Journal of Modern Philosophy

Descartes on Natural Signs and the Case of Sensory Perception

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Descartes did not devote a specific work to develop a doctrine of semiotics, but he used the notion of sign to describe three phenomena: language, the external movements of the passions, and sensory perception. For this, he appealed to conventional, external, and natural signs respectively. A systematic treatment of signs as proper components of Descartes' considered views is rare and, specifically, natural signs are often deemed as a figure of speech with no metaphysical import and no appreciable place within his thought.[1] The objective of this paper is to challenge this view and

1. Descartes' reference to natural signs has been characterised in the literature as a 'startling' addition (Slezak 2000: 543), as presenting a scheme that is the reverse of what one might expect from Descartes' system of philosophy (Yolton 1984: 23), and as not having a clear place in the Early Modern philosophical context (Yolton 1996). Bennett (2001: 107) declares that seeing natural signs as a piece of the process of sensory perception is 'overloading the text.' De Rosa (2010: 176–7) takes the passage in the *Optics* in which Descartes ridicules the view that the mind inspects the brain (AT VI.130/CSM I.167) to be sufficient evidence for ruling out a model with semantic features. In a more positive tone, a model with semantic features has been looked on as 'intriguing but implausible' (Simmons 2003: 561). There are a few exceptions to these readings: the possibility of natural signs constituting an acknowledged aspect of Cartesian philosophy was first explored by Rodis-Lewis, who reads Descartes' theory of sensory perception as 'extended by a general theory of signs in which those of nature announce those which men institute in language' (1964: 159, my translation). Wilson (1991) moves away from a metaphorical reading of the language analogy and claims that Descartes uses it to dismantle the similarity policy in sensory perception. Rozemond (1999) is sympathetic to a 'sign model' as one of the instances in which Descartes is clearer about the need for a causation model compatible with lack of resemblance between ideas and their phys-

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https://doi.org/10.25894/jmp.1905

establish that Descartes' identification of corporeal states with signs instituted by nature in the language analogy of the *Treatise on Light* (AT XI.4/G.4)[2] is a genuine attempt at understanding the causal structure of sensory perception. The use of signs is Descartes' most fruitful effort at devising a non-mechanistic causal relation for the interplay between brains and minds. In section 1, I present some preliminaries for Descartes' reference to signs in perception and I define the scope of the proposal. In section 2, I reconstruct a taxonomy of signs. Section 3 focuses on natural signs and Section 4 examines the linguistic model and its explanatory advantages.

1. Preliminaries: What is the Problem?

What exactly about sensory perception calls for explanation, and why are signs a part of it? To answer these questions, one needs to look into a ubiquitous aspect of the conjunction of Descartes' mechanistic natural philosophy and his substance dualism: the rejection of the need of resemblance between sensory ideas and their physical causes.[3] Targeting what he understood as a standard Aristotelian-Scholastic theory, Descartes sought to erase a number of traditional notions on the charges of unintelligibility and lack of explanatory power (AT

ical causes. Gaukroger suggests that an account of perception modelled on language, although not sufficiently developed, appears in the *Treatise on Light* to answer the question of how we are able to 'respond to certain properties or events as information' (2002: 204). Chignell's (2009) interpretation is, to my knowledge, the only one that sees natural signs as the basis of a wholesale sensory perception model dubbed 'causal-semantic.' More recently, Hatfield (2017) has paid attention to how Descartes uses a natural sign relation for the formation of colour sensations, spatial perception, and natural geometry; and Ben-Yami (2021) has examined the language analogy to dispel any temptations to interpret it along representationalist lines. Slater (2023) reads it as a *practical*, non-metaphysical piece of knowledge under Descartes' third primitive notion. Details of these readings will appear throughout the paper.

2. Descartes' works are cited in the Adam and Tannery edition (AT) with volume and page numbers, and in the translation by Cottingham, Stoothoff, Murdoch, and Kenny (CSM, CSMK) with volume and page numbers. There are two exceptions: the translation of *The World* is by S. Gaukroger (abbreviated G) and the translation of the Correspondence with Elisabeth is by L. Shapiro (abbreviated S). Both are cited after the original with page numbers. When a translation is mine, I have indicated so.

3. The *Treatise on Light* opens with a forthright statement about the difference that there might be between our sensations and their physical causes: '[I]t is possible for there to be a difference between the sensation that we have of it [light] that is, the idea that we form of it in our imagination through the intermediary of our eyes, and what it is in the objects that produces that sensation in us, that is, what it is in the flame or the Sun that we term ''light'''(AT XI.3/G.4, clarification added). Descartes commonly treated 'sensation' as a synonym of 'sensory perception' (e.g., AT VIIIA.32, 316-8/CSM I.216, 280-1). Even though the term 'sensation' is more often attached to the perception of secondary qualities, there is not in Descartes a clear-cut distinction that corresponds to a contemporary split between representational and non-representational mental states, or qualia (Simmons 2003: 552). See also Morris (2015), Hatfield (2015), and De Rosa (2007).

XI.26/G.18; AT III.649/CSMK III.216).[4] Upon his rejection of hylomorphism and its cognate conceptual system in favour of mechanism, the primary perceptual object of traditional philosophy lost most of its intrinsic qualities (Spruit 1995: 363). Although the mechanistic standpoint allowed for a variety of scientific theories, its pre-Newtonian version is generally defined as the view that all natural phenomena can be explained by appealing to a small range of quantifiable characteristics of micro-particles of homogeneous, inert matter. In the Cartesian theory, these features are the shape, size, and motion of corpuscles existing in a plenum, which constitute the 'true nature' (AT VIIIA.37/CSM I.220) of physical objects, the entirety of the *res extensa,* including human physiology.[5] Descartes' mechanistic physiology accounted for the transmission of sensory information between external objects and the brain, and depicted it as an isomorphic relation in which the characteristics of objects are communicated through the nerves as the motion patterns of its geometrically reduced properties. Still, the promising explanatory power of mechanistic natural philosophy, in which 'it is no less natural for a clock (...) to tell time than it is for a tree (...) to produce fruit' (AT VIIIA.326/CSM I.288) was not without challenges.[6] Sensory perception is a case on point. Mechanism opened a gap between appearance and reality that proved difficult to bridge without the assistance of the sensible and intelligible species of the theories of the Schools. Descartes had substituted the resembling species with motion, yet what remains is a seemingly inscrutable dissimilarity

4. Descartes' ambivalent relation with the philosophy of the Schools is well documented, as well as the fact that his reference to Scholastic Aristotelianism as a placeholder for a group of claims and authors is not always accurate. He does occasionally cite some authors including the Conimbricenses, Toledo and Rubio (AT III.185/CSMK III.154), and he also refers sporadically to Aristotle, Aquinas, Eustachius, and Suárez, yet there is no engagement with their concrete views. Descartes acknowledged the diversity of Scholastic thought, but he saw it as rooted in a shared foundation that became his tractable target (AT III.232/CSMK III.156). For a rendering of this common foundation as Descartes understands it, see Hatfield (2007: 447–52). For some of Descartes' misunderstandings about Scholastic theories regarding perception, see Spruit on sensible and intelligible species (1995, especially Chapter 11).

