Getting to reality through perception: Peirce and scientific realism[1]

A obtenção da realidade através da percepção: Peirce e o realismo científico

Pierre-Luc Dostie Proulx
Université catholique de Louvain – Belgium
pierre-luc.dostie@uclouvain.be

Abstract: This article explores the capacity of Peirce's perceptual and realist theories to solve some of scientific realism's main challenges. Although I will suggest that the problem of the underdetermination of scientific theories might not admit a Peircean solution (DE REGT,1999), I will contend that Peirce can provide innovative support for scientific realism by addressing some of its fundamental issues. My main hypothesis is that Peirce's perceptual theory—and, particularly Aaron Wilson's interpretation of this theory (WILSON, 2012)—can help us shed important light on the following questions: (i) how can we account for a mind-independent reality? (ii) how can we explain the success of science? and (iii) how can we account for the knowledge of unobservable entities? I will argue that Peirce offers insightful contributions to (i) and (ii), while only producing a weak argument for (iii).

Keywords: Realism. Science. Perception. Judgment. Pragmatism. Synechism.

Resumo: *Este artigo explora a capacidade das teorias perceptiva e realista de Peirce para enfrentar alguns dos principais desafios do realismo científico. Embora sugira que o problema da indeterminação de teorias científicas possa não admitir uma solução peirciana (DE REGT, 1999), argumentarei que Peirce pode dar um suporte inovador para o realismo científico ao abordar algumas de suas questões fundamentais. Minha hipótese principal é que a teoria perceptiva de Peirce – e, particularmente, a interpretação de Aaron Wilson dessa teoria (WILSON, 2012) – pode nos prestar um importante esclarecimento sobre as seguintes questões: (i) como poderemos explicar uma realidade que independe da mente? (ii) como poderemos explicar o sucesso da ciência? e (iii) como poderemos explicar o conhecimento de entidades não observáveis? Argumentarei que Peirce oferece contribuições perspicazes para (i) e (ii), embora apresente apenas um fraco argumento para (iii).*

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Palavras-chave: *Realismo. Ciência. Percepção. Juízo. Pragmatismo. Sinequismo.*

Introduction

Can Peirce be relevant to the contemporary debates on scientific realism? Some scholars have argued strongly against such a proposal (especially DE REGT, 1999), and indeed, it may be true that a convincing Peircean solution is not available for all the problems of scientific realism. In particular, the underdetermination of scientific theories by data (understood as a logical problem) presents a serious challenge for a Peircean account. While acknowledging this limitation, this paper makes the modest argument that Peirce's takes on perception and realism still can positively contribute to scientific realism. My main hypothesis is that Peirce's perceptual theory—and, particularity Aaron Wilson's interpretation of this theory (WILSON, 2012)—can offer interesting (and even innovative) insight into some of scientific realism's most fundamental questions: (i) How can we account for a mind-independent reality? (ii) How can we explain the success of science? (iii) How can we account for the knowledge of unobservable entities? I will argue that Peirce can give insightful contributions to (i) and (ii), while producing only a weak argument for (iii).

This paper is divided in four sections. I will first give some theoretical background on both scientific realism and Peircean realism and contrast their respective projects (1). I will then suggest that Peirce's view on realism is best understood through his perceptual theory. This will lead me to explore some of the most established interpretations of this theory (2). Next, I will strengthen and refine this reading through Aaron Wilson's recent understanding of how we directly perceive Thirds (WILSON, 2012) (3). Finally, I will show how this reading of Peirce's perceptual theory—combined with other aspects of his philosophy—can be seen as contributing to some of scientific realism's major challenges (4).

1 Scientific Realism and Scholastic Realism

My first objective will be to underline the differences between the specific projects of *scientific* and *scholastic realism*. Let's start with scientific realism. While there are probably as many forms of scientific realism as there are authors discussing it, the main spirit of this theory is a *general positive attitude towards the possibility that our scientific theories offer a true* (*or an approximately true*) *description of the observable and the unobservable entities of the world*. Among the many debates surrounding this theory, two seem to have gained importance over the last few decades. The first is a *metaphysical* debate about the possibility of a mind-independent reality. Here, for instance, realists engage in a rebuttal of neo-Kantianism (the idea that the world investigated by science is partly dependent on what we bring to scientific inquiries). The second—and more salient—debate is an *epistemological* debate about the possibility of producing knowledge about unobservable entities (e.g. atomic particles). As we shall see in further detail below, this controversy pertains to the status of such entities in contemporary scientific theories. This epistemological tension is at the core of one of the most important debates in contemporary philosophy: the realist/antirealist debate.

In contrast to the project of scientific realism laid out above, the main ambition of Peirce's scholastic realism is to provide a strong account of the reality of *generals* (or of the *objective existence of form*). While Peirce believed his realism could aid the advancement of science, his main aspiration was to produce an argument that could refute both *nominalism* and—especially in his later works—*idealism*. While Peirce's stance against nominalism is undeniable, his position on idealism (and objective idealism) is still debated today. Setting aside this internal debate, however, some decisive distinctions between the scientific and scholastic realist projects should now be apparent: while scientific realism is principally concerned with the status of unobservable entities, scholastic realism aims primarily at challenging the premises of nominalism. As Herman de Regt's puts it:

> *Contemporary scientific realism*: We have good reasons to suppose that our best scientific theories tell us something about the unobservable structures of reality […] Peircean scientific realism: We have good reasons to suppose that our best scientific theories tell us which of the postulated generals are real generals (DE REGT, 1999, p. 384).

