contact with the environment.

2. Scenario-Content as a Model of Perceptual Representation

One of the most favored models of perceptual content in nonconceptualism is the scenario-content hypothesis, according to which perceiving is representing the environment

3 Other arguments in favor of nonconceptualism include conceptual learning (TORIBIO, 2007; ROSKIES, 2008), the relative independence of perception from beliefs (cognitive impenetrability) (BERMÚDEZ, 2003; RAFTOPOULOS, 2014), and cognitive complexity in nonlinguistic creatures (SCHMIDT, 2015; PEACOCKE, 2001).

as a set of objects with certain properties, organized in a specific arrangement in space and time. According to this model, perceptual content involves how the perceiver represents the environment around them, which we specify based on how physical space is "filled" with objects, properties, and relationships. An accurate representation is the consistency, or coherence, between perceptual content (scenario-content) and the external environment, that is, its objects and properties instantiated in reality. An inaccurate representation, consequently, implies an inconsistency between perceptual representation and the external environment. Schmidt describes scenario-content as follows: "A *scenario* is a conglomerate of spatial properties, more specifically, a way in which surfaces, objects, their properties, and the like can be located in the space around the perceiving subject" (2015, p. 13). Scenario-content is a perceptual representation and primarily involves the organism's discriminative abilities and the way it explores this content in action and thought.

Physical space is represented, first, from a specific, egocentric origin – the individual's body – and certain axes that are derived from this origin, such as up-down, front-back, and left-right. This is true, at least, for terrestrial organisms like us and other animals. This origin, and its axes, is subtly different for each sensory modality. In vision, for example, the center and axes are organized based on the head. In the case of touch, these parameters are organized based on the body's periphery, such as the hands and feet (BERMÚDEZ, 2009, p. 462). From these parameters, the organism is able to establish its orientation in relation to the perceived environment, which in turn determines the distance and direction of the organism relative to the environment. Once orientation is established, it is said that perceptual content determines how space is populated with various entities and their properties.

In the case of the visual modality, for example, let us imagine that an individual is observing a particular room: his office. The content of his experience represents, first, his egocentric point of origin (where they are located), as well as the angles at which his visual system is directed. Their perceptual states represent, based on this orientation, how certain objects – such as the computer, desk, mug, and flowerpots – are arranged in a particular configuration. The desk is next to the window, the computer is on the desk, and the mug and flowerpots are next to the computer. These objects have certain properties, such as colors, textures, and shapes. All of these details are captured by the perceiver, the nonconceptualist argues, in a way that is independent of the conceptual resources they possess.

The complete characterization of perceptual content is then referred to as scenario-content: a set of ways in which objects, with specific properties, are configured relative to each other, based on an egocentric point of orientation. Perceptual representation is accurate, or correct, if the external environment corresponds to the objects and properties represented. If it is incorrect, there has been a failure to properly attribute the content to the external environment. As Schmidt explains:

> The objects (or surfaces) and their properties involved in a scenario-content should be taken immediately to reflect the objects and properties present to the subject of the experience. It tries to respect the three-dimensional spatial character of the perceived world (2015, p. 14).

The scenario-content hypothesis, within the context of the argument for phenomenological richness, helps clarify how perception can capture the multiplicity of environmental details, such as those detected by vision or hearing, without the individual applying his conceptual repertoire. Furthermore, this nonconceptual content model explicitly

adopts a *representationalist* interpretation of perceptual states. In this context, representationalism involves understanding the mind (and its cognitive processes) as an information-processing system. Information is processed through computational manipulations of representations. Mental activity consists of the "[...] acquisition, transformation and use of information and misinformation" (STERELNY, 1990, p. 19). The goal or function of our various cognitive systems (perception, memory, thinking, decision-making) is to map or produce an internal (neural) model of the environment based on the available information, and to select an appropriate type of behavior for the organism's interactions with its objects. Representational states are intermediaries between sensory input and behavioral output. They are required to explain how behavioral (motor) output emerges on the basis of sensory input (BERMÚDEZ, 2005; BURGE, 2010a).