5. A complete outline of Descartes' physics should also include the basic motion principles: the principle of centrifugal force and the principle of rectilinear inertia (Gaukroger 2000b: 384). Cottingham (2003: 61) also points out that it can be doubted whether everything that Descartes wants to attribute to matter can be reduced to the size and behaviour of corpuscles. He conceived of motion as a mode of extension, but it is not clear how motion is derivable in such a way. The notion of force runs into similar problems. For a detailed treatment of this topic, see Gaukroger (2000a, 2002, especially Chapter 4).

6. This is an expressive passage, but we should not forget that Descartes' picture of the natural world is modelled on fluid mechanics. The image of the clock has become paradigmatic of Early Modern mechanism, yet Descartes offers analogies of a deliberate organic nature. The mechanically powered fountains of the gardens of Saint-Germain-en-Laye are a well-known analogy with human physiology (AT XI.130-2/G.107), and the circulatory system is compared to the workings of a church organ where animal spirits that come from the heart in different quantities, agitation, and texture are equated to the air pushed by the organ bellows into the wind chests (*ibid*. 165-6/140).

between the quantitative nature of physical states (states of objects and brains) and the qualitative character of the mental states that invariably correspond to them in our sensory experience. In the literature, this is commonly labelled as 'dissimilarity thesis' or, in its problematised strain, as 'dissimilarity problem' (Rozemond 1999).

Descartes does not deny the interaction of mind and body anywhere in the texts, but his causal explanation of sensory perception becomes elusive at the brain-mind junction. However, lack of systematicity is not equivalent to inconsistency (Simmons 2017: 21). In one of his clearest expressions of interaction, of which sensory perception is a species, Descartes tells Elisabeth that we have 'confused' the causes operating in interactions amongst bodies with those at play in the interaction between mind and body (AT III.667/S.66). This gesture towards a metaphysically interesting distinction between types of causes is not surprising if one attends to the terminology that Descartes normally choses for interaction. The texts are a testament to his search for an alternative conception of causation compatible with dissimilarity between physical and mental states. For describing the brain-mind stage of the process of perception, Descartes employs a plethora of different expressions, and this terminological effort seems aimed at preserving a delicate balance between the evoking of a genuine causal link between brains and minds on the one hand, and the dismissal of causation by contact on the other.[7] Among these familiar expressions, interaction is described with terms such as 'make the soul sense' (*faire sentir*, AT XI.146, 176; AT VI.131), 'affect the soul' (*afficere*, AT VIIIA.316), 'give means to the soul' (*donner moyen*, AT XI.159; AT VI.113), 'give occasion to the soul' (*donner occasion*, AT XI.144, 151, 176), and 'excite' and 'stimulate' the mind (*excitare*, *impellere*, AT VIII.320). It is interesting to follow Descartes' usage of words for mind-body interaction in comparison with interaction amongst bodies and observe a story that we have not properly appreciated. Although the term 'cause' rarely appears, causal language is prevalent. This has tempted a few translators, who have inserted 'causes' where Descartes employs other expressions to maintain a deliberate division of labour. An illustrative example appears in the *Treatise on Man*, where, in a single sentence, the verb *causer* is used for the interaction between the nerves and the brain, and the expression *donner occasion* appears when the mind enters the picture: 'the movement that they (the nerves) will cause in the brain (...) will give occasion to the soul to have the sensation of pain' (AT XI.144; *donner occasion* is

7. Causation by contact (here a species of transeunt efficient causation and the all-encompassing causation model for the material world in the Cartesian framework) *is* the single replacement of the four causes of Aristotelian-Scholastic accounts. Descartes employed diverse terminology for capturing the interaction between brain and mind in an effort to convey, on the one hand, the invariable law-like regularity of its workings and, on the other, the fact that causation by contact is simply ill-suited for describing any phenomena involving the mind.

translated as 'cause' in G.119, and the same happens in *ibid.* 146/120).[8] The strategic use of these expressions reveals one of Descartes' goals: namely, that of procuring knowledge of the *whole* of the natural world (to which the mind belongs) in a way in which the material and the mental can be treated with equivalent intelligibility (in a way that does not appeal to obscure notions, for example) without, at the same time, making the mind into a material thing.

It is alongside these expressions that signs join the discussion, and they are meant to give insight into this particular causal relation. Right after the opening statement of the *Treatise on Light*, Descartes de-problematises dissimilarity between objects and ideas by drawing an analogy with the workings of language: if the words we have created, being conventional and entirely different from the things they signify, are able to regularly induce the mind to form the appropriate corresponding idea, nature should be all the more capable of having instituted a relation of signification among objects, brain states, and ideas:

> Now if words, which signify something only through human convention, are sufficient to make us think of things to which they bear no resemblance, why could not Nature also have established some sign which would make us have a sensation of light, even if that sign had in it nothing that resembled this sensation? (...) our mind represents to us the idea of light each time the action that signifies it touches our eye (AT XI.4-5/G.4)

This passage opens the possibility of understanding the causal process of sensory perception in terms of a 'linguistic' (Rodis-Lewis 1964; Gaukroger 2002), 'semantic' (Yolton 1984; Chignell 2009), or 'sign' model (Rozemond 1999). This refers to the understanding of the process of perception in a triadic relation of body, mind, and idea. The brain isomorph –as bearer of the geometrically reduced characteristics of external objects– is a *sign* of the sensory idea, which is its *significatum*. The mind becomes an *interpreter* of signs by virtue of natural institution. That is, given its substantial union with the body, it is naturally equipped with the ability to react to brain states as significant. I will favour the term 'linguistic model' given the importance of the analogy with language for describing features of the account of sensory perception, as opposed to semantic notions that Descartes did not contemplate.

8. In Principle 197, the CSM reads 'various sensations can be produced', yet Descartes uses the Latin verb '*excitare*.' Maintaining the closer verb 'excite' might better describe a relation between the brain and the mind that is closer to stimulation than to causation by contact. Other translation choices that obscure Descartes' terminological point include article 23 of the *Passions*: '[motions in the brain] *font que l'âme les sent* [the perceptions]' (AT XI.346, clarification added). The CSM reads 'which *cause* the soul to have' (I.337).

1.2. Plausibility and scope of the reading

Some commentators have questioned the relevance of the language analogy, which could be seen as an inconsequential figure of speech. Here are two initial points which address this concern: First, it is important to note that similar references to signification in connection with sensory perception appear throughout the Cartesian corpus. In Meditation Six, we read that the motion pattern that reaches the internal cavities of the brain 'gives the mind its signal (*signum*) for having a certain sensation' (AT VII.88/CSM II.60). The teleofunctional aspect of perception is phrased similarly: 'the perceptions of the senses have been given by nature to signify to the mind (*ad menti significandum*) what is beneficial or harmful' (AT VII.83, my translation).[9] In the *Comments*, the relation between corporeal states and ideas is an instance of signification: 'everything over and above these utterances and pictures which we think of as being signified by them (*quam earum significata*) is represented to us by means of ideas which come to us from no other source than our own faculty of thinking' (AT VIIIB.360-1/CSM I.305). In the *Passions*, the physical cause of the sensation of pain is described as instituted by nature to 'signify to the soul' (*signifier à l'ame)* the harm in the body (AT XI.400).[10] In the *Optics*, the analogy of the *Treatise on Light* is resumed: 'our mind can be stimulated by many things other than images –by signs and words, for example, which in no way resemble the things they signify' (AT VI.112-113/CSM I.165-166).