The main goal of this paper is to provide an answer to the following question: *how helpful can Peirce's stance against nominalism be in discussing scientific realism*? To this end, I will follow the works of scholars who argued for the importance of Peirce's scholastic realism in the contemporary philosophy of science (in particular Almeder, Haack, Rescher, and Rosenthal). Before engaging with Peirce's theory, I will consider the main argument of Hermann de Regt's paper, "Peirce's Pragmatism, Scientific Realism, and the Problem of Underdetermination," published in the *Transactions of the C. S. Peirce Society* in 1999. In this paper, de Regt presents a strong hypothesis concerning Peirce's possible contribution to current debates on scientific realism. His "sad" conclusion is that:

> […] the difficulties of contemporary scientific realism, stemming from the logical problem of underdetermination, cannot be solved by an appeal to the ingenuity of Peirce. Sometimes even a genius can raise expectations that cannot be met (DE REGT, 1999, p. 392).

De Regt's argument is divided into two interrelated facets: first, he identifies fundamental differences between Peirce's notion of abduction and scientific realism's notion of "inference to the best explanation"; second, he interrogates Peirce's ability to refute antirealist claims concerning the underdetermination of scientific theories by data. Let's explore his argumentation.

De Regt's first hypothesis is that "it would be a great historical distortion to reconstruct the abductive defense of scientific realism along […] 'Peircean' lines" (FANN, 1970; DE REGT, 1999, p. 377). According to de Regt, Peirce, in his later works, conceived of abduction as the First Stage of Inquiry. Thus conceived, abduction is first and foremost a methodological process "by which one introduces or suggests a hypothesis as a candidate for a true explanation of certain phenomena"

(DE REGT, 1999, p. 378). Since most of scientific realism's problems are now well-established, de Regt believes that this Peircean understanding of abduction is unfit for contemporary explorations of this theory. As de Regt points out, when scientific realists use the notion of "inference to the best explanation," they almost inevitably refer to a form of *abductive evidencing reasoning* (which is, according to de Regt, fundamentally different from Peirce's late notion of abduction). De Regt concludes that "the notion of abduction as suggested by Peirce in his later work has no place in contemporary defenses of scientific realism, since scientific realism is simply an already formulated philosophical theory" (DE REGT, 1999, p. 378).

Yet, de Regt notices that this observation on the nature of abduction does not, by itself, lead to the conclusion that Peirce *cannot* be conceived of as a scientific realist. According to de Regt, the main threat to scientific realism is not a semantic debate about abduction, *but the fundamental problem of the underdetermination of scientific theories by data*. The proponents of this view assert that it is always possible to construct an *infinite number of logically incompatible alternatives* to a scientific theory that postulate unobservable entities. Antirealists use this argument to contend that no scientific theory can examine all possible alternatives: the dramatic upshot being that none of these theories can (fully) claim to produce true descriptions of reality. De Regt suggests that *it is not clear at all that Peirce saw this problem* (and even less that he produced a convincing response to it), stating: "[literary] evidence for the claim that [Peirce] was conscious of the threat from underdetermination is lacking" (DE REGT, 1999, p. 389). De Regt's argument here contrasts sharply with the interpretations of Christopher Hookway, Peter Skagestad, and Robert Almeder, all of whom do believe that Peirce was aware of the underdetermination problem. Yet, even while de Regt leaves open the possibility that Peirce's notion of "real vagueness" in his "opaque" theory of continuity could lead to underdetermination, he still concludes that it is ultimately unlikely for a Peircean analysis to produce a convincing counterargument to this problem.

While it is true that we need to carefully assess the theoretical differences between Peircean realism and scientific realism so as to not distort the history of philosophy, I will argue that the challenges behind scientific realism cannot be reduced to the sole problem of underdetermination (even if such a problem could "completely destroy [scientific realism's] philosophical plausibility," DE REGT, 1999, p. 386). Besides, if we conceive of scientific realism as a positive epistemic attitude towards the (potential) truth of our scientific theories, it is not difficult to see Peirce as a disciple. The present paper will argue that, while de Regt may be fundamentally right in arguing for Peirce's incapacity of solving the underdetermination problem, his ingenious theory of perception can nevertheless give innovative answers to some of scientific realism's most fundamental challenges, including (i) *how can we account for a mind-independent reality*? (ii) *how can we explain the success of science*? and (iii) *how can we account for the knowledge of unobservable entities*?

The first challenge is central to any kind of realist commitment, since it concerns a *metaphysical stance in favor of an independent reality*. I will argue that, even if some of Peirce's affirmations clearly point to metaphysical realism, *the real nature of this realism may not be as easy to understand as it seems*. In what follows, I will show how Peirce's scholastic realism *opens itself up to an objective idealist reading*. This reading, I believe, is rooted in his (sometimes) ambiguous

view on the status of generals. The *second challenge* relates to the scientific realists' ambition to account for the achievements of science. One of their most famous claims is that realism "is the only philosophy that doesn't make the success of science a miracle": what we now call "The Miracle Argument" (PUTNAM, 1975, p. 73). Scholars who defend scientific realism (in particular Boyd, Lipton, and Psillos), suggest that if our scientific theories were not able to provide a true description of the world, their success would be somewhat miraculous. I will contend that Peirce's conception of scientific success deserves careful examination within this line of argumentation. The *last challenge* relates to an epistemological problem concerning the knowledge of unobservable entities: i.e., those entities that cannot be detected by the unaided senses. Can Peirce account for such entities? While I will argue that Peirce's perceptual theory is not incompatible with this position, his theory is likely to remain unable to solve the underdetermination problem. Thus, I will ultimately conclude that Peirce can be considered only a modest contributor to scientific realism. To address these challenges, I will now turn to Peirce's perceptual theory.