The most common way to understand a representational system is by characterizing it as a computational system. The process of acquiring, manipulating, and selecting responses is a process of computation over internal representations. "Computation" is a general term for various types of systems capable of processing information. In the representationalist approach, computation simply involves manipulating representations through algorithms: finite sets of rules that determine how different activities should be performed, thus enabling the solution of a given problem. It is the algorithms that make it possible to understand the different stages of information processing in cognitive systems (PICCININI, 2016).

For our purposes, the perceptual system, as a computational system, has the function of generating an internal model of the external environment (the scenario-content) capable of capturing its details in a way that explains our perception and the behavior that follows from it. Vision is

the most commonly cited example. The goal of visual perception is to generate accurate representations of the distal environment, where objects and their properties are located, based on the proximal stimulation of the retina. In this case, "the human visual system computes complex representations of certain visible properties on the basis of the values of light intensities in retinal images" (BURGE, 1989, p. 367). The problem is that, when the stimulus reaches our sensory receptors, the information contained within it is impoverished, ambiguous, and incomplete: something known in the literature as *the poverty of stimulus problem*. At the same time, as highlighted by the nonconceptualist argument, we perceive the world in a way that is rich in details, not fragmented or incomplete. Our visual system is capable of acquiring accurate information about the environment despite the limitations of the initial stimulus. This problem can be framed as a question: how are perceptual states of the environment formed, given that the proximal stimulations to which the system has immediate causal access do not determine the environmental entities that perceptual states detect? This is where we insert the computational explanation of how perceptual content is generated: a series of computational algorithms allows the construction of a model of the external environment, which resolves the ambiguities and informational poverty of the stimulus. As Burge emphasizes, the "initial registration, or encoding, of proximal stimulation is transformed through a series of events in the visual system into perceptual representations of, and as of, entities in three-dimensional space" (2010, p. 8).

Nonconceptualists, such as Burge (2003, 2010a, 2014), Bermúdez (2003), and Raftopoulos (2014), although they differ in some details, argue that the computational-representational approach to the mind is the most effective way to explain the mechanisms underlying mental states,

whether conceptual, like propositional attitudes, or nonconceptual, like perception. Without the capacity to construct representations, organisms would not be able to exhibit the various flexible and adaptive behaviors observed in nature.

Therefore, perceptual content functions as a kind of "topographical map" or internal model of the space-time properties of various entities in the external environment[4]:

> Perceptual representation is organized in fundamentally different ways from propositional organization, and the two sorts of representational content mark fundamentally different sorts of abilities. I think that perception has a topological-like structure. Genuine predication, which is the key element in propositional representation, embodies a type of generality […] not present in perceptual representations […] (BURGE, 2003, p. 525).

The nature of perceptual information, therefore, is independent of the individual's conceptual repertoire. Using the vocabulary of cognitive sciences, the nonconceptualist can explain the scenario-content (or perceptual content) as the representation of objects that are persistent entities in space and time, with relative spatial relationships, either stationary or in motion, and with specific colors, sizes, and other basic properties (RAFTOPOULOS, 2006). Here, we have a proposal for non-conceptual content in perception, along with a hypothesis about how this nonconceptual content is constructed through computational operations on representations. Let us now turn to the enactivist position and how it evaluates these arguments.

