

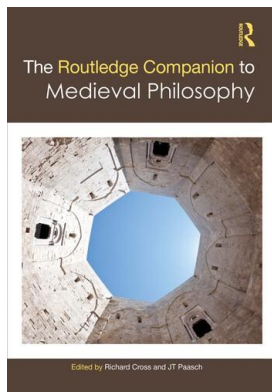
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Richard Cross, JT Paasch

### Abstraction

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Simo Knuuttila

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# ABSTRACTION

*Simo Knuuttila*

In this chapter, I shall address the role of abstraction in the medieval theories of acquiring concepts from experience. After some introductory remarks on the medieval discussion of universals, I describe in the section “Illumination vs. Abstraction” the non-abstractive accounts of concept acquisition through divine illumination and influence from higher separate intellects. The section “Abstraction in Early Medieval Philosophy” deals with the Aristotelian ideas of abstraction as idealization and selective attention in early medieval thought, and the section “Abstraction in Thirteenth-Century Aristotelianism” with the notion of abstraction in the speculative psychology of thirteenth-century Aristotelians. Finally, a very different approach to abstraction in late medieval nominalism is discussed in the last section.

### Universals

The medieval theories of universals are often mentioned in general works on the history of philosophy, usually with a reference to the distinction between universals *ante rem*, *in re*, and *post rem* (before things, in things, and after things). This late ancient classification was known in Latin philosophy since the twelfth century. The main example of universals *ante rem* was Plato’s theory of immaterial forms or ideas: things in the world are imitations of the ideal archetypes located in the higher sphere of reality outside of space and time. Referring to the realm of ideas, Plato could explain the unchanging structures of the changing world, the univocal meaning of universal terms of language, and the possibility of invariant knowledge about reality. While medieval thinkers did not accept Plato’s approach to the otherwise much discussed themes just mentioned, they endorsed the theological doctrine of ideas as divine thoughts developed by some ancient Platonists and embraced by Patristic thinkers such as Augustine. The question of universals *in re* was addressed in extensive discussions of whether the ingredients of the created world included universal entities that were simultaneously, essentially, and as a whole present in many individuals as common natures, whether ontologically distinct from the instantiating particulars with “less than numerical identity,” as in Duns Scotus, or without an ontological unity of their own outside the individuated particulars, as in Thomas Aquinas. Universals *post rem* were universal concepts of the intellect. Aquinas preferred the latter view to the theory of universals *in re*, but he held that the concepts are based on abstracted intelligible forms which are formally the same as the individuated forms in singular things. The theories of concept formation in Aquinas and other Aristotelians from the second half of the thirteenth century form the main context for medieval considerations on abstraction. William Ockham and his followers, who came to be called nominalists, thought

that there was no such metaphysical network between concepts and things in the world, the universal concepts being mental representations of sufficiently similar things first recognized by sensory powers and intuitive knowledge (see de Libera 1996; Panaccio 2012).

### **Illumination vs. Abstraction**

The Augustinian view of divine illumination, the Arabic theories of separate intellects, and the more naturalist epistemology of the rising Aristotelianism were the parties of the thirteenth-century controversies about intellection and concept formation. Augustine associated the view of divine ideas with an illumination theory of concept formation. The continuous illumination of human intellect did not make it grasp the ideas themselves, but it helped humans to understand the essence and nature of things which they could in a preliminary way conceptualize by means of their perceptual and cognitive powers. The better understanding took place “in a sort of incorporeal light” (*De Trinitate* XII.15.24). Various versions of this view were put forward by thirteenth-century thinkers such as Bonaventure and Henry of Ghent, who tried to combine it with Aristotelian views by treating the supernatural illumination as complementing the natural function of the intellect. Even Aquinas accommodated his Aristotelian theory with the doctrine of divine illumination, at least on a terminological level, by speaking about the illumination of phantasms through the active human intellect. The Latin discussions of external illumination were also influenced by the translations of the treatises on the soul by Avicenna and Averroes. Avicenna argued that humans were able to form particular representations of things and even partial abstractive generalizations through their external and internal senses, but in order to grasp the intelligible essences of things and to form universal concepts, these particular representations had to be illuminated by the spiritual light of the agent intelligence, which was a higher intellectual sphere as well as the formative power of particular things. Acquired universal concepts were habits of conjoining with the informing agent intelligence. Averroes taught that both the agent intellect and the receptive intellect were immaterial higher substances with which the human mind conjoined in forming universal concepts. It follows that individuals did not have full intellectual faculties of their own. Some Latin authors interpreted Avicenna’s view from an Augustinian perspective. Siger of Brabant followed Averroes, but monopsychism was heavily criticized and Siger gave up his Averroistic interpretation of intellectual powers (see Black 2010; Noone 2010; Marrone 2011; Pasnau 2011).