2 Percept, perceptual judgment, and percipuum

2.1 The percept

The greatest difficulty with any theory of perception comes from the simplicity of the perceptual experience. It is an experience that is hard to describe mainly because of its evidence. In order to analyze Peirce's theory of perception, our best starting point is the notion of the "percept." Peirce claims that "we perceive objects brought before us" (CP 1.336) and that the percept "compels the perceiver to acknowledge it" (CP 7.622). As Susan Haack adequately suggests, thus conceived, "the percept is the first item in the chain of a perceptual event of which the subject is aware" (HAACK, 1994, p. 14). But the fact that the percept comes *first* does not necessarily reveal something fundamental about its nature or its ontological status. As Robert Almeder puts it: "Peirce very broadly defined the percept as that which we directly perceive in any act of perception. The definition, of course, tells us nothing about the ontological status of what we perceive" (ALMEDER, 1970, p. 100). One of the difficulties with Peirce's take on the percept is that the author vacillates between a *physicalistic* and a *mentalistic* definition. For instance, Peirce asserts that "the word 'image' would be a misnomer for a percept" (CP 7.619) and that "it is the external world that directly perceives" (CP 8.144). Yet, in the same paragraph, Peirce qualifies the percept as a "psychical product" (CP 8.144). As Almeder suggests: "Peirce seemingly talks about percepts as though they were physical objects, but in the next breath suggests that they are psychic entities in so far as they are mental constructs of sensory experience and products of cognitive elaboration" (ALMEDER, 1970, p. 102-103).

A question thus arises: are percepts physical or mental entities? How can we make sense of this tension in Peirce's theory? Almeder's proposition is interesting. His suggestion is that "it is the same object but enjoys a different ontological status depending on whether or not we consider it apart from its relationship to the perceptual act" (ALMEDER, 1970, p. 103). If we take the percept *without the act of perception*, our realist intuition about the world will lead us to a form of direct

realism (a strong physicalistic theory). But, if we take the percept *within the act of perception*, our holistic intuition about the world will lead us to a more interpretative (or inferential) account of the percept.[2] According to Peirce, philosophers are wrong if they believe that they have to choose between those two alternatives. In fact, Peirce's aim is to reconceptualize this false dichotomy. He affirms that: "of course, in being real and external, it does not in the least cease to be a purely psychical product, a generalized percept, like everything of which I can take any sort of cognizance" (CP 8.144).

Central to Peirce's intuition (and this is probably the key to the whole of his theory of perception) is the notion that perception is a *dynamic process*. We can make a conceptual distinction between something like a "percept *without perception*" and a "percept *within perception*," but this distinction makes no sense from the point of view of the actor-perceiver. We cannot stop the perceptual flux in order to identify something like a "pure percept": *it is always already too late to do so*. Because perceptual flux is incessant, Peirce asserts: "there is no such thing as an absolute instant" (CP 7.653). In a perceptual judgment, "the mind professes to the mind's future self what the character of the present percept is" (CP 7.630). With the "percept" thus conceived as a complex notion within a dynamic process, we can understand why Peirce was hesitant to say that this notion can, single-handedly, justify a strong form of realism. As Peirce asserts, the percept does not possess "fully developed reality" (MS L427:20-21). It is "existent," but it does not give up direct access to reality (BERGMAN, 2007, p. 28). Nor, at the same time, is it sufficient to *refute* realism. To further explore this complex theory, let's now go deeper into the notion of *percept* and examine its categorial structure.

As the reader probably knows, Peirce, very early in his career, introduced a system of three universal categories to describe the world and its relations: Firstness, Secondness and Thirdness. Firstness expresses "quality" in the simplest sense (what we also call "phenomenal qualities" or "monadic properties"). Peirce says that "the first is that whose being is simply in itself, not referring to anything nor lying behind anything" (CP 1.356). Secondness expresses simple relations or interactions (what we also call "dyadic relations": like the inner-outer relation). As we will see, Secondness is the realm of "presentation" (where an object presents itself to a perceiver). Thirdness, finally, expresses triadic relations (such as habits, laws, and indexical signs). Peirce argues that "representation" is a form of Thirdness: where a perceiver interprets a sign representing an object.

It is useful to study how Peirce uses these categories to define the "percept." Peirce attributes part of the complexity of this notion to its dual categorial structure: more precisely, its combination of Firstness and Secondness (CP 5.53, 5.539, and 7.632). The Firstness of the percept comes from its phenomenal quality: it "is" something without reference to anything else. Peirce asserts that a percept "cannot be generalized without losing its essential character" (CP 2.141). As Mats Bergman puts it: "it is as it is, without appealing to anything for support (BERGMAN, 2007, p. 14). But, at the same time, within our perceptual experience, this "something" always exists in relation to a perceiver. It is in a dyadic relationship with the self. Peirce asserts that "concrete duality is there in the every experience itself" (CP 6.95)—an idea Susan Haack builds on when she comments that "the percept's Secondness is a

2 On these intuitions, see my book (DOSTIE PROULX, 2012, p. 41-42).

direct relation of the subject to things and events around him" (HAACK, 1994, p. 16). For the same reason, she also asserts that a percept is "two-sided": dual in structure. It is something, but it can only *reveal* itself within an inner-outer relation.