4 The term “topographic” for the perceptual content is specially used by Burge (2003).

3. Sensorimotor enactivism

The enactivist approach rejects the representationalist explanation of perception. According to the enactivism, perceiving is fundamentally an activity correlated to the actions and movements that the organism performs. We access the environment perceptually by utilizing practical knowledge of sensorimotor contingencies. Sensorimotor contingencies refer to how sensory stimulation relies on the actions the organism performs. Perception is not a passive process of receiving external stimuli. Instead, we actively seek to modulate the flow of sensory stimuli through our actions. As we move through the environment, some properties of objects in the perceptual field become apparent to us, while other aspects remain hidden. Approaching or distancing oneself from an object alters its profile in the visual field. The movement of objects in the environment also alters the organism's sensory stimulation profile – for instance, when we hear a siren approaching due to the increasing intensity of sound waves. Perception cannot be separated from the organism's morphological structure and motor capacities. Behavior (or motor output) is not merely the result of internally processed information; it is a constitutive part of information detection itself (NOË, 2004, 2012; HURLEY, 2001). The exploratory activity of organisms demonstrates their ability to appropriate these patterns of sensorimotor regularities in order to coordinate their actions within the environment.

Sensorimotor skills involve patterns that follow strict, law-like regularities, due to the connection between the organism's bodily structure and the properties of the environment (SHAPIRO, 2012). We can even investigate these patterns and explain their characteristics with greater precision. Each sensory modality – such as vision, touch, taste, smelling and hearing – possesses its own specific patterns of

sensorimotor regularities, corresponding to the various forms of energy distributed throughout the environment (mechanical, luminous, chemical, auditory, etc.). While representationalists focus on how the brain constructs internal representations of the environment, enactivists emphasize the importance of the organism's motor and morphological structure during the sensory engagement with the environment. As Noë often points out: "[...] perceiving is a kind of skillful bodily activity" (2004, p. 2). The brain is certainly fundamental for understanding the flow of information in the organism, but perception is not limited to its operations. As we move through the environment, we can take advantage of reciprocal causal relationships between our sensory apparatus and certain properties of the external world. Perception involves a kind of circular chain between movement, stimulation, new movements, new stimulations, and so on. The function of the brain is precisely to mediate the connections between perception and action in this circular chain[5].

By exploring various sensorimotor contingencies, perceivers are able to externalize environmental information that would otherwise need to be computed and stored internally in the nervous system[6]. Why replicate the external environment as an internal model when our immediate sensory environment is readily accessible through our exploratory movements? The information is always available for access, at least in cases where we maintain continuous causal contact with the objects and substances in the environment. Replicating environmental information is

5 On the function of the brain in the enactivist approach, see Fuchs (2011), Barrett (2011), and Johnson and Tucker (2021).

6 Chemero (2009) employs the term "mental gymnastics" to refer to the process of computing internal representations.

unnecessary (since it can be easily accessed) and biologically costly. The world itself can serve as its own model or as a form of external memory:

> [...] The outside world is considered a form of ever-present external memory that can be sampled at leisure via eye movements. There is no need for an internal representation that is a faithful metric-preserving replica of the outside world inside the head (O'REGAN, 1992, p. 463).

From an evolutionary standpoint, it makes perfect sense that natural selection would favor organisms with cognitive systems capable of relying on the external environment as substitutes for internal computations: "we are built in such a way that we can get the information about the world that we need, when we need" (NOË, 2004, p. 22). This argument can be understood as following a principle of cognitive economy (CLARK, 1998). Since our cognitive systems are biological entities, they are subject to the same pressures as any other biological systems, such as energy efficiency, adaptability, simplicity, and effectiveness. As Barrett points out, "[…] evolution is a thrifty process, and organisms that expend more time and energy than do their competitors to achieve the same ends are penalized by natural selection" (2011, p. 216). Reconstructing perceptual information appears to be more costly than simply updating the flow of sensory stimulation continuously through active exploration. The environment is always accessible to an organism through sensorimotor skills[7].