Second, these textual facts should be supplemented with intellectual context to realise that Descartes is employing a common technical notion, and that his use of it, though novel in some respects, is not unorthodox. While the issue of Descartes' theory of perceptual cognition, its merits and shortcomings, and its Scholastic debts and misunderstandings have generated an ocean of literature, his use of signs for the context of perception has received scant attention. He does not fully systematise a linguistic (or any other) model, but to consider his reference to signs as anomalous is a mistake. A study of signs flourished during the Middle Ages and became a common topic in the disputationes of the late Scholastics. Specifically, the Conimbricenses produced an in-depth treatment of semiotics that Descartes read during his studies at La Flèche.[11] He reminisces

9. The CSM translation reads 'to inform the mind.' Signification terminology is also maintained in the French translation of the *Meditations* by Louis-Charles d'Albert, Duc de Luynes, and approved by Descartes: '*pour signifier à mon esprit*' (AT IX.66).

10. The CSM reads 'indicate to the soul' (I.362).

11. This group of Jesuit professors at the University of Coimbra (1592–1606) produced a set of commentaries of Aristotle's works that became remarkably popular. It was a 'corporate production' of the Society of Jesus (Des Chene 2000: 41). It was reprinted several times during the seventeenth century and it was distributed in Protestant countries (Solère 2015: 150). It was even translated into Chinese (Doyle 1998: 29).

about that twice in his correspondence with Mersenne (AT III.185, 251/CSMK III.154). The Conimbricenses examined the nature and types of signs in their commentary of Aristotle's *De Interpretatione*, the most exhaustive to appear at the time.[12] Given their authority, I will use their work to draw a parallel with Descartes' usage of signs, although this does not mean that they are the only source for it. In line with the dominant Augustinian conception, the Conimbricenses define a sign as 'anything which represents something other than itself to a knowing power' (Q.2, Art.1/D.57, cf. *De Doctrina Christiana* II.1),[13] and they draw five distinctions between types of signs, two of which are reflected in Descartes' own treatment. As we will see below, one of these distinctions –between *formal* and *instrumental* signs– show that the use of signs to explain the workings of perceptual cognition had been explored before Descartes.

Finally, two caveats are in order to delineate the scope of this reading. First, we have seen that Descartes introduces the notion of 'representation' in the context of sensory perception. It appears in the language analogy too. In seventeenth-century terminology, representation means to 'present' something or to 'make something available' to the mind. Descartes' main focus is not on what we now understand as questions of representation and semantic properties, but on the missing piece in a causal puzzle.[14] It is true that the problem of dissimilarity involves a concern about how corporeal modes bring about mental modes with representational properties (objective reality, in Cartesian terms) and that, in a linguistic model, ideas can be said to represent objects insofar as they are elicited on the presence of signs that consist of the geometrically

12. The *Commentaries on the Whole Logic of Aristotle* included issues such as the nature and division of signs, the signification of spoken words, and the status and differences amongst concepts. For a detailed treatment, see Doyle (1998). As Meier-Oeser (2011) points out, medieval semiotics constituted a large field of diverse studies and commentaries stemming principally from Aristotle's use of the term 'sign' (σημεῖον) for referring to the word in relation to the concept (*De Interpretatione*, 16a3), as well as from Augustine's understanding of sacrament as a visible sign of an invisible Grace in *De Doctrina Christiana*. Augustine developed a theory of signs within his principles for understanding the Scripture, supported by the use of σημεῖον in the Septuagint and the New Testament. His understanding of signs as causes of thoughts was expanded in Late Scholasticism and became the prevalent understanding of signs.

13. The Coimbra Commentaries are cited in the edition of John P. Doyle of *Some Questions on Signs*, with original question and article numbers followed by Doyle's (D) page number.

14. In this, I agree with Ben-Yami's (2021) framing of the question in terms of causation, though he does not see the reference to signs as an analogy but as just a one-off example of dissimilarity between cause and effect, and as having the same status as the examples of the feather and the tickling sensation, or the soldier's pain caused by a buckle caught under his armour (AT XI.6/G.5). As I show throughout this paper, however, there is a more significant thread to be followed in the case of signs. With Ben-Yami, I also notice that Gaukroger (2002: 206) might be projecting some contemporary considerations on representation when he distinguishes Descartes' use of a causal-mechanical model for the question of 'how perceptual information is conveyed,' and the use of a linguistic model for the question of 'how perceptual information is represented.'

reduced properties of those objects. However, Descartes' treatment of the topic shows that his primary concern is not to elaborate on this relation, but to reconstruct an intelligible causal story for the correspondences between sensory ideas and their physical causes despite their seeming arbitrariness.[15] This will be the focus of the paper. Second, I do not claim that Descartes advances a fully systematised linguistic model. I show, however, that Descartes consistently models perceptual cognition as a linguistic scheme because of its explanatory capacity, and that he designs the language analogy as a genuine naturalistic device. This model is his most fruitful attempt at describing the causal structure of sensory perception. I start by examining the notion of sign to establish that it is a technical term employed with consistency at the convergence of Descartes' dualism and mechanism, and on this basis, I will develop further details about the model.

2. A Taxonomy of Signs

Descartes refers to three types of signs: conventional signs signify other things in virtue of human conventions (e.g., language, the toll of bells); external signs are the visible manifestations of passions in the soul (e.g., laughter, blushing); and natural signs are the corporeal modes that, in virtue of conventions established by Nature, signify (and thus *give occasion* to the mind to form) sensory ideas.

Descartes' conventionalist view about language, in Part 5 of the *Discourse*, is that there is no intrinsic connection between the linguistic sign (the word, the letter) and its significatum. Thought is prior to language and language is created by use. Although there is dissimilarity between the two, our mind is consistently compelled to form the appropriate idea upon the hearing or reading of words: 'the fact that words bear no resemblance to the things they signify does not prevent them from causing us to conceive of those things' (AT XI.4/G.3-4). Next, external signs appear predominantly in the *Passions*, where they are identified as the 'signs of the passions' (AT XI.411/CSM I.367). These are called 'external' due to the distinction that Descartes makes between the 'internal' and 'external' movements of the passions, the two corporeal manifestations of a passion

15. Rozemond (1999: 453–6) has argued for a difference between a problem of dissimilarity, which arises when trying to explain the relation between cause and effect, and a problem of heterogeneity, which arises between cause and patient. That the nature of the patient (the receiving subject) is part of the explanation of the nature of the effect does not seem to be a worry for Descartes. The body *can* cause a mental mode with representational properties. This is how things, however caused, exist in the mind. So, substance interaction is an intelligible causal relation for Descartes but, given a qualitative gap between mental representations and mechanistic explanations, he struggles to spell out the causal details of it.

in the soul. This classification figures already within the anatomical studies in *Treatise on Man* (AT XI.193-4/G.163-4), written approximately seventeen years before the *Passions*. For instance, for one of the ways in which the passion of joy occurs, the internal movements correspond to an abundant flow of animal spirits from the brain into those nerves that have the function of opening the orifices of the heart (AT XI.409/CSM I.366). The external movements of passions can be diverse. In the case of joy, external signs could be laughter or blushing (*ibid*. 413/368). These movements signify or 'bear witness to' (*témoigner*) the passions (AT XI.193/G.163).