This dual categorial definition reveals the epistemic role of the percept. If there is one thing that should strike us in Peirce's definition, is the absence of Thirdness. The author is careful not to include any triadic relations when talking about the percept. But why? Peirce argues that the percept "presents" itself to us; but it is neither a "representation" nor a "proposition" (which are forms of Thirdness). This stipulation has important consequences because, if percepts are not propositional, if "they make no claim", they cannot be true or false. As Peirce famously asserts, the percept "simply knocks at the portal of my soul, and stands there in the doorway" (Peirce CP 7.619). It is the first item in the perceptual chain, but it does not allow for the assignment of truth-values. The difficult question is—and this will be the subject of the next section—can we directly perceive Thirds?

2.2 The perceptual judgment

It is precisely this complex notion that Peirce combines with the concept of "perceptual judgment." In a word, a perceptual judgment is a "mental description" of the percept. Peirce describes perceptual judgments as "stenographic reports" of the evidence of the senses (CP 2.141). Thus, these judgments are not simply a product of our intention. In some way, we are forced to acknowledge them, as we are forced to acknowledge the percept itself. Bergman asserts that "there is very little power, if any, that the perceiver can exert on such judgments" (BERGMAN, 2007, p. 16).

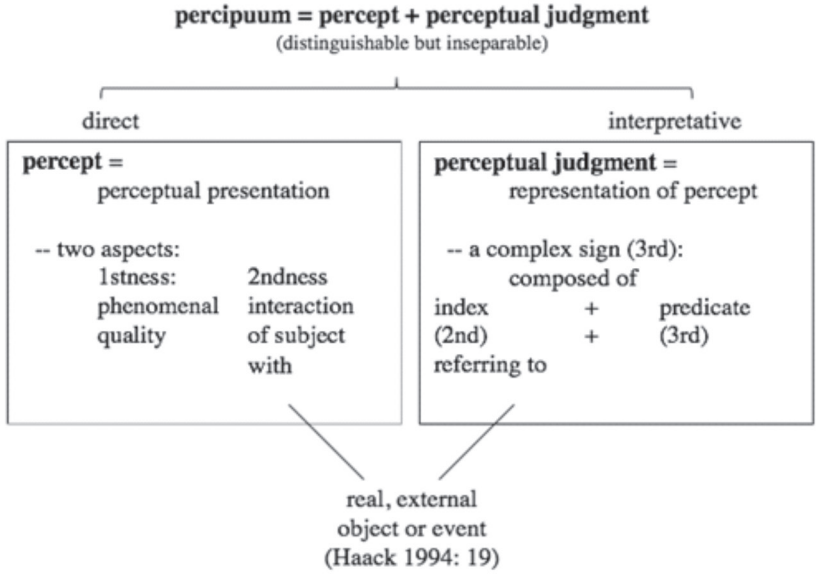
But still, Peirce affirms that "[a] perceptual judgment is entirely unlike a percept" (CP 7.630). In what respect are these two concepts different? I will argue, alongside Susan Haack, that they differ precisely in regard to their categorial structure and their epistemic role. While the categorial structure of the percept combines Firstness and Secondness, the categorial structure of the perceptual judgment combines Secondness and Thirdness.

The Secondness of the perceptual judgment comes from the fact that it is an index ("just as a weather-cock indicates the direction of the wind or a thermometer the temperature," CP 7.628). As an index, a perceptual judgment must embody a dyadic relation: it must be an index *of* something; it must refer *to* something (precisely, it refers to the percept—the object the perceptual judgment). Here again, then, we have an inner-outer relation. But (and this is crucial), the perceptual judgment is also a sign. According to Peirce, a *sign* represents an *object* to an *interpreter* (it is part of a triadic relation). As a sign, a perceptual judgment is in the realm of "representation" (a form of Thirdness). One important consequence of the perceptual judgment's representational nature is that its Thirdness defines its epistemic role. Contrary to percepts, perceptual judgments can be true or false. As Susan Haack insightfully puts it, such judgments "may *mis*represent the percept" (HAACK, 1994, p. 18). As it was the case with the Firstness and Secondness of the percept, the Secondness and Thirdness of the perceptual judgment come together. In the perceptual flux, those two aspects are not separable. This is one of the reasons why Peirce talks of perceptual judgments as indexical signs ("indexical" to point out their Secondness; "signs" to point out their Thirdness).

But again, as such, Peirce's definition of perceptual judgment is not sufficient to justify metaphysical realism. Bergman notes that "according to Peirce, not even an observation provides a 'pure' contact with ultimate reality" (BERGMAN, 2007, p. 28). As many commentators have noticed, the references of our indexes could be hallucinations (not all percepts are "existent" percepts). Conceptually, a perceptual judgment would work perfectly even if its objects were not external and real. As Mats Bergman affirms, "perceptual judgments do not declare that certain percepts are illusory; we have no other means of finding out whether a manifestation is real or not than to test it by trying to suppress it, asking others, or experimenting on the percipuum" (BERGMAN, 2007, p. 18). To overcome this difficulty, we need to go even further into this theory and explore Peirce's notion of the "percipuum."

