

ENTRIES

ABSTRACTION VERSUS EXCLUSION

The distinction between the mental operations of abstraction and exclusion plays an important part in Descartes’ philosophical methodology. He does not give an explicit account of this distinction in any of his published works, though he does explain it in a letter to **Gibieuf** of January 19, 1642 (AT III 474, CSMK 201), and he touches on it in a letter to **Mesland** of May 2, 1644 (AT IV 129, CSMK 236).

In the case of abstraction, we focus our attention on *one* **idea**, while turning our attention away from the contents of a richer idea of which it is a part. For example, we focus our attention on the **shape** of some object, while turning our attention away from the **extension** of the object. We can tell that this operation is an abstraction from the fact that we can focus our attention on the shape without paying any attention to the extension, though we cannot without absurdity *deny* that the shape has that extension or that the extension has that shape. In the case of exclusion, by contrast, we focus our attention on *two* ideas, and *deny* the one of the other. We can focus our attention, for example, on the **thought** and extension of some **human being**, and deny that the thought is extended and that the extension is thought. We can tell that this operation is an act of exclusion by the fact that we can deny the one of the other without absurdity. Descartes sometimes calls exclusion “negation.”

For Descartes, the operation of exclusion is an indispensable instrument for determining the connections between ideas and the items they stand for. If we can mutually exclude the idea of an *F* and the idea of a *G*, then there is a real distinction between an *F* and a *G* in the sense that an *F* can exist independently of a *G*, and vice versa. If we cannot make this mutual exclusion, then there is only a modal distinction or a conceptual distinction between an *F* and a *G*, and the ideas of *F* and *G* can be distinguished only by an abstraction (see **distinction [real, modal, rational]**).

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The operation of exclusion plays a crucial part in Descartes' argument in the Sixth Meditation that he is really distinct from his **body** and can exist without it. He states, "I have a clear and distinct idea of myself, in so far as I am simply a thinking, non-extended thing" (AT VII 78, CSM II 54). He forms this idea, not by an abstraction from the richer idea of himself as a human being – that is, a thinking and extended thing – but by an exclusion from the idea of his own **mind**, for he can deny without absurdity that he is extended. If he had formed this idea by an abstraction, then the distinction between his thinking and his extension might be only a modal distinction or a conceptual distinction, but since he has formed this idea by an exclusion, the distinction between his thinking and his extension is a real distinction, and hence he can exist without his body. In the *Principles of Philosophy*, he formulates this argument explicitly in terms of exclusion (AT VIIIA 29, CSM I 213).

Whereas Descartes' *ability* to perform an exclusion is crucial to his argument for the real distinction between himself and his body, his *inability* to perform an exclusion is crucial for other important arguments in the *Meditations*, such as the argument for his **existence** (see *cogito ergo sum*), the argument for his being a thinking thing (see **thought**), and the argument for the existence of **God** (see **ontological argument**). Let us consider these arguments in turn.

In the First Meditation, Descartes resolves to suppose that all his former beliefs are false, and in the Second Meditation he tries to carry out this resolution where the belief, "I exist" is concerned, but he recognizes that he is not able to carry it out. He recognizes, in other words, that he cannot without absurdity *deny* that he now exists – that is, he cannot *exclude* existence from the idea of himself. He concludes, therefore, that he exists. He goes on to investigate what he (this "I") is, and, in accordance with his resolution, he rejects all the things he can without absurdity deny that he is, such as that he is a man or that he has a body, but he recognizes that he cannot without absurdity deny that he is now thinking. He cannot, in other words, *exclude* the **attribute** of thought from the idea of himself. He concludes, therefore, that he is a thinking thing.

In the Fifth Meditation, Descartes argues that, from the fact that he cannot think of God except as existing, it follows that existence is inseparable from God (AT VII 67, CSM II 46). He cannot think of God except as existing in the sense that he cannot without absurdity *deny* that God exists, since existence is part of God's **essence**. He cannot, in other words, exclude existence from the idea of God. He concludes, therefore, that God exists.

Whereas Descartes' argument that he is really distinct from his body can be called "an argument from *successful* exclusion," his arguments that he exists, that he is a thinking thing, and that God exists can be called "arguments from *failed* exclusion." Moreover, just as an argument from successful exclusion gives us a real distinction, so an argument from failed exclusion gives us a modal distinction or a conceptual distinction.