Lastly, Descartes makes use of natural signification for describing an aspect of sensory perception. A natural sign is also dissimilar from the thing it signifies, but it is related to it in a non-conventional way, that is, in a *natural* way. Confronted in perception with a causal relation that seems intractable in mechanistic terms, Descartes summons a different relation that could operate with analogous invariability. Language, despite being a human creation, supplies such a model, considering the remarkably reliable connection that obtains between objects, conventional signs, and ideas. Descartes writes that motion reaches the inner parts of the brain, where it becomes a sign for the mind to have a sensation (AT VII.88/CSM II.60). In turn, the mind carries out an analogous activity and produces an idea (AT XI.4-5/G.4). Hatfield (2017: 456) summarises the core of the relation in three features: (1) the sign and the idea that it produces co-vary; (2) this correlation is established by the institution of Nature; and (3) signs refer to objects and, in this way, it can be said that ideas represent objects. Across the taxonomy, then, we are presented with very similar processes in which signs induce the mind to form ideas. It is also worth noting that all three categories –conventional, external, and natural signs– appear consecutively, as distinct, in the key paragraph from the *Treatise on Light* that we have been examining:

> Now if *words*, which signify something only through human convention, are sufficient to make us think of things to which they bear no resemblance, why could not Nature also have established some sign which would make us have a sensation of *light*, even if that sign had in it nothing that resembled this sensation? And is it not thus that Nature has established laughter and tears to make us read *joy and sorrow* in the faces of men? (AT XI.4/G.4, emphases added)[16]

16. The reader will have noticed that external signs are also attributed to nature, though in a different sense. I address this point at the end of the section.

2.1. Signs as marks of the embodied mind

Piecing together a taxonomy of signs in Descartes is a helpful exegetical task for identifying a technical term in use.[17] Yet what is most important to this exercise is to discern why Descartes employs signs in these cases. Two common features are salient:

(1) For all three cases, signs explain the etiology of processes characterised by dissimilarity between the mechanistic explanations of the physical world and the qualitative nature of mental states. Signification appears to make sense of aspects of the dissimilarity thesis, and it does so for three very particular cases, namely, the three cases (language, passions, and perceptual cognition) that mark that which is exclusively human for Descartes *i.e.,* the union of mind and body. This leads to the second common trait, which highlights a corresponding textual fact.

(2) Signs appear *only* when the human being enters the picture within the explanations of language, passions, and perception, and this points to a deliberate usage of the notion. Descartes makes linguistic competence the ultimate evidence for the presence of a mind (e.g., AT IV.573-75/ CSMK III.302-3).[18] Analogously, while a notion of passion referring only to the corporeal process is also attributed to non-human animals, 'external signs' are confined to the appearance of the human being, to mark a phenomenon that is unique to the nature of embodied minds.[19] Compare the occurrence of 'external signs' in the *Passions* (focused on the passions in *ensouled* beings) with the mere mention of 'external movements' of the bodily machine in the *Treatise on Man* (AT XI.193-4/G.163), where Descartes' goal is to show how the functions of the vegetative and sensitive souls can be mechanised.[20]

17. By tracking a consistent use of the term, this paper can be read as rehabilitating the notion of sign as a Cartesian technical notion. Even though Descartes made regular use of it in three distinct contexts, there is no general understanding of it as a term that merits rational reconstruction.

18. Descartes considers the use of language in non-human animals with the example of parrots but, to deal with such occurrence, he distinguishes between a 'meaningful' and a 'meaningless' use of language, where the former is the manifestation of the versatility of reason and the latter is deemed a purely physical stimulus-response mechanism (AT VI.57/CSM I.140).

19. Hatfield calls these the 'physiological passions' (2007). This is the *Discourse*: 'we must not confuse speech with the natural movements which express passions and which can be imitated by machines as well as by animals' (AT VI.58/CSM I.140, cf. AT XI.369/CSM I.348).

20. It is interesting to observe this shift in terminology bearing in mind the traditional definition of sign as something which 'signifies something other than itself to a cognitive power.' While external signs appear when there is a mind to signify something to, the appeal to external 'movements' removes, in principle, such a referential quality. It would be odd to say that movements refer to something other than themselves to a cognitive power.

The parallel between conventional and natural signs illuminates particularly well the idea that signs mark the domain of that which is exclusively human. Note that the topic of language appears in Descartes primarily as an argument for dualism: the pure ideas of the mind do not need language and, consequently, language is subordinated to thought and is relevant only for the need of communication.[21] This dissociation between thought and language is not a *distinctio rationis*, but a *real* one, that is: it corresponds to the real distinction between the two substances and, for Descartes, it exposes the real distinction more clearly than any other phenomena.[22] It is not odd, then, that the dualist point encapsulated in the technical notion of conventional sign carries over to other cases, like perception, to communicate the same fact about the nature of human beings. Descartes' views on language illuminate well the fact that a sign, within dualist parameters, is the technical notion that marks the embodied mind.[23]

2.2. Aren't external signs also instituted by nature?

One could object at this point that, while there is a sharp divide between conventional and natural signs, external signs could also be characterised as natural insofar as they are a product of natural institution. To maintain a meaningful distinction, it is worth considering the following points:

21. This idea became a well-known indication of Cartesianism through the *Port-Royal Logic*. For a survey of the Cartesian model of language, see Ehrsam (2012).

22. This dichotomy can be seen in the correspondence with Chanut, where it appears in comparison with the correspondence of physical states with passions in the soul: 'certain motions of the heart should be naturally connected in this way with certain thoughts, which they in no way resemble. The soul's natural capacity for union with a body brings with it the possibility of an association between each of its thoughts and certain motions or conditions of this body (...) In the same way when we learn a language, we connect the letters or the pronunciation of *certain words, which are material things, with their meanings, which are thoughts*' (AT IV.604/CSMK III.307, emphasis added). These considerations can help us make sense of what can be seen as an ambivalent position by Descartes, namely, that while language is distrusted insofar as it belongs to the public sphere of perception, it is also elevated as the manifestation of the immaterial mind. The versatility of reason is subjected to a limited medium that needs to be used *methodically*. Descartes cautions against the focus on ordinary words rather than the things that they are meant to signify and, in the *Principles*, he identifies this as the 'fourth cause of error' concerning the judgments that we make about objects of sensory perception (AT VIIIA.37-8/CSM I.220). Clarke makes this point with clarity: 'human language is fundamentally compromised by the lack of the clarity and distinctness of the senses. The unique path to scientific knowledge (…) requires the purification or turning away from the senses that is recommended in the Meditations' (2003: 159).