### **Abstraction in Early Medieval Philosophy**

Boethius, whose translations of Aristotle’s works and commentaries on them formed a great deal of the background of early medieval logic, was inclined to the *post rem* view of universals in his logical treatises, explaining that the universal aspect of particulars is their being understood in a universal way. If genera and species subsist in one way and are understood in another, one might think that universal concepts misrepresent the world. In his answer, Boethius refers to drawn geometrical figures about which the intellect can think by abstracting from their individual material features and understand the universal geometrical properties accordingly. This is related to Aristotle’s attempt to treat mathematical objects as the result of idealizing abstraction (*aphairesis*) by separating in thought what is inseparable in external things. Boethius also applied the conception of inductive abstraction in forming universal concepts by paying selective attention to what is common to different particulars and disregarding what distinguishes them. Boethius regards universal concepts formed through abstraction as intellectual constructions with a realist foundation. Understanding things by eliminating matter or attributes is to grasp their uniform aspects which, while not founded on separately existent entities in the external world, provide the correct basis

for universal concepts. Peter Abelard applied Boethian remarks on abstraction in his criticism of various realist theories of universals (genus and species) and in his philosophy of ontological particularism. In addressing the question of whether universal concepts have a foundation in external things, he argued that the individuals of the same species such as horses share the same status of being such, which is real but not a being. (See Spade 1994; Marenbon 1997, 2003; for Aristotelian abstraction in Alexander Aphrodisias to whom Boethius refers, see Helmig 2012.)

An influential abstractive conception of common nature was Avicenna's account of horseness itself: considered as separate from existence, it is neither one nor many and neither universal nor particular. In his treatise *On Being and Essence*, Aquinas explains that while this view holds of a nature or essence in its absoluteness, it exists as individuated in singulars and the minds that conceive of things in terms of this nature. Gyula Klima characterizes this as "the sameness of several, numerically distinct realizations of the same information-content," the content in itself being no entity (Klima 2013).

### Abstraction in Thirteenth-Century Aristotelianism

Thirteenth-century Aristotelians believed that in Aristotle's view, the human intellect understands its extra-mental proper object from a universal point of view without a commitment to extra-mental universals. The common nature was said to fall under the notion of universality only as understood.

Siger of Brabant, Aquinas's contemporary in Paris, writes: "Human being and stone are universals only in the sense that they are understood universally and as abstracted from individual matter, not in the sense that they would have external existence. Since human being, stone and other similar things are abstractly understood only in the soul, they as universals are in the soul—their abstract intellections are not found among things . . . Universals can be understood as being universal things in two ways, either as existing universally or as understood universally. Universals are not universal things in the first sense, that is, as existing universally among things, for in this case they would not be concepts of the soul, but they are universal things in the second sense, namely insofar as the things are understood universally and abstractly" (*De aeternitate mundi* III: 122, 127). Aquinas writes similarly: "For the intellect does not apprehend this: that a common nature exists without its individuating principles. Rather, it apprehends the common nature without apprehending the individuating principles . . . The result, then, is that universals, inasmuch as they are universals, exist only in the soul. But the natures to which the notion of universality applies exists in things" (*Sentencia libri De anima* II.12: 121–147, trans. Pasnau).

The Aristotelians of that time developed an elaborated theory of concept acquisition by means of abstraction, following Aristotle in explaining perception and intellection with the help of the general theory of active and passive potencies. This theoretical framework considerably influenced the details of their psychology of the faculties. Let us begin with sight. When one sees a white object, the passive potency of sight is actualized by the whiteness, and simultaneously the visibility of whiteness, that is, its power of being seen is actualized in the potency of sight. These formulations were associated with a further assumption which proved to be somewhat cumbersome to the proponents of this approach: Aristotle argued that the passive potency was actualized by an activator which was already such as that the actualized potency was coming to be (*Met.* IX.8, 1049b17–1050a3; *On Coming-to-be and Passing-away* I.7). Aristotle applied this view to the passive powers of perception and intellection as well (DA II.5, 418a3–5; *ibid.*: III.4, 429a13–18).

The assimilation of the content of a power to the corresponding aspect of its external activator is described in the first known Latin commentary on Aristotle's *De anima* as follows: "That which moves something from potentiality to actuality is actually such as that which it moves to actuality when it is actualized" (Anonymous, *Lectura in librum De anima*, III.2: 467). Aquinas similarly tells

that the visible object as the active power is already such as that the passive power will be when it is actualized: “All things that are in potentiality are affected and moved by what is active and actually existent; the agent, in other words, when it actualizes the things affected, makes them like itself. So, in a way, a thing is affected somehow by something that is like and in a way by something unlike, as has been said. For at the beginning, when it is being changed and affected, it is unlike. But at the end, when it has been changed and affected, it is like. So in this way even sense, after it has been actualized by a sense object, is like that object, whereas before it is not like it” (*Sententia libri De anima* II.10: 121–130, trans. Pasnau). In what follows, I mostly refer to Aquinas’s theory which he regarded as a contribution to Aristotelianism, the best philosophy of his time.