2.3 The percipuum

It is precisely the combination of the percept and the perceptual judgment that Peirce names the *percipuum* (one of the most puzzling concepts in Peirce's perceptual theory). But why does he use this label to refer to these two dimensions? Essentially, Peirce argues that, while the percept and the perceptual judgment are *conceptually* distinguishable, within the perceptual flux, they are in fact inseparable. This connection is expressed most clearly in Peirce's assertion that "[we] know nothing about the percept otherwise than by the testimony of the perceptual judgment" (CP 2.141). In her article "How the Critical Common-Sensist Sees Things," Susan Haack uses the following table to summarize Peirce's view on perception:



It is worth noting that Peirce uses the concept of "percipuum" to seize the middle ground between a "theory of the given" and a "pure representational (or interpretative,

or inferential) theory" of perception. It is precisely the combination of these observations that allows him to adopt a stance in between the two most common theories of perception of his time. Peirce's theory of perception cannot be reduced to a theory of the given, because within the perceptual flux, the act of interpretation is unavoidable. The perceiver is always embedded in a dynamic process where the external object is never completely within reach. Something *presents* itself to us with some vividness, but this mere phenomenon is insufficient to describe the complexity of perception. Likewise, Peirce's theory of perception cannot be reduced to a pure inferentialist theory, since the objects of our perceptual experiences can be real and external; they are not purely mental images. Peirce asserts: "nothing can be more completely false than that we can experience only our own ideas" (CP 6.95).

Yet, at this point in our discussion, the relationship between *perception* and *realism* still seems elusive. For instance, how do Peirce's notions of scholastic realism and synechism relate to this model? To clarify this relationship, I will now try to elucidate the exact status of Thirdness in Peirce's theory. More precisely, I will ask whether *laws* and *generals* are mental constructions (a product of interpretation), or whether they can be directly perceived in external reality. Ultimately, my intention is to interrogate the exact role of interpretation in Peirce's perceptual theory. To fulfill this objective, I will now turn to Aaron Wilson's paper "The Perception of Generals," published in the *Transactions of C. S. Peirce Society* in 2012.

3 Aaron Wilson and the direct perception of thirds

Wilson's project aims at explaining how Peirce's theory of perception can be said to be both *direct* and *interpretative*. According to him, "how deeply [the] interpretative element runs in Peirce's account of perception is open to confusion" (WILSON, 2012, p. 170). Wilson's hypothesis goes against idealist interpretations of Peirce and suggests that *we directly perceive Thirds* (*or generals*) *as active physical laws*. One obvious counterargument stands in the way of such a proposal: if the categorial structure of the percept is composed only of Firstness and Secondness, how can we assert that we can perceive generals? One of Wilson's key observations is that "to claim that we perceive […] things to which some form of Thirdness is an essential element […] is not to claim that we perceive Thirdness as a universal phenomenon" (WILSON, 2012, p.170).Wilson's claim, thus, is not that the percept *contains* Thirdness, but rather that we always directly perceive *instances* of this category. For Wilson, claiming that we can directly perceive active laws in external reality is not inconsistent with the model presented above.

Moreover, Wilson asserts that, if we refuse the idea that we directly perceive Thirds, *then the general knowledge of the external world is* "*surrendered*." The reasoning behind this is easy to understand: if general elements (like laws) are imposed by the mind, we have no way to truly learn about them. This idea is backed by Peirce's "extreme scholastic realism": any position that requires that we only directly perceive Seconds—Thirds being a mere projection of our minds—makes the process of inquiry meaningless (since the perceived object is thus cut off from its own nature).Wilson states that, "because Peirce saw this, he could not have thought that the general element in perceptual judgments originate in any other way besides from our directly perceiving them in external objects" (WILSON, 2012, p.176).

Among Wilson's many arguments, two seem essential to his claim. These arguments relate to two fundamental difficulties of Wilson's take on Peirce: if we believe that we can directly perceive generals in external reality, (a) how can we give an adequate account of the connection between the percept and the external object (and the possibility that it has general features), and (b) how should we construe the role of interpretation in Peirce's perceptual theory? More precisely, how can we make sense of the interpretative dimension of the perceptual judgment and the percipuum while arguing that we directly perceive generals?

3.1 The percept and the external object

The first challenge to Wilson's hypothesis naturally arises from the model introduced in the previous section: if the category of Thirdness plays no role within Peirce's understanding of the percept, what is the exact relationship between direct perception and generals? As Wilson notes, "if percepts comprise the external world we perceive, *but do not have a general nature*, then it is not the case that, according to Peirce, we perceive generals in the external world" (WILSON, 2012, p. 177, *my italics*). Wilson therefore hypothesizes that the percept cannot be limited to individual attributes, arguing that nothing Peirce says forces us to such a limited view of the percept. On the contrary, percepts can have both specific and general features: "according to [Peirce], everything we directly perceive in the external world has individual and general elements" (WILSON, 2012, p. 173).

Yet, this understanding seems only possible if the percept is not *reduced* to the external object. Wilson affirms this understanding: "although the percept *involves* the external object we perceive, I deny he holds that it is the external object we perceive" (WILSON, 2012, p.177).More precisely, Wilson argues that the percept is an "epistemological notion"; meaning that it "contributes something to knowledge" (CP7.622). Here, Wilson relies on the interpretation brought forth by Christopher Hookway in his book *Peirce* (HOOKWAY, 1985). Both authors assert that "the percept is a contribution to knowledge only in the sense that it is the brute awareness of an object; but we remain unaware of the nature of that object until some further stage in the perceptual process" (WILSON, 2012, p.177-178).As we noticed in the previous section, the fact that the percept is an "outward clash" gives us no information about the ontological status of the percept (HOOKWAY, 1985, p. 151).