23. To this effect, this idea can be inscribed in a long-standing tradition –stemming primarily from Augustine and present in the *Logic of Port-Royal* and in John of St. Thomas– that identifies that which is essential to human beings in the use and creation of signs (Biard 2015: 14; Lyons 2019: 14–38, cf. AT VI.56/CSM I.140). Rodis-Lewis also comes close to this point when discussing how Cartesian linguistic signs manifest the universality of reason (1990: 239).

(1) A common definition of natural signs at the time can help disentangle the issue: what makes a sign natural, as opposed to conventional, is the fact that it signifies *the same for all* (Q.2 Art.1/D.57). This is not the case of external signs. When Descartes presents external signs from the viewpoint of our perception of them, their correlations present a degree of changeability that would be undesirable in the case of natural signs. This is, after all, a simple point: I see a friend's tearful face and I interpret that they are sad. As in *any* instance of sensory perception, the sort of judgments that accompany it are relative to personal and cultural circumstances. In a circumscribed cultural context, tears can be an identifiable expression of joy. Descartes indicates that laughter can signify joy, but also nervousness and indignation (AT XI.421-2/CSM I.372), and he also considers that one can conceal or simulate external manifestations of the passions whose physiological causes are in the nerves and muscles (*ibid*. 412-13/368). Thus, external signs do not signify *the same for all* and are not natural in this stricter sense. While external signs could be considered natural only insofar as most processes of the underlying physiology of the human body are not dependent on the will, the interpretation of those signs is akin to the reading of words. Natural signs are *natural* in a stricter sense, then, because they are a piece of the very psycho-physical correspondences established by nature, unchangeable by human beings.[24]

(2) The previous point leads to Descartes' precedents for the use of signs in cognition. Two prominent distinctions between types of signs were common at the time: that between natural and conventional signs, and that between formal and instrumental signs.[25] Natural signs 'by their

24. Note that even if we shift our perspective to the naturalistic study of the passions, we observe that a single passion can be realized by a variety of physical processes and, in consequence, it can be manifested through a variety of external signs. For example, Descartes gives two different accounts of joy (AT XI.405, 409/CSM I.364, 366). This variability, if non-exceptional (that is, excluding cases such as hallucination and illusion), would be an undesirable feature of the psychophysical correlations that constitute the very process of sensory perception, for which natural signs are invoked.

25. The first division is found in Augustine's *De Doctrina Christiana* (*signa naturalia* and *signa data*, II.2), which, along with *De Dialectica*, was crucial for the development of the field of medieval semiotics (Meier-Oeser 2011). It is also present in the exhaustive classification of signs in Roger Bacon's *De Signis* as the primordial division out of which the rest emerge. The distinction outlives Descartes and is taken up by several renowned Cartesians: it appears in the *Logic of Port-Royal* (I Ch.4; II Ch.14) and in La Forge's *Traité de l'Esprit de l'Homme* (Ch.IV, 35–6). The distinction between instrumental and formal signs has been traced back to Giles of Rome (1243–1316) by Doyle (1984). Both classifications appear, notably, in the comprehensive and novel semiotics of John of Saint Thomas (contemporary of Descartes, also known as John Poinsot), in the Coimbra Commentaries, in Fonseca, Suárez, and Eustache of St. Paul (whose *Summa Philosophica* Descartes qualified as the 'best book of its kind ever made' (To Mersenne, AT III.232/CSMK III.156)).

very nature have the power to signify something' and thus 'signify the same thing for all' (Q.2 Art.1/D.57). A sign is conventional when its power to signify has been imposed externally. The second distinction captures a different aspect of semantic relations: some signs are known themselves as objects, while others are not. Instrumental signs are known as objects and, by their mediation, we also get to know what they signify. Words are signs of this type. Formal signs, instead, play a role in bringing about cognition and are not known as objects of experience: they produce knowledge by '*in-forming*' a cognitive power.[26] For the Late Scholastics, formal signs are the sensible species that enable the *terminus* of cognition (Q.2 Art.1/D.59). This function is reflected in Descartes' treatment: as perceivers, we get acquainted with conventional and external signs as objects, but we do not experience natural signs in this way. Natural signs are summoned by Descartes to fulfil a causal role in the very process of perceptual cognition and, in this respect, they are akin to formal signs. Finally, in combining the two distinctions (conventional vs. natural and instrumental vs. formal), treatments like the Conimbricenses' conclude that, given their function, formal signs cannot be conventional.[27] Then, all formal signs are, by definition, natural, since they are a piece of the very process of cognition and they present to the mind 'the same thing for all.' This common piece of terminology can be seen as the explanation behind Descartes' designations: what he calls signs 'instituted by nature' are not simply *any* signs established to some degree by facts about human nature (as, for example, external signs). Rather, they track the role of formal signs, which are natural in this stricter sense.

3. Natural Signs in Focus

Natural signs are related to the things they signify by natural convention: 'If words (…) are sufficient to make us think of things to which they bear no resemblance, why could not Nature also have established some sign which would make us have a sensation of light (...)?' (AT XI.4/G.4). Descartes' reasoning seems to work with a hidden premise, namely, that a human convention is an imperfect version of a convention established by Nature. Anything that human beings can do, Nature can do more perfectly. Here, Descartes equips

26. 'Everything by whose mediation we know something else must be itself first either known or not known to us. If it must be known, it is an instrumental sign; if not then it is formal. It is called formal because it causes knowledge by informing it' (Q.2 Art. 1/D.59).

27. See Behan (2000) for more detail on formal signs and the Conimbricenses' account.

the language analogy with a claim about the modal strength of relations instituted by nature. If human convention, being so counterfactually weak in a conventionalist model like Descartes', is able to influence our mind in such an effective manner, natural institution is all the more capable of bridging the gap between physical and mental states. Then, in the case of natural signs, the correlation between sign and *significatum* appears to be nomologically necessary. The analogy with language introduces, to begin with, the point that nature works by means of a more sophisticated linguistic scheme. Human language becomes analogous with a 'language of nature' (Rodis-Lewis 1990: 240): a language with its own signs, its own type of convention, and its own Creator.

But what does it mean that the connection between sign and *significatum* is necessary in this case? One could object that natural institution is in no way superior to human convention because both are recognised by Descartes as contingent. Certainly, he asserts on several occasions that specific correlations between physical and mental states could have been otherwise: 'God could have made the nature of man such that this particular motion in the brain indicated something else to the mind (…) the actual motion occurring in the brain, or in the foot' (AT VII.88/CSM II.60). Descartes' reason for concluding this is that because of the lack of similarity, there is no apparent intelligible connection in the correlations between physical and mental states, and that gives them an air of arbitrariness (*ibid*. 76/53; see Rozemond 1999: 455; Simmons 2020: 47). In this respect, natural signs seem to be on a par with the rest of signs, since one cannot infer *a priori*, upon the inspection of signs, the response that they will elicit in the mind. However, there is a sense in which brain states are correlated with mental states in a more robust way insofar as they are a product of natural institution instead of human will and, crucially, natural institution is identified in Descartes with an optimal divine order aimed at the preservation of the human being. The institution of nature, originating in God's creation via a principle of parsimony (AT XI.201/G.168) grounds correlations between physical and mental states that, in this sense, could not have been otherwise. Thus, these correlations are not metaphysically necessary, but they do exhibit nomological necessity. Following up on the idea of the 'language of nature,' it seems clear that, for Descartes, the agency behind the creation of natural signs is God's intentionality: that is, the intentionality of the omnipotent and benevolent Creator of the laws of nature, whose reliability is established categorically in the *Meditations*.[28]

28. For a helpful comparison regarding God's role, see how Descartes justifies the immutability of the two laws of motion (AT XI.43/G.28-9).