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See also Attribute; Clarity and Distinctness; *Cogito Ergo Sum*; Distinction (Real, Modal, and Rational); Dualism; Extension; God; Ontological Argument; Thought

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ANALOGY

IN THE *Private Thoughts* (1619–22), Descartes stipulates that “man has **knowledge** of natural things only through their similarity [*per similitudinem*] to the things which come under the senses. Indeed, our estimate of how much **truth** a person has achieved in his philosophizing will increase the more he has been able to propose some similarity between what he is investigating and the things known by the senses” (AT X 218–19, CSM I 5; modified). By this measure, Descartes became a very accomplished philosopher, for in his published and unpublished work he frequently uses analogies between what comes “under the senses” and “natural things.” Specifically, Descartes’ analogies identify similarities between the effects of observable phenomena and processes, whose **causes** we know, and natural effects, whose causes we do not know. By way of his analogies, Descartes discovers or makes plausible the existence of specific unobservable natural causes and thereby provides a causal **explanation in physics**.

Although analogical reasoning is just one component of Descartes’ scientific **method**, which may be characterized as a version of hypothetical deduction minus careful confirmation (see Clarke 1982, Sakelleriadis 1982, and McMullin 2008 and 2009), it is with his analogies that Descartes bridges the gap between the world of experience and the moving and colliding particles at the microscopic level that ultimately explain the effects we observe. Yet Descartes rarely used the Latin term from which our “analogy” derives, let alone its French cognate *analogie* (cf. AT XI 158; see Galison 1984). The analogies from the *Dioptrics* (1637) that I discuss here are “comparisons” (*comparaisons*), and those from the *Meteors* (1637) are instances

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of reasoning by “example and similarity” (*exemplum & similitudinem*) (AT VI 83 and I 422, respectively). In the *Principles* (1644), analogies are typically “comparisons” (*comparationes*) or efforts to “compare” (*consero/comparo*) (e.g., AT VIIIA 87 and 110, respectively). In the famous Rule 8 from the *Rules for the Direction of the Mind* (1620s), Descartes’ method does not involve seeking “analogies” but advises us to “enumerate all the other natural powers so that, by means of knowledge of some other one, [we] might come to understand [the action of **light**]..., at least by imitation [*imitationem*]” (AT X 395, CSM I 29).

Descartes’ first public expression of his scientific views in 1637 gives analogies a prominent role in physics that would resurface in parts II and III of the *Principles*. When discussing light in the *Dioptrics*, for example, Descartes likens visual **sensation** to the sensory experience of blind men who “see with their hands” in order to make plausible his hypothesis that light is “nothing other than a certain movement, or very rapid and lively action, which passes to our eyes through the medium of the air and other transparent bodies.” He goes on in the *Dioptrics* to analogize light’s propagation to the movement of fermenting wine within a vat, which helps us understand instantaneous propagation in all directions, and to tennis balls ricocheting off a surface or breaking through a sheet, which makes plausible a materialist account of light’s reflection and refraction (AT VI 83ff., CSM I 153–64). In the *Meteors*, Descartes even uses an analogy between a raindrop and a round “flask” filled with water in order to facilitate his optical experiments (AT VI 325).

One of Descartes readers, **Jean-Baptiste Morin**, recognized Descartes’ reliance on analogies in the *Discourse* and its companion essays, and in 1638 Morin challenged his use of them (AT II 291 and 297). In response, Descartes concedes that he had used analogies to answer difficult questions in physics but then offers a strong defense of this strategy:

True, the comparisons [*comparaisons*] that are usually employed in the Schools explain intellectual matters by means of physical ones, **substances** by means of accidents, or at any rate, one quality by means of a quality of a different kind, and they are not very instructive. But in the comparisons [*pource qu’en celles*] which I employ, I compare **motions** only with other motions, or **shapes** with other shapes; that is, I compare things that are too small to be perceived by the senses with other things that can be so perceived, the latter differing from the former simply as a large circle differs from a small one. I maintain, therefore, that comparisons of this sort are the most appropriate means available to the human mind for laying bare the truth in problems of physics. I would go so far as to say that, when someone makes an assertion concerning **nature** which cannot be explained by any such comparison [*qui ne peut ester expliquée par aucune telle comparaison*], I think I have demonstrative knowledge that the point is false. (AT II 367–68, CSMK 122; modified)

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Setting aside the veracity of Descartes' charge against the "Schools," he is making two noteworthy claims about his analogies in this passage. First, he is insisting that his analogies provide sufficient evidence for making a causal claim. More specifically, they are informative and relevant because they are confined to the same ontological category. But what is unstated in the letter to Morin, just as it was unstated in the *Discourse's* companion essays, is Descartes' ontology and his conception of matter as **extension**. It is because matter is just extension that Descartes is so confident his analogies will not mislead us. In particular, worries that inferences to unobserved causes will involve false generalizations – including generalizations about the scope of the **laws of nature** – can be ignored because we are simply comparing one instance of extension with another, which is not unlike comparing "a large circle ... [to] a small one."