With this picture in mind, Wilson suggests that it may be possible to directly perceive generals in external reality. According to him, nothing in Peirce's theory prevent the reading that "the external object, of which we are only brutally aware in the percept, can have general features"(WILSON, 2012, p. 178).Yet, despite the potential compatibility between Peirce's percept and the direct perception of generals, the exact role played by interpretation in this model still needs to be unpacked.

3.2 The role of interpretation in Peirce's perceptual theory

A potential counter to Wilson's interpretation of Peirce is the argument that the perceptual judgment and the percipuum *could potentially lead to a form of* (*complex*) *idealism* (and *not* to an interpretation of generals as *physical*). To address this difficulty, we first need to look at the *perceptual judgment*. One could argue—without any difficulty—that the main role of the perceptual judgment is to *interpret* the percept.

Such an argument poses a potential problem for Wilson, since it could mean that the general elements of any percept owe their forms to our own interpretations. How can generals be the result of both direct perception *and* interpretation? Wilson's argument is that the perceptual judgment is, first and foremost, an *act of discernment* (and, more precisely, the discernment of the perceived object in external reality). Thus, the perceptual judgment does not represent the percept "logically" but "only […] as an index" (WILSON, 2012, p.179). According to Wilson, the interpretative dimension of the perceptual judgment is nothing more than an act of distinction: precisely, the distinction of the main elements of the percept (elements that are already extant in the perceived object).

But, even if generals are not the product of our own mental states, could one argue that *the perceptual judgment logically represents the percipuum*? If this is the case, the perceived object may owe its general features to this latter interpretative step of the perceptual process. Wilson asserts that a careful examination of Peirce's percipuum still allows for a reading of generals as physical. From Peirce's writings, we know that the percipuum includes both the percept and the perceptual judgment. But Peirce also says that the percipuum is "the percept as it is immediately interpreted in the perceptual judgment" (CP 7.643). How can we make sense of these two different definitions of the percipuum? Wilson addresses this issue as follows:

> Although these appear to be different definitions […][if] the percipuum is the conjunction of the percept, the perceptual confrontation of an object, and *what that object is judged or interpreted to be*, then there is less of a difference between them. The percipuum is the perceptual confrontation of an object as that object is immediately interpreted or judged—that is, the percipuum is the *interpreted percept* (WILSON, 2012, p.179).

Wilson suggests here that the percipuum is the *appearance* of the perceived object, already distinguished; in other words, the percipuum represents the perceived object as an index. Thus, for Wilson, there is no difference between "what the perceptual judgment *says* and what the percipuum *is*" (WILSON, 2012, p.179), and, as a result, the percipuum is able to directly interpret the percept. To clarify his view, Wilson provides the following example. Imagine that you are at the zoo, and that you see, in the distance, a zebra:

> *Percept*: the brute appearance of the zebra.
>
> *Perceptual judgment*: the discernment of certain things (its animality for instance). In this case, the perceptual judgment may tell you: "there is a funny-looking horse."
>
> *Percipuum*: the *appearance* of a "funny-looking horse" (what Wilson calls "a 'funny-looking horse'-*appearance*").

Here, the percipuum is both the combination of the percept and the perceptual judgment (in the sense that it is "the brute appearance having the character I judge to have it") *and* a direct interpretation of the percept. The discernment of the brute

appearance of the zebra leads, through the perceptual judgment, to the appearance of a funny-looking horse.

I believe that Wilson's interpretation of this perceptual theory does the best available job of aligning with Peirce's (sometimes inharmonious) affirmations. Consider, for instance, Peirce's statement that the percipuum "cannot fail to have the character described by the perceptual judgment" (WILSON, 2012, p. 180). This means that the percipuum "must always be in error whenever the perceptual judgment is in error" (WILSON, 2012, p.180). For Wilson, this means that:

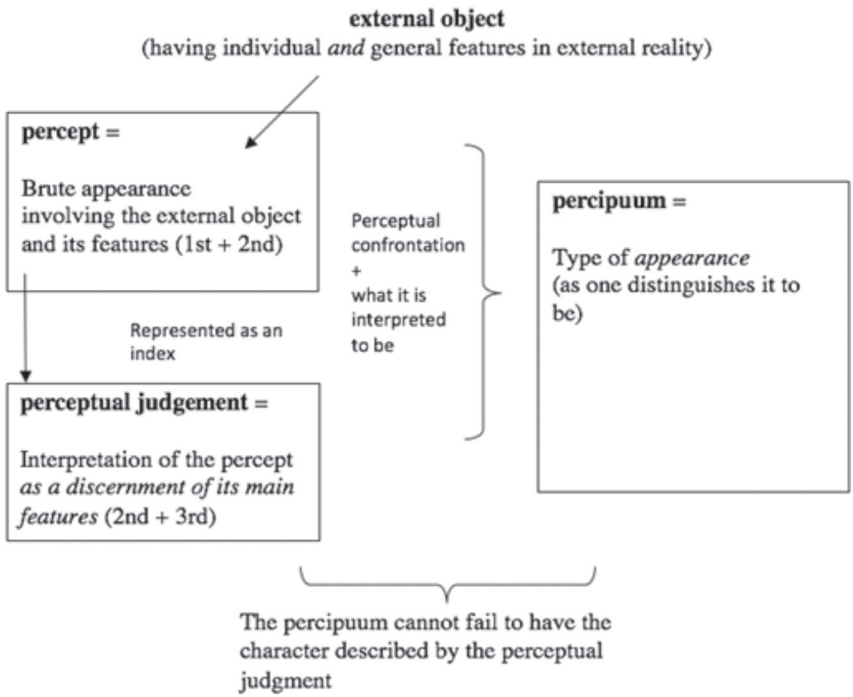
> The percipuum is an appearance in the sense that the parts or features of the object which appear to one are just those that one is able to *distinguish*; and "distinguishing" is a two-sided coin. On one side, we have a thought representing what it is we distinguish. This is what I think Peirce means by the perceptual judgment. On the other side, there is the object actually appearing as we distinguish it to be. This is the percipuum. The perceptual judgment is the mental act in which one distinguishes certain features of the object upon one's mental confrontation with it (WILSON, 2012, p.180-181).