The argument of perceptual richness asserts that we do not capture all the details of experience through our concepts and beliefs derived from them. But what if we don't even need to capture such details in experience itself, at least not all at once? As Noë (2001) points out, vision is not confined to what is immediately visible. Our perceptual perspective of objects is

[7] See Hurley (1998) as well.

always full of ambiguities, incompleteness, and imperfections. Due to the anatomical structure of the eyes, photoreceptor cells are unevenly distributed (only the central portion is capable of capturing stimuli with the highest quality[8]). We perceive three-dimensional objects arranged in a certain way in our visual field, but what actually reaches our sensory receptors are only some aspects, while many others are, for instance, occluded. When I see an apple, only one of its faces is directly reaching my sensory receptors. It is not possible to perceive its full three-dimensionality from a single viewpoint. When I see a cat walking behind a fence, it is partially occluded by its surface. When we access the environment through touch, we do not gain complete access to an object with a single instance of touching. Instead, we manipulate objects in order to detect their properties through successive sensory explorations[9]. At the same time, perceivers do not have the impression of perceiving the world in a diminished or incomplete way. We perceive a world populated with objects full of details and properties. This phenomenon can be described as *the problem of perceptual presence*: we perceive a world rich in details within our reach, while at the same time, much of the environmental information is not immediately detected by the sensory systems. Only certain aspects of objects are given at any one time (NOË, 2011).

In other words, how do we experience an environment rich in details when what actually reaches our sensory receptors are only fragments of reflected surfaces (or their counterparts in other sensory modalities)? Traditional proponents of nonconceptualism suggest that we construct a distal representation of the environment from the proximal

8 See O'Regan (1992) on the visual system's anatomical limitations.

9 Indeed, Noë (2004) suggests that tactile exploration should serve as the primary model for explaining any sensory modality.

stimuli (as seen in the scenario-content model). The richness of details is achieved through an internal model (a representation of the environment) computed by the brain. Internal representations supplement this purported imperfection of the sensory stimulus. Noë (2004, 2009) refers to this view as the *pictorial model of vision*.

Enactivism rejects this explanation and offers a different solution. We do not, in fact, represent all the details of the environment, nor do we need to represent it in the form of an internal model. We can acquire relevant information about the environment simply because we are able to access it continuously through our sensorimotor skills. We can explore the environment. By exploring it, we bring forth aspects (or information) that were not present from a certain perspective, in a certain moment. Perception is an activity distributed across space and time, not confined to a stationary point. We move closer and interact with the environment to reveal its details. We adjust our ears and the position of our head to optimize our auditory apparatus in relation to a sound source. Likewise, we systematically manipulate objects with our hands to explore their tactile properties. In resume, we gain access to information by exploring it:

> Our sense of the perceptual presence of the detailed world does not consist in our representation of all the detail in consciousness now. Rather, it consists in our access now to all of the detail, and to our knowledge that we have this access (NOË, 2004, p. 63).

Taking visual perception as an example, it involves a kind of "presence in absence." The environment is virtually detailed to us, in the sense that we can explore its details whenever necessary. However, these details are never fully available to us all at once. We should not limit sensory processing to the stimulus that reaches the retina at a given moment. The external environment functions as a stable repository of information, readily accessible to organisms

equipped with the appropriate sensorimotor skills. Noë argues that the richness of perceptual experience is *virtual*, accessed only when needed "[...] all presence is virtual in this way – not in the sense of being false, or illusory, or less than genuine, but in the sense that the world is present as *reachable*, rather than as *depicted*" (2009, p. 83. Our emphasis). We can draw an analogy with a painter creating a realistic painting of a landscape, for example. He does not need (and, in fact, cannot have) a detailed, faithful internal model of the landscape. As he works on his painting, he makes various observations of his visual field, shifting his perspective to access details that were previously out of reach. Whenever necessary, he can gather new samples of his environment through fresh observations. The artist does not rely mainly on memory or imagination to access these details: his environment is accessible for him to explore. This dynamic interaction between perceiving and acting is what allows sensory perception to be so rich. The richness of perceptual experience is an *achievement* (NOË, 2012). In the words of O'Regan: "[...] the outside world is considered a form of ever-present external memory that can be sampled at leisure via eye movements" (1992, p. 463). There is no need to construct and maintain an internal model of the environment, since internal representations can be replaced by direct sensory stimulation through the active exploration of various sensorimotor regularities.