Second, Descartes insists that analogies are also *necessary* in physics. Lacking an analogy of the sort he advocates, Descartes believes that we have a definitive reason to reject any proposed causal explanation – that is, the cited cause is either nonexistent or outside of nature. This suggestion is especially unacceptable to Morin, whose deep disagreement is evident in his next letter to Descartes (AT II 411). But what Morin never came to understand is that Descartes' view is not, simply, where there is a cause, there will be an analogy. Rather, Descartes' view is that where there is just extension, there will always be an analogy to aid in the discovery of an unknown cause or to show the plausibility of a given cause.

Descartes would go on to make this last point again in the *Principles*, but his ontology would be more explicit:

I ... acknowledge that I recognize no matter in corporeal things apart from that which the geometers call quantity ... i.e. that to which every kind of division, shape and motion is applicable. Moreover, my consideration of such matter involves absolutely nothing apart from these divisions, shapes and motions.... And since all natural phenomena can be explained in this way ... I do not think that any other principles are either admissible or desirable in physics. (AT VIIIA 78–79, CSM I 247)

If something is entirely unlike shape, size or motion, it will not enter into Descartes' physics. Whereas Morin, like the Scholastics, accepts a plurality of ontological categories and even occult qualities, Descartes does not. For Descartes, explanations without possible analogs elsewhere in nature run afoul of an immediate consequence of the **metaphysics** that is the foundation of his physics.

In the years after his death, Descartes' analogies were ridiculed as instances of his worst "speculative" inclinations and therefore wholly without merit when observation and experimental science became the benchmark of science. Advances in microscopy alone were enough to undermine the particular claims Descartes had

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used his analogies to support. To Descartes' early detractors, his analogies typified everything that was wrong with the Cartesian research program in science, which was portrayed as constrained only by the limits of Descartes' imagination and bolstered by his deluded faith that he saw clearly and distinctly into how nature functions (see Lauden 1966 and especially Anstey 2005). But as imaginative and implausible as Descartes' analogies often are, in truth they are just one part of a metaphysical physics where the identity of extension and matter serves to constrain admissible truths and practices.

The role of metaphysics in Descartes' use of analogy might suggest that we should take a negative view of Descartes' analogies, but our final judgment of the role he assigned to analogies should not be entirely negative. The epistemic virtues of unity and simplicity touted by philosophers and scientists today support Descartes' belief that lacking an analogy between a proposed cause and other causes in nature requires a choice of endorsing the existence of the new cause or maintaining the ideals of unity and simplicity. If we are willing to allow these ideals to go proxy for Descartes' metaphysics, though Descartes himself seems to have done just the opposite, we can see that science has remained deeply Cartesian. And even if Descartes proved willing to judge in favor of these ideals to the point of stifling research into natural causes, his use of analogy, though not his specific analogies, is both well conceived and defensible (see Manning 2012, Statile 1999).

See also Cause; Explanation; Law of Nature; Metaphysics; Method; Morin, Jean-Baptiste; Nature; Optics; Physics; Sensation

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ANALYSIS VERSUS SYNTHESIS

In Second Replies, Descartes draws a distinction between two **methods** of demonstration: analysis and synthesis. He nowhere offers a formal **definition** or account of the two methods, but he does make claims throughout his corpus, but especially in the Second Replies, that provide important clues as to the details of their nature. For example, he identifies analysis as a method of instruction, and he says that indeed it “is the best and truest method of instruction” and is the method that he employs in the *Meditations*. He says that synthesis “is very suitable to deploy in **geometry**” (AT VII 156, CSM II 111) and that it characteristically involves the presentation of a series of definitions, postulates, axioms, and theorems that together form a deductive chain of reasoning that forces even the most stubborn of **minds** to affirm its conclusion (AT VII 156, CSM II 110–11) (see **deduction**). He makes additional claims as well: that analysis is a version of a method that was highly regarded in ancient geometry; that it helps us to have clear and distinct **perceptions** of the primary notions of **metaphysics**; and that it is a method of discovery (AT VII 155–57, CSM II 110–12). He says that synthesis and analysis are complementary methods but one difference is that a successful analytic demonstration does not compel our assent (AT VII 156, CSM II 110–11).