Yet a final challenge remains. If the percipuum is conceived as the "appearance" of the brute manifestation of a percept, how can it—or the perceptual judgment—be in error? In proposing a solution to this problem, Wilson invokes Peirce's views on temporality and synechism (i.e. the notion that space, time, and law are continuous; see Peirce CP 6.102-163). His main claim is that:

> According to Peirce, active laws are essential elements of the objects we perceive, such as that the objects have their *esse in futuro*, which according to Peirce, is to say that "they will have a present reality which consists in the fact that events *will* happen according to the formulation of those laws (CP 5.48)" (WILSON, 2012, p. 181).

As we already saw in the previous section, it is impossible to fully understand Peirce's perceptual theory without understanding this connection between temporality and perception. Here, though, Wilson does not insist on the dynamic dimension of every perceptual act, but rather on the fact that *perception leads to the formation of expectations*. As Christopher Hookway notices: "an account of the relations between judgments and their objects will inevitably look to the future, to the inferences that can be drawn from the judgments, to the expectations they license, and to the ways in which they are sensitive to further perceptual information" (HOOKWAY, 2000, p. 126). Temporality is the key to unveiling how the percipuum can be both a direct interpretation of the percept *and* a misrepresentation: "Since laws essentially involve the future as it would be, if perceptual judgment were about those laws […] then such judgment and appearances may be falsified by future percipua (WILSON, 2012, p.184).

In Peirce's theory, temporality is the key to understand how one's percipuum (and perceptual judgment) *could be mistaken*. According to Wilson, it is precisely the combination of Peirce's remarks on time, laws, and perception that lead us away from idealism and towards *synechism*. If we combine this idea with his extreme scholastic realism, Wilson argues, then we may conclude that the Thirdness we perceive in the external world "involves mainly physical laws." Importantly, this conclusion directly opposes idealist interpretations of Peirce (WILSON, 2012, p. 187). To conclude this section, I propose below a model that captures Wilson's construal of Peirce's theory of perception. Although this model does not necessarily contradict Haack's model (depending on our understanding of the interpretative act), it does insist on some of Peirce's complex statements:



4 Peirce and scientific realism

Building on the previous discussion of scientific realism and Wilson's interpretation of Peirce, I present the following hypothesis: among all of Peirce's arguments, his perceptual theory (and, more specifically, Wilson's interpretation of this theory) is the most capable of positively contributing to scientific realism. In what follows, I will show how Peirce's theory can help us answer the three questions posed in the introduction to this article: (i) How can we argue for a mind-independent reality? (ii) How can we explain the success of science? and, (iii) How can we argue for the knowledge of unobservable entities?

(i) The question about *metaphysical* realism may be the easiest to answer. As I have shown, Wilson's interpretation of Peirce's perceptual theory leads us to the idea that *the Thirds we directly perceive are principally active laws in external reality*. One of the key aspects of this view is that the perceived object—together with all its features—*is independent of the perceptual act*. This conclusion is attested in one of Peirce's most famous statements on the nature of reality: "[the characters of external objects reveal themselves], regardless of what you, or I, or any man, or generation of men, may think" of them (CP8.144). I suggest that Wilson's reading of Peirce's perceptual theory is in fact one of the only interpretations to date that can fully explain this realist position. Reality is external to us and does not depend on human faculties precisely because *we can directly perceive generals* (understood as physical laws). I also suggest that Wilson may offer the only interpretation of Peirce that is strong enough to truly refute *objective idealism*. I hope this point is now clear: Peirce's late theory of perception does not simply argue for an *independent reality*, but also for a *physical understanding* of active laws. To refute objective idealism, it is not enough to account for a mind-independent reality; we also need to defend the position *that laws of nature are not the result of mental processes*. If Wilson is right (and I believe he is), Peirce's late theory may contain strong counterarguments to both objective idealism *and* nominalism.

(ii) As discussed at the beginning of this paper, one of the main arguments of scientific realists is that *science works*. My hypothesis is that Peirce's perceptual theory—combined with some of his main observations concerning scholastic realism and semiotics—can provide an original argument in favor of such success. The metaphysical challenge of a mind-independent reality thus becomes an epistemological challenge about the possibility of scientific knowledge. I suggest that Peirce's belief in the success of science rest on the idea that our best theories can correctly describe external reality.