4. Contrasting nonconceptualists and enactivists

A possible nonconceptualist reply is that enactivists may be explaining only a subset of the sensory capacities of relatively simple organisms, which, in fact, do not require the

formation of representational content [10]. Burge suggests distinguishing between two types of sensory capacities: (i) sensory registration and (ii) perception proper. According to him, some forms of environmental sensitivity in organisms do not rely on internal representations of the distal environment. The mere correlation between a source of energy and receptor stimulation is sufficient to explain an organism's activity within its environment. Examples include reflexes in response to specific stimuli, the behavior of unicellular organisms (such as bacteria moving according to chemical gradients), or even the response of plants to light sources. In these cases, invoking any robust notion of "representation" does not seem necessary to explain the organisms' behavior. Environmental and physiological variables suffice. Claiming that a bacterium "represents" the presence of sugar in its medium or that a sunflower "represents" the sun's position throughout the day appears to be an inappropriate application of the concept of representation (BURGE, 2010b, 2014). These organisms clearly respond to the conditions of their environment, often in complex ways, yet they are capable of exhibiting behavior based solely on causal correlations between energy sources and their sensory systems – this capacity is understood as *sensory registration*. This ability can be explained in terms of physiology, evolution (the adaptive functions of these sensory systems), and causal dependence on proximal stimuli. According to Burge, sensory registration should not be conflated with genuine *perception*: "There is a scientific difference between information registration and representation properly so-called" (2010b, p. 4-5).

[10] Here, we are adapting Burge's arguments (2010a, 2010b; 2014) against what he terms "direct realism," which, in practice, refers to non-representational approaches to perception.

Genuinely perceptual capacities come into play only when it is necessary to invoke *accuracy conditions*: that is, whether a perceptual state is accurate or inaccurate, or whether it adequately or inadequately represents objects and their properties in the environment. In other words, perceptual capacities are required when an organism cannot rely solely on correlations between stimulation and behavior and must instead attribute specific properties and relations to the objects within its perceptual field. Organisms exhibiting only sensory registration do not need to attribute properties or relations to the objects in their environment; they simply respond to particular types of stimulation. On the other hand, organisms capable of regulating their behavior in more flexible ways – behavior not rigidly dictated by specific stimuli –employ *perceptual* capacities that represent the distal environment in a particular manner, allowing them to exhibit different behaviors based on the same representational state. Organisms with perceptual systems have a more complex relationship with the distal environment. Their perceptual systems must solve two problems that Burge (2010a, 2014) understands as the *stimulus under-determination problem* and the *phenomena of perceptual constancy*. The problem of under-determination provides another way of framing the cognitivist argument from the poverty of the stimulus, which we have already discussed. That is, multiple distal sources in the environment can causally produce the same proximal effects on sensory receptors. The question then arises: how can our perceptual systems accurately represent the environment given the indeterminacy of these causal sources? In contrast, the phenomenon of perceptual constancy refers to the idea that, through perception, organisms can represent the same object (and its properties) despite variations in the conditions of environmental stimulation. For example, we represent a surface as "white" despite the different lighting conditions it may be under—such as one area being more brightly lit and

another less so—or, for instance, a white wall illuminated by an orange-tinted light source. As the author notes: “a corollary of this explanation is [...] to represent a particular or an attribute as the same from different perceptual perspectives, produced by different proximal stimulation.” (BURGE, 2010b, p. 10). In a certain way, both arguments are examined in the preceding section (Sec. 3) on enactivism.