Descartes draws a further distinction between the *method* of demonstration and the *order* of demonstration. Both analysis and synthesis must employ the proper order: claims that are put forward initially cannot depend for their support on claims that come later, and claims that are derived thereafter must depend solely on claims that have already been established (Gueroult 1984, 1:8–11). Descartes emphasizes that in the *Meditations* he tried to adhere to this order: in the First Meditation he refrains from affirming claims that are dubitable, and

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when he does finally stand behind metaphysical principles, they are either primary notions that are known through themselves or the conclusions of arguments whose premises comprised such notions (AT VII 155, CSM II 110). Any method must adhere to the proper order, and so it is in other respects that analysis and synthesis diverge.

Descartes says that synthesis is very suitable to employ in geometry. We might attempt to prove, for example, that when two parallel lines intersect with a third line, the resulting internal angles add to 180 degrees. The assent-compelling proof would include among its premises the definition that a straight line has 180 degrees and the axiom that when two parallel lines intersect, opposite angles are equal. Descartes' stated preference is not to use the synthetic method in demonstrating metaphysical results, although he relents when the authors of the Second Objections suggest that the results of the *Meditations* would be more conspicuous if presented *more geometrico* (AT VII 155, CSM II 110; AT VII 128, CSM II 92). In the **Geometrical Exposition**, appended to the Second Replies, Descartes lays out definitions and axioms and then uses them as premises in syllogistic arguments for the **existence of God**, the existence of the heavens and earth, and the real distinction between mind and **body** (AT VII 166–70, CSM II 117–20). He also appears to employ a hybrid version of synthesis (and analysis) in *Principles of Philosophy* (Garber and Cohen 2000, 52–63).

One reason Descartes does not like to use synthetic demonstrations to establish metaphysical results is that he thinks that the definitions and axioms of metaphysics are too difficult for most untutored intellects to fully apprehend. Axioms about parallel lines and the lines that intersect them are fairly intuitive, and they accord very well with everyday sensory experience, but “in metaphysics by contrast there is nothing which causes so much difficulty as making our perception of the primary notions clear and distinct” (AT VII 157, CSM II 111). A metaphysician certainly could produce arguments for metaphysical results – like that God exists, or that bodies exist, or that mind and body are really distinct – but these arguments would be of little help to us if we did not understand their premises (Curley 1986, 154; Hatfield 1986, 71). Accordingly, a component of Descartes' analytic method is to help us to recognize the **truth** of metaphysical premises that upon reflection are obvious, even if they appear to be controversial or false at first glance (AT VII 156–57, CSM II 111). The primary notions of metaphysics include that nothing comes from nothing, that it is impossible for the same thing to be and not be at the same time, that what is done cannot be undone, that he who thinks cannot but exist while he thinks (AT VIIIA 23–24, CSM I 209; AT VII 145–46, CSM II 104) (see **common notion**). The primary notions also include results that might appear to be more derivative but that (Descartes argues) are obvious to a mind that has reflected sufficiently (AT VII 69, CSM II 47). Primary notions are not

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known through the senses, but they are known, and they are demonstrated. What is curious is how exactly an analytic demonstration is supposed to be structured if its conclusion is a truth but, unlike the conclusion of a synthetic demonstration, is not a matter of “the proper deduction of the consequences” (AT VII 157, CSM II 111) and “is not contained in what has gone before” (AT VII 156, CSM II 111). Presumably we would want there to be that kind of connection between a demonstration’s conclusion and its premises, but if a primary notion were demonstrated in that way, then its demonstration would not be analytic (Gaukroger 1989, 85–88). For Descartes, a primary notion appears to be primary or fundamental in the sense that it is not contained in anything else and does not follow from anything else (AT VII 140, 145–46; CSM II 100, 104), and so a synthetic demonstration of a primary notion is ruled out from the start. An analytic demonstration is a carefully selected set of claims, a consideration of which happens to facilitate – without irresistibly compelling – our recognition of a primary notion’s primitiveness and self-evidence (Hatfield 1986, 65, 69–71). Once we do recognize the truth of a primary notion, we can then use it as a premise in a synthetic demonstration, but we would have little chance of following the demonstration if it was presented to us cold and in isolation.