In his book *Truth, Rationality, and Pragmatism*: *Themes from Peirce* (2000), Christopher Hookway also argues for a realist reading of Peirce. According to him, in Peirce, "indexical signs put us in contact with external independent things […] which constrain our opinions and whose properties we try to discover through inquiry" (HOOKWAY, 2000, p. 108). I will argue that it is precisely *this constraint that can lead us to epistemological realism* (and thus, to an explanation of the success of science). Two observations seem necessary. First, consider the fact that *the resistance we encounter through Secondness allows for regularity and convergence in our predictions about the behavior of the world*. It is because we can predict, with a high degree of regularity, the way in which the world will resist us that Peirce asserts, "Reality consists in regularity" (CP5.121). Moreover, we have strong reasons to believe that our indexical signs can lead to scientific knowledge because *the regularity of that reality's resistance allows for the formation of laws. In the same paragraph that he equates reality and regularity, Peirce likewise suggests that "Real regularity is active law*" (CP 5.121).

Second, we can notice a strong *convergence* of beliefs about regularity (and active law) through inquiry. It is important to note that not only that I can acknowledge these regularities, but that they can be *socially* acknowledged. Consider, furthermore, the corollary observation: that our convergent beliefs about regularity allow *for the possibility of correcting our views about the world* (and for a confirmation of

those corrections). Hookway asserts that the "study of the dynamical object of my judgments is thus a way of eliminating error and increasing my knowledge of what I am thinking about, of what I first pick out indexically" (HOOKWAY, 2000, p. 132-133). Again, for Peirce, epistemological realism is not justified only because we feel the resistance of the world (which is to say, the presence of Secondness), but also, and above all, because this resistance can undergo social experimentation and our judgments about it be corrected. The success of this justification illustrates the close association between Peirce's metaphysical realism and his epistemological realism: a conception of Thirds as *active physical laws* may be the best to fully explain the strong regularity in our perception of the world. Through inquiry, this regularity can be formalized, tested, and corrected. This, in turn, leads to a fallible but cumulative conception of knowledge about the external world.[3]

(iii) The final challenge to Peirce's realism concerns his description of unobservable entities. Can Peirce's theory successfully argue for the knowledge of such entities? At first glance, this question seems to admit a simple positive answer, since *generals can obviously not be reduced to observables*. As de Regt puts it, "generals are obviously unobservables, even when they concern classes of observables" (DE REGT, 1999, p. 384). To explain this phenomenon, he refers to Peirce's 1878 paper, "Deduction, Induction, and Hypothesis." Therein, Peirce argues that all kinds of hypothetical inferences implicitly use counterfactuals. As Peirce suggests: "when we adopt a certain hypothesis, it is not alone because it will explain the observed facts, but also because the contrary hypothesis would probably lead to results contrary to those observed" (EP 1:191; see also DE REGT, 1999). Induction does not only tell us something about *what is* (in the observable realm); it also necessarily tells us something about *what is not*.

Yet, the necessary use of counterfactuals in inferences entails only a weak argument for the existence of unobservable *entities*. Does Peirce offer anything stronger in defense of such entities? One case comes to mind: Peirce's famous analysis of the hardness of diamonds, proposed in his "Issues of Pragmaticism" (1906). Peirce's argument there is that the "high polemerization of the molecule bespeaks" of the hardness of the diamond. Scientific explanation here rests on unobservable chemical entities (in this case, the covalent bonding between the diamond's atoms). The possibility of such knowledge seems evident, "for to what else does the entire teaching of chemistry relate except to the 'behavior' of different possible kinds of material substance?" (CP5.457). Even though Peirce lacks a substantive theory about unobservable entities, they clearly seem to play a role in his understanding of reality. De Regt's conclusion on this topic is striking:

> According to Peirce, it is to be expected that there are laws of nature of which the real generals postulated are concerned with natural classes of individual unobservable objects. It is the history of science that offers an inductive argument to believe that the postulation of unobservables is indispensable to real science (DE REGT, 1999, p. 385).

3 I will not explore the subject of fallibilism here since I did it elsewhere. Let us just note that, according to Peirce, "there is a world of difference between fallible knowledge and no knowledge" (CP 1.37).

Can a similar conclusion be drawn from Peirce's perceptual theory? Inarguably, this theory articulates no explicit difference between *unaided* and *aided* perception (contrary to Peirce's clearly drawn separation between the *direct* and *interpretative* dimensions of perception). In failing to make sure a distinction, the theory may be seen as leaving enough room for a Peircean reading of unobservables. Consider the following example: with the help of instruments (e.g. IACT telescopes), we perceive the effects of an unobservable entity (e.g. through the detection of very high energy gamma-ray photons). This *aided* perceptual act can, through inquiry, lead to the formation of expectations and predictions. Corroboration through time and further experimentation may then allow for the verification of our expectations. Nothing in this example seems to contradict Peirce's assumptions about realism.

Yet, as asserted in the first section, such a reading offers only a weak argument for the knowledge of unobservables, since *it does not give us a solution to the logical problem of underdetermination of scientific theories by data*. Leaving aside the weak possibility that Peirce's synechism could produce an argument for logical underdetermination, this situation could ultimately be fatal to scientific realism. Since Peirce does not offer an answer to this critical challenge, he remains perilously exposed to an antirealist reading (despite the answers his theory provides to the first two challenges discussed above). As a result, I conclude that Peirce can be considered only a modest contributor to this debate. Sadly, if de Regt is right—and we have good reasons to believe he is—little more can be said about the scientific realist dimension of Peirce's thought.

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Endereço/ Address

Pierre-Luc Dostie Proulx
Centre Europé
Université catholique de Louvain
Belgium

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