According to Burge’s ideas, a nonconceptualist could argue against the enactivist that our perceptual systems would not be capable of detecting objects and their properties in the environment by relying solely on sensory registration devoid of representational content, as such registration would be too ambiguous, impoverished, and idiosyncratic – varying with environmental conditions. Even if nonconceptual, perception requires the construction of an internal model (as in the case of scenario-content) to overcome the limitations of proximal stimulation. An organism cannot rely solely on the causal processes between environmental energy and its effects on sensory receptors. Moreover, only by manipulating representations can we account for perceptual attribution errors – that is, perceiving objects and their properties *inaccurately*. A sensory receptor could depend on the environment (without constructing representations) only under highly general and regular conditions, such as a sunflower responding to sunlight or a bacterium responding to a sugar gradient in its medium. Thus, nonrepresentational models (such as enactivism) can only account for behaviors based on sensory registration, rather than behaviors that rely on detecting more complex patterns, such as objects and events in vision and audition. A nonconceptualist model of perception, therefore, appears to provide a more adequate framework for explaining the detection of information that involves both the problem of underdetermination and perceptual constancy, as well as the possibility of inaccurate

perceptual representations. The enactivist model, in contrast, must be confined to the most basic layers of cognition in living beings – those grounded in sensory registration.

In light of the enactivist ideas discussed in the previous section, it can be argued that Burge (or a nonconceptualist approach based on his ideas) underestimates the amount of information that can be detected through "sensory registration" (the proximal impact of energy on receptors) *when considering the organism's ability to continuously explore its environment and regulate the flow of information interacting with its perceptual systems*. Again, sensory registration is impoverished only if we consider a passive, stationary perceiver, one that lacks the ability to actively modulate his flow of sensory stimulation [11]. The problems of underdetermination and perceptual constancy can be "solved" through the organism's sensorimotor abilities, without the need for complex internal representations. In fact, contrary to representational models, we can argue that environmental information possesses far more structure and organization than is typically assumed, so it does not need to be computed or internalized by the organism. Actively exploring the environment already enables the perceiver to detect the behaviorally relevant properties of their surroundings. As Golonka and Wilson highlight:

> Properties of the environment are projected into energy media via law-based processes. The details of the projection are unambiguously related to the details of the dynamic that caused it, and different dynamical properties project differently (2019, p. 240).

Different sources of energy, such as light or sound, interact with the surfaces and structures of objects in the environment before even reaching the sensory receptors (GIBSON, 1966, 1979/2015). This interaction is already law-

[11] Also taking into account the sensorimotor contingencies of objects in relation to the perceiver, as discussed in Section 3.

like structured and can be used by perceivers. Despite the continuous changes in the flow of sensory stimulation resulting from movement, some information remains *invariant*. There are both variations (which representationalists tend to emphasize) and invariants in the flow of sensory registration (which are the focus of enactivist approaches). Enactivists emphasize that invariant information is crucial for an organism to detect behaviorally relevant properties in the environment without having to "infer" the configuration of the distal environment from proximal stimulation. Rather than "attributing" properties and relations to objects, the organism becomes "tuned" to the information distributed throughout its surroundings:

> There are certain "higher-order" variables – "invariants" – present in the stimulus energy that do not change over time and place, despite the movements of the observing animal and the changes in the intensity of stimulation it receives. These invariants correspond to certain permanent properties of the environment and, as such, they constitute information about the environment that the organism can detect or "pick up" (BARRETT, 2011, p. 105).

For example, perceivers can determine the length of a pointed object (such as a rod) without the aid of vision by detecting its resistance – more precisely, its inertia, which functions as an invariant – during self-generated tactile manipulation using angular movements (PAGANO; CABE, 2003)[12]. Another example is the perceiver's ability to locate the direction of an object based on the difference in the time it takes for sound waves to reach each ear (GIBSON, 1966, chap. 5; GAVER, 1993). In another example, perceivers can determine the time of contact of an object relative to themselves based on the rate at which the object expands in their visual field (HERAS-ESCRIBANO, 2019, p. 56–57). The

[12] For a discussion on empirical evidence for the detection of perceptual invariants, see OLIN (2014).

greater the expansion of an object in the visual field, the closer it is to the observer. This invariant information can be used to guide a range of behaviors, such as avoiding a collision or catching a thrown object.