3.1. Two objections

First, it has been pointed out that summoning signs to act as causes at the body-mind junction is odd because, while causes do not depend for their operation on our recognition of them, signs do require that we acknowledge them for them to signify something (Gaukroger 2002: 207). The intuition behind this distinction is right: the very nature of signs entails that they signify something *for* a cognitive power. Still, this does not render signs and causes mutually exclusive notions. This objection ignores the role of formal signs in previous theories of cognition as well as the dominant understanding of signification at the time. Of course, smoke, as a sign of fire, is *not* also the cause of fire. This is not the Augustinian scheme that Descartes is familiar with, and it is not what he is proposing. What he is invoking is the traditional notion of sign as a cause of thoughts (Q.1 Art.1/D.39; Q.1 Art.1/D.59; *De Doctrina Christiana* II.1). Smoke signifies fire, and it does so *for* the mind by being the cause of the idea of fire. By analogy, Descartes is using a common relation of mental causation (words cause ideas of things) for handling intelligibly the causal step between brain and mind: a brain state is a sign *for* the mind by being the cause of the mind's own activity of forming sensory ideas.[29]

Second, even if it is only due to Descartes' own insistence and objectives, one should be wary of attributing to him a well-rooted Scholastic notion. But this should not be taken at face value. Descartes maintained Scholastic terminology as well as actual philosophical content. Furthermore, a treatment of signs outlived Descartes in Cartesianism, notably in the *Port-Royal Logic* and in Cordemoy's *Discours Physique de la Parole*, which, interestingly, restates closely the language analogy.[30] Most importantly, Descartes' main charge against a standard Aristotelian-Scholastic account of sensory perception concerns the similarity thesis accompanied by the doctrine of transmission of sensible species from the object to the perceiver's mind. In this respect, he departs from a purely Scholastic usage of semantic terms. Descartes' stance against the Scholastic theory of perception is not compromised by the introduction of signs precisely because he invokes them to deal with the dissimilarity between physical and mental

29. Recall Descartes' description in the *Principles*, where, after restating the case of words and the thoughts they 'excite', he phrases the activity of the mind as 'constructing within itself' (*in se efformat*) the ideas of objects (AT VIIIA.320-1/CSM I.284).

30. '[T]his strict union that only human institution is capable of establishing between certain exterior movements and our thoughts is (…) the most beautiful means to conceive what the union of the body and soul truly consists in. For if one understands that humans can by institution join certain movements to certain thoughts, it will not be difficult to understand that the Author of Nature, in making a human being, had united some of his soul's thoughts to some of his body's movements, so that the movements could not excited in his body without thoughts also being excited in his soul' (*Discours*, CG.210, my translation).

states. While the Conimbricenses identify the signs that bring about cognition with the sensible species transmitted from the object as a form without matter (Q.2 Arts.1,3/D.59,69), Descartes was careful to assign the role of signs instituted by nature to corporeal states accounted for naturalistically, and was emphatic about eliminating those obscure species 'flitting through the air' (AT VI.85/CSM I.154). In this sense, he made the necessary changes for the theory not to be Aristotelian-Scholastic in its most substantial aspect. Recall the passage of the *Optics* where Descartes retains the term 'images' for referring to brain states but urges the reader to think of them 'in an entirely different manner (*tout autrement*) from that of the philosophers' (AT VI.112/CSM I.165).[31]

4. The Linguistic Model

Having established a stable notion of sign as well as some features of the language analogy, it is time to address what Descartes accomplishes by making sensory perception analogous with language, and why this is a reading that we should ascribe to him. We have seen that it fulfils some basic Cartesian requirements: it makes clear that causation by contact is not imported to the mental domain, and it eliminates a transmission model in which *likenesses* of objects are transferred to the mind. Some commentators have pointed out how a language model becomes, for Descartes, a metaphysical paradigm to erode imagistic theories (Di Bella 2015: 438) and an effective way of dismantling the similarity policy[32] that underpins a standard Aristotelian-Scholastic doctrine (Wilson 1991: 296; Ben-Yami 2021).[33] Yet, interestingly, it does more than that. I elaborate here on the linguistic model in four explanatory advantages.

31. I address the issue of mental activity in the next section. See Rozemond (1999: 462–6) and Chignell (2009: 19) for a review of how Descartes sought to avoid a literal 'contemplation' account.

32. Regarding the point that a similarity thesis was common, but not ubiquitous amongst Scholastic theories, both Pasnau (1997) and Behan (2000) have traced the analogy between language and cognition to the work of William of Auvergne (~1180–1249). In his *De Anima*, language provides an example of signs that are dissimilar to what they signify and that function with regularity, just as the institution of nature is expected to do: '[T]he sign of heat that is in the intellective power is undoubtedly not a likeness of heat in the true and proper sense, just as you see in names and numbers and in the writing down of those things that have no likeness to those things of which they are the signs' (457).

33. Rodis-Lewis identifies the convergence of two issues in Descartes' theory of language: the invention and interpretation of signs as that which is exclusively human, and the continuance of such a scheme for expressing the correlation between quantitative and qualitative notions (1990: 239). Hatfield (2017) offers an interesting reading of the sign-relation as a device that Descartes employs in the process of mechanisation of sensory powers, namely colour perception, spatial perception, and natural geometry. I do find the choice of these three cases slightly problematic, since Descartes seems to invoke natural signs for *all* instances of perception given the dissimilarity between physical and mental states, and he does not draw a bifurcation between primary and

Conceptual integration

A linguistic model does a good job of integrating Descartes' diverse conceptual frames under a single notion *i.e.*, signs. Amongst commentators that have taken seriously Descartes' terminology at the brain-mind stage and have proposed different models of interaction, Wilson notes that a 'presentation model' is the most pervasive (1991: 306). In it, the brain isomorph is literally presented to the mind for recognition (AT VII.75/CSM II.52; XI.353/I.340). Similarly, Nadler (1994) reads Descartes as an exponent of occasional causation, a relation by which, in accordance with the laws of Nature, brain states give occasion to the mind to immanently cause its own ideas (AT XI.144; AT VIIIB.359/CSM I. 304). In both readings, signs are subsumed as an incidental occurrence that fits with the general model. I claim, however, that the scheme is the other way around: the notion of sign does the work of unlocking the activities of brain and mind. In a model in which brain states are natural signs, it is possible to encompass 'presentation' and 'occasion' talk, as well as other expressions, in a picture of a more organic unity. Signs integrate, by their very nature, dissimilarity in relation with ideas (signs signify via dissimilarity and not *in spite of it*), and they carry within them a double relation. At once, as accurate testimonies of external objects, signs signify ideas of those objects, and they do so *for* the mind. Signs 'exhibit' a version of objects for the mind's consideration, and thus they 'give occasion to' and 'excite' the immanent causal activity of the mind.[34] For further contextual support, note that, while other models might have tenuous precedents, Scholastic treatments of signs include this two-fold character of signs. The sign has two 'dispositions' –one to the object that it signifies, and the other to the cognitive power to which it presents something (Q.1 Art.1/D.41). One disposition is 'significative' (a sign, by its nature, signifies something other than itself) and the other is 'representative' (it makes something present to a cognitive power, and it causes ideas). This duality appears in Descartes: 'It is our mind that *represents to us* (*qui nous represente*) the idea of light each time the action *that signifies it* (*qui la signifie*) touches our eye' (AT XI.4/G.4, emphases added; cf. AT VIIIB.360-1/CSM I.305; AT XI 399-400).[35]