As we have seen, Descartes regards analysis as a method of instruction, and he uses it to help us to recognize the necessity of metaphysical claims that we might otherwise reject as false. We reject these, Descartes thinks, because we are in the **habit** of affirming entrenched philosophical **prejudices** that oppose them (Nolan 2005); if we appreciate the relative perspicuity of the primary notions of metaphysics and the truths that they entail, and if we develop the opposite habit of allowing these notions to guide our thinking instead, our prejudices will be neutralized (AT VII 157, CSM II 111; AT VIIIA 38, CSM I 221; Cunning 2010, ch. 1). Descartes tells **Arnauld** that the analytic method is in part a matter of advancing claims that are false and reevaluating and refuting them later (AT VII 249, CSM II 173). Commentators have attempted to arrive at a general characterization of Descartes’ analytic method by appealing to all of the different claims that he makes about it and then looking for instances in which the method (so described) is at work in the *Meditations*. Curley (1986, 157–62) argues that the method is a matter of leading the meditator to explore and unpack his confused concepts and, by exposing their inherent problems, to clarify them and then see the truth for himself. Curley points out the important connection here between analysis and Socratic dialectic: the First Meditation appears to be cast as an imaginary debate that exposes the problems inherent in a commonsense representation of reality and points the way to a representation that is sustainable. Hatfield (1986, 45–48) argues that the method is a matter of making us have first-person experiences that increase the likelihood that we will recognize that intellectual perception is a better guide to truth than sensory perception and then

recognize the truth of particular intellectual notions. Garber (1986, 91–97) argues that the method is a matter of employing heuristic devices that neutralize prephilosophical commitments as they interfere with our ability to register the proper foundations of science.

One such instance of pedagogical intervention occurs in the **wax** digression at the end of the Second Meditation. Descartes' meditator has just arrived at the result that there is something about which we are indubitably certain, and something that "is necessarily true whenever it is put forward by me or conceived in my mind" (AT VII 25, CSM II 17). If the meditator entered the *Meditations* with the view that what is known best is known through the senses (Garber 1986, 99–101), or the view that the only things that are real and substantial are sensible objects – and Descartes thinks that the prephilosophical mind is likely to harbor both of these prejudices (AT VIIIA 35–37, CSM I 218–20) – he will wonder if he can really be certain of the real existence of anything nonsensible (AT VII 29–30, CSM II 20). Descartes offers the wax discussion to help the meditator to see that there is an insensible component to bodies and that we know it better than we know qualities like color and taste and smell (AT VII 30–32, CSM II 20–22; Curley 1986, 158–59). Descartes asks the meditator to consider a piece of wax that has such qualities, but of course bodies do not literally have them, at least not in the way that most readers would imagine (AT XI 31–36, CSM I 90–92). This thought experiment helps us to appreciate that our purely intellectual and nonsensible **thought** is real and that its existence is indubitable (Cunning 2010, ch. 3).

A similar pedagogical move is at work in Descartes' introduction of hyperbolic **doubt** at the start of the *Meditations*. In the First Meditation, the meditator entertains claims that contradict necessary truths. These claims include that it is possible that God does not exist and that our minds were produced by a nondivine **cause**; that it is possible that God is a deceiver and has created us with minds that are defective; and that it is possible that there exists an evil demon who makes us think that things are true when they are in fact false (AT VII 21–23, CSM II 14–15). All of these claims conflict with the necessary truth that God exists and would not allow us to be deceived on matters that are most evident to us. We recognize this to be a necessary truth upon reflection, and thus the claims that conflict with it are incoherent, but at the start of inquiry it is useful for us to entertain the claims so that we can recognize the truth of the wholly insensible result that "I am, I exist" at the start of the Second Meditation (AT VIIIB 60, CSMK 222; Curley 1986, 167). The hypotheses of the First Meditation are fictional, but Descartes has us consider them because they help motivate the kind of premise that is appropriate in a synthetic metaphysical argument (AT IV 64, CSMK 230). Descartes is happy to make use of confused concepts in the course of presenting and defending his metaphysics. If our concepts were intrinsically and irretrievably confused,