Thus, the perceiver can overcome both the problems of underdetermination and perceptual constancy, as they possess sensorimotor abilities that allow them to regulate their immediate behavior through successive perception-action cycles. The distinction between sensory registration and perception proper appears unnecessary, since both types of sensory capacities can be explained within a single nonrepresentational framework. The organism's motor systems can effectively serve as a substitute for internal computational operation (HURLEY, 2001).

Finally, Burge also argues that perceptual systems must involve representational intermediaries if intend to account for the possibility of misperception. After all, how can perception be inaccurate without the attribution of a representation that is inconsistent with the environment? How, then, can a perceiver register inaccuracies within an enactivist framework? Noë (2012) suggests that we should reinterpret the notion of success or performance for perception. Sensorimotor skills are manifested in the performances that organisms execute. However, even practical skills can be performed poorly. Conditions of success are not an exclusive feature of mental representations. Perceptual engagement with the environment is an achievement that is not immune to error. The difference is that unsuccessful perceptual episodes are not explained in terms of inaccurate attributions of perceptual content to the external environment. A perceiver can explore the environment and still fail to regulate their behavior appropriately in response to the flow of sensory stimulation. He may, for instance, fail to detect the relevant invariants necessary for the proper

execution of their behavior. Environmental conditions may also be less than ideal for the successful exploration of the surroundings, thereby hindering effective perceptual engagement with the environment. They may not be fully conducive to successful exploration (for example, trying to see in a foggy environment or to follow a conversation in an extremely noisy setting, such as a concert or a protest. These factors can interfere with the effective exercise of sensorimotor skills. Internal variables (such as fatigue or inattention) can also account for unsuccessful perceptual exploration. Moreover, certain forms of perceptually guided activity are notoriously complex and require extensive training for the perceiver to detect the relevant invariants and adjust their behavior according to the appropriate sensorimotor contingencies, as in the case of professional sports or dance (SILVA; ET., AL, 2019; ARAUJO; DAVIDS, 2011). The importance of action and movement for perception becomes even more apparent when considering unsuccessful instances of perception. The possibility of error illustrates how the organism must continuously guide and adjust its exploratory movements to maintain adaptive contact with the environment. Exploration, distributed across space and time, is a way of ensuring successful engagement with objects and environmental properties: we adjust our body, hands, and head, change our perspective, and seek to interact with the available sources of energy in the world in multiple ways. The misattribution of representations is one possible explanation for unsuccessful instances of perception. However, the exercise of sensorimotor skills can account for the same phenomenon in nonrepresentational terms, through adjustments, readjustments, and attunement to the environment (NOË, 2012; GIBSON, 1979/2015; CARVALHO, 2020).

Conclusion

If the enactivist view is correct, the argument for the richness of experience is not accurate for supporting nonconceptualism in perception. We do not capture all the details of experience through concepts, nor do we capture them through representational, nonconceptual contents in perception. However, our intention is not to dismiss nonconceptualist approaches, as we also believe that perception does not rely on concepts to connect us to reality. What we propose is that nonconceptualists should abandon the representational-computational model of perception (exemplified by the notion of scenario-content) and adopt an enactivist model as a replacement. At least their supporters should considerer nonrepresentational approaches of perception. We do not need to construct detailed internal representations of the environment in the form of an internal model. Much more effectively, we rely on our sensorimotor skills to access the details when needed, since the environment itself serves as an external, dynamic repository of information for organisms. Perception does not involve representations, even in a nonconceptual format. One of the primary motivations for developing the nonconceptualist approach is precisely to provide non-intellectualist explanations of how perception places us in contact with the environment. The enactivist approach aims to demonstrate that it is possible to offer an even less intellectualist account of perception, one that does not presuppose the construction of representational content, even if nonconceptual. Traditional nonconceptualist models fail to recognize the importance of motor systems and exploratory action for perception, as well as the richness and informational structure present in the environment, which does not need to be internalized as representations. We think that the nonconceptualist tradition should consider enactivism more

carefully. There is not just representationalism and computationalism.

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