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secondary qualities in this way (see Simmons 2003; Nadal 2019). Simmons (2020: 47–8) has briefly considered how Descartes turns to the natural sign relation as *one* of the explanatory substitutes for resemblance in the theory of sensory perception.

34. This type of causal activity mirrors the way in which the Conimbricenses formulate the function of signs in respect to a cognitive power as one of 'influencing' and 'arousing awareness': '[A] sign is said to be that which (…) is the cause of a knower's being carried by its influence to the knowledge of something else' (Q.1 Art.1/D.39). 'A sign is what is put in the place of a thing and arouses awareness (*notitiam affert*) of that thing' (*ibid.*).

35. It is reasonable to favour a model that mirrors a common pre-existing scheme for understanding signs in cognition. Note the double aspect also in the *Passions* : 'Ce qui fait une impression

Mental activity

The above remarks lead to the main advantage of my reading, namely, that it tells us something about the kind of mental activity involved in sensory perception. Motivated by a problem of dissimilarity, Descartes strongly suggests that the mind *does something* with the isomorph of the external object.[36] Terminology of mental activity dominates the texts: as a result of brain states being present, the mind 'conceives' (*concevoir*, AT XI.5/G.5), 'constructs in itself' (*in se efformat*, AT VIII.321/CSM I.285), 'perceives' (*apercevoir*, AT VI.137/CSM I.170), 'recognises' (*connoître*, AT XI.360/CSM I.344), 'represents to itself' (*sibi exhibere*, AT VIII.359/CSM I. 304), or 'attends' (*advertire*, AT V.162/CSMK III.344). The difficulty, of course, is that we are told very little about this act of mind (perhaps because we *cannot* know much about it). The mind's ability to react to the same brain states with the formation of the same ideas stems from its nature as united to the body (AT IV.604/CSMK.307; AT VIII.320/CSM I.284) and it constitutes a 'special mode of thinking' (*specialis modus cogitandi*, AT V.162/CSMK III.344). Though limited, this is the piece of knowledge that the language analogy offers, and it is one core difference with other proposed accounts. Via an analogy with our experience with other signs, we can grasp a mental act that fits the bill of sensory perception perfectly. After writing to Chanut that one should not be surprised that certain corporeal motions are connected with certain dissimilar thoughts, since that is a 'natural capacity' of the soul (AT IV.603/CSMK III.307), Descartes immediately adds the comparison with language for clarification: '*in the same way*, (*ainsi*) when we learn a language, we connect the letters (…) which are material things, with their meanings, which are thoughts, so that when we hear the same words, we conceive the same things' (*ibid.* 604/307 emphasis added). In the *Principles*, the claim that the nature of the mind is such that corporeal motions can stimulate it to have thoughts is explained with the case of language: 'For we see that spoken or written words excite (…) thoughts and emotions in our minds' (AT VIII.320/CSM I. 284). Descartes elaborates then on a comparison between the

dans le cerveau, laquelle étant instituée de la Nature pour *témoigner* cette bonne disposition (…) la *represente* à l'ame (…). [L]e sentiment qu'on nomme douleur (…) en sorte qu'étant *institué de la nature pour signifier à l'ame* le dommage que reçoit le corps par cette action (…) *il luy represente* (…) des maux…' (AT XI.399-400, emphases added).

36. Despite a popular conception of Descartes' theory as positing a passive mind, many interpreters have identified mental activity as a key feature of his views on perceptual cognition. The passivity reading has been challenged, amongst others, by Wilson (1991); Schmaltz (1997); Rozemond (1999); Vinci (2008); Chignell (2009); Machamer and McGuire (2009); and Wee (2014). In the *Comments* we find a clear instance of the need for the mind's activity due to the dissimilarity between mental representations and their mechanistic correspondences. The reconstruction of mental activity in Descartes' theory helps in interpreting a knotty textual issue that arises there *i.e.*, Descartes' avowal of the innateness of all ideas (AT VIIIB.359/CSM I.304).

different motions of a pen on a paper and the dissimilar thoughts they elicit. In the *Passions*, he explains the soul's power (*pouvoir*) as something that 'experience shows (…) in the case of language' ('*ainsi que l'experience fait voir aux paroles*' AT XI.369/CSM I.348). We have already seen that the analogy has a prominent place at the opening of the *Treatise on Light*, where Descartes hints at a particular type of mental awareness when noting that the mind conceives ideas 'often without paying attention to the sounds of the words' (AT XI.4/G.4). Language becomes a genuine model for sensory perception because it helps us grasp the mental act of decoding natural signs. 'Attending' to the brain and 'constructing' ideas is what we do in the familiar phenomenon of language. Surely, the processes are not identical insofar as natural signs cannot be direct objects of our awareness, but rather pieces in the larger operation of mind-body interaction of which we are not directly aware.[37] What matters to the language analogy, however, is that Descartes has identified an operation that the mind *can do*. It carries it out habitually with other types of signs (as the taxonomy of signs above attests), and therefore, the act can be considered part of the mind's natural equipment of abilities, even when the object of interpretation changes.

Note that the emphasis on what 'experience shows' in these passages conforms to the sensory investigation that Descartes recommends Elisabeth for matters concerning the union of mind and body (AT III.692/S.69).[38] On this note, Simmons (2017) has offered an illuminating analysis of the possibilities of the non-purely intellectual route for comprehending the substantial union, of which sensory perception is a product. She identifies two empirical sources for this knowledge: psychophysiology, exemplified by Descartes' study of corporeal states and the correlations between mind and brain; and reflective phenomenology, the 'careful description' of our experience of embodiment including the inner and the outer senses, imagination, and the passions (Simmons 2017: 22). The language analogy is a good fit in this picture: on the basis of the psychophysical institutions of nature, Descartes turns to inner experience to identify

37. Chignell (2009) employs contemporary terminology to explain this activity: the reading of neural patterns is a type of 'non-cognitive' awareness. In this way, one can also deal with objections regarding a traditional reading of the Cartesian mind as entirely transparent to itself while avoiding the positing of a subconscious. Chignell adds that it would be odd to claim that 'every part of every mental operation is transparently available to the mind,' and that it is not clear in the texts which parts of a mental operation a subject must cognitively be aware in order to count as available to the mind *per se*. He observes that Descartes relies on the non-cognitive awareness of the mind for other operations, so this is not an *ad hoc* case in his corpus. Examples include natural geometry in the *Optics*, the notion of habit, and even the inferences involved in reasoning and judgment. See also Vinci (2008), who reconstructs 'Descartes' special cognition doctrine' in a similar vein.

38. Cf. *Conversation with Burman*: 'This [mind-body interaction] is very difficult to explain; but here our experience (*experientia*) is sufficient, since it is so clear on this point that it just cannot be gainsaid. This is evident in the case of the passions, and so on' (AT V.163/CSMK III.346).

a mental act that that we commonly encounter as embodied beings, and he imports from outer experience traits of the institution of a familiar phenomenon (language) that we are generally unconcerned about. The picture that emerges is a consistent one: as established in section 2 above, signs do not only appear to make sense of this *one* aspect of the union, but they consistently mark the embodied mind in the texts. They are the recurring means to think about language, the passions, and sensory perception.

Use of analogy

This type of sensory investigation calls for an explanatory tool with the right naturalistic credentials, and analogy is a fitting candidate. A linguistic model has the advantage of including, at its core, a methodological device that Descartes considered essential for knowledge discovery. As a result, the connection between language and sensory perception can hardly be considered a figure of speech. Descartes employed analogies (*comparationes*, *similitudinem*) frequently and reflected on their nature and uses (AT II.367-8/CSMK III.122). He has a basic philosophy of analogy that places it both in the context of discovery and in the context of justification of theories.[39] Most importantly, Descartes introduces certain rules to generate proper analogies. This is relevant for my reading because it illuminates the point that analogy is, for Descartes, what confirms a claim in natural philosophy precisely by ensuring that it is free of the excesses of the imagination that he had diagnosed in other theories, eminently in those of the Scholastic tradition.[40] Language substitutes a system of 'obscure' notions with an analogy between the features of a familiar act of mind and the larger operation of mind-body interaction. In this sense, the use of the language analogy for sensory perception shares a crucial aim with his general understanding of analogy. He writes about the problem of Scholastic analogies to Morin, identifying, for instance, dis-analogies between elements of different ontological classes (AT II.367-8/CSMK III.122). Cartesian analogy can be seen as a rationalist tool to counter the ontologically loaded empiricism that he had identified in Scholastic theories, including sensory perception accounts.[41]

39. The analogical treatment of the transmission of light in Chapter 14 of the *Treatise* (AT XI.98-103/G.62-67) constitutes a prominent example of how he considered analogies 'methodologically normative' (Statile 1999: 220) and connected to scientific truth. For a reading of Descartes' analogies as scientific models in the contemporary sense, see Rodis-Lewis (1978).

40. Such excesses were also identified by Descartes in other medieval authors, notably in Ramon Llull, whose *Ars Brevis* he considered 'sophistries' (AT II.629/CSMK III.142).

41. Paired with Descartes' well-known charges of obscurity, this attitude is in line with the methodological shift at the turn of the seventeenth century where, amongst others, Bacon

Explanatory depth

Finally, I add here my take on an advantage that has been reconstructed by Chignell (2009). He claims that a linguistic model adds a further layer of explanation to the causal description of sensory perception, and that this is a desirable feature in the Cartesian account (*ibid.* 14-7). All causation models that one might attribute to Descartes include a final recourse to divine will. God is the source of the institution of nature, regardless of whether that involves natural signs, occasional causes, or even Humean-style constant conjunctions between physical and mental states. However, conceiving of corporeal states as natural signs that the mind interprets provides a causal scheme with superior naturalistic credentials, and this is something that a rationalist natural philosopher like Descartes would have considered theoretically virtuous. Throughout the paper we have taken notice of Descartes' efforts to find a suitable causal candidate to accommodate key aspects of sensory perception, and it is not odd to see those efforts as an attempt to postpone an appeal to God's ordination that, if premature, would diminish the explanatory power of the theory. The aim, then, is to produce explanations that are grounded as much as possible in the powers of human brains and minds. To this effect, Chignell has identified in Descartes a methodological policy that he dubs 'Qualified Explanatory Naturalism' *i.e.*, the policy of not resorting to supernaturalistic explanations until naturalistic ones have been exhausted (2009: 16).[42] A linguistic model is on a par with natural institutionalism readings broadly conceived in one key respect: they both rely on an act of divine creation that establishes nomologically necessary correspondences between physical and mental states. Yet the sole appeal to psychophysical laws still has an air of brute associationism because it does not tell us much about the type of relation that makes the mind react to brain states and the act of mind that this involves. As we have seen above, the analogy with language supplies precisely this: a grasp of a recognisable mental act of interpretation. Chignell expresses it as thus: 'in virtue of its created nature [the mind] possesses the capacity to attend to [brain states] and 'read' them as significant' (2009: 15). This ability of the mind, then, adds a layer of explanatory depth to the model.

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was championing the use of analogy in science as an antidote for an uncontrolled imagination (Park 1984).

42. Note that 'naturalism' here is the counterpart of 'supernaturalism' and not of 'immaterialism.' The mind is an immaterial substance and a feature of the *whole* of the natural world insofar as it is united to the body constituting the human being. Chignell considers further evidence of this policy in the *Meditations*, for example, in the method of elimination of naturalistic causes of the idea of God before establishing *him* as the cause (2017: 16).

Concluding remarks

A linguistic model is not problem-free. There remain issues that are difficult to determine, and for which I do not think we can find an answer in Descartes. How does this interpreting activity work, and how are mental states endowed with the type of meaning that the mind responds to? And, why are given correspondences between signs and ideas the case, and not others? Admittedly, though, these questions appear for Cartesian interactionism *tout court*. These sorts of omissions might as well be philosophical weaknesses on Descartes' part but, given his views on knowledge of the union of mind and body, they signal at the same time a genuine epistemic limit (AT III.666-8/S.65-6). Regardless of the nature of these limitations, modelling perception on language allows Descartes to explore a productive causal alternative for the relation between brain and mind. A linguistic model is philosophically fruitful: it identifies a familiar mental act that can be imported to the explanation of sensory perception. It integrates key aspects of the Cartesian system, and it is centred around a notion used with consistency for describing the mind-body union. The reading also looks at Descartes' account in light of the common understanding of signs as causes of thoughts and describes his specific use of a well-established conceptual system. What comes into view is a reading that helps us understand how Descartes conceived of sensory perception and that reinstates the importance of the notion of sign in his philosophy. For Descartes, the pages of the book of Nature are, indeed, filled with signs for the mind.

Acknowledgements

I am grateful to Han Thomas Adriaenssen, Martin Lenz, Lodi Nauta, Alison Simmons and Fiorella Tomassini for their comments on earlier versions of this paper. Thank you to the anonymous reviewers of the *Journal of Modern Philosophy* for their valuable reports.

Competing Interests

The author has no competing interests to declare.

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Submitted: 07 December 2022 **Accepted:** 28 March 2024 **Published:** 13 May 2024