To begin with, one may wonder whether two things are confused here. It was assumed that the actuality of the intentional content of the sensory power is overlapping with the actualized perceptibility of the object. This likeness or in fact sameness in actualization seems to pertain to the actualities of powers after their having been changed and not to the initial activation of the sensory faculty by the external cause whose potency to be perceived is not actualized at this stage. This was not considered a problem, however, because of a further assumption in the potency model about the perceptible sensible form and the not-perceptible intelligible form of things. The likening of the faculty was understood in an Aristotelian way as a causal process which resulted in the patient faculty being made like the activating agent which was the sensible or intelligible form. The external activating agent was the object of the act which it caused in the faculty, its likening occurring in a form transferring way. (For Aristotle, see Charles 2000: 81–82.) The sameness of the form in a potentially perceived or understood object and the object-directed faculty of the soul was the basis for arguing that the activator is what the passive potency will become.

Aquinas explains the transfer of the visible form as follows. Before a color is seen, it causes a non-perceptible spiritual change in the medium by means of which the organ receives the visible form without matter (see *Summa theologiae* I.78.3; *Sententia libri De anima* II.24: 45–59 and II.26: 111–126; Tellkamp 1999). In this way, the perceptible form is brought into activating contact with the sense-power, the immediate contact between the mover and the moved being a central principle in Aristotelian natural philosophy. The result is that “the sense is made like its object as regards form, not as regards its material disposition” (*Sententia libri De anima* II.24: 74–75, trans. Pasnau).

There is an analogous application of the likening model to intellection in Aquinas, who compares the processes of perception and cognition as follows: “But since Aristotle did not assume that the forms of natural things subsist without matter, and since the forms which exist in matter are not actually intelligible, it followed that the natures or forms of sensible things which we understand are not actually intelligible. But a thing can be brought from potentiality to actuality only by some actual thing, as the sense becomes actual by what is actually sensible. Therefore it was necessary to posit an intellectual power which renders them actually intelligible by abstracting the species from material conditions. This is why it is necessary to posit the agent intellect” (*Summa theologiae* I.79.3; see also *Sententia libri De anima* III.1 (7): 323–328 and III.4 (10): 59–63, 106–115).

The proper object of the intellect is the intelligible form of particular things (*Sententia libri De anima* III.2 (8): 240–241). Just as visibility is an extra-mental property of the visible object, intelligibility is a property of the object of the intellect. The intelligibility of an object is rendered actually intelligible through the intelligible species which the agent intellect forms by shedding light on sensory phantasms and abstracting from their material and singular aspects. The passive possible intellect as the seat of intellection is then actualized by the intelligible species in the same way as the sensory power is actualized by the sensory form. (For the intelligible species, see Spruit 1994.)

Aquinas does not explain how the agent intellect illuminates the phantasms in the sensory soul. He only states that illumination makes them more suitable for the abstraction of intelligible species (*Summa theologiae* I.85.1, ad 4). Abstraction is described in terms of selective attention: “To abstract

the universal from the particular, or an intelligible species from phantasms, is to consider the nature of the species without considering the individual principles represented by the phantasms” (*Summa theologiae* I.85.1, ad 1; see also Pasnau 2007).

Sensible and intelligible forms which are present in the faculties of the soul are not the objects of their acts, but rather tools by which external things are sensed or understood. “The relation of intelligible species to the intellect is like that of sensible species to the sensory power. But a sensible species is not that which is sensed, but rather that by which the sensory power senses. Therefore, the intelligible species is not that which is actually understood, but that by which the intellect understands” (*Summa theologiae* I.85.2; see also *Sentencia libri De anima* III.2 (8): 264–274). While the abstracted form as such has no epistemic role apart from activating the possible intellect through the abstracted form, it was regarded important in arguing for a correspondence between the cognitive and sensory contents and the mind-independent objects. The Aristotelian foundation for this realism was found in the theory that the senses receive the sensory form of the object without matter (*DA* II.12, 424a17–24) and that substantial forms have two modes of existence, one as being actual in hylomorphic external things and another as being separately actual in the intellect (*DA* III.8, 431b28–30). Aquinas refers to the form in the soul as a similitude (*similitudo*) to what is understood or sensed (*Summa theologiae* I.85.2, ad 1). This similitude is explained as formal sameness. The same form which is a constituent of extra-mental things is in a different way present in the intellect: “The intelligible likeness through which a thing is understood in its substance must be of the same species or, rather, its species; as the form of the house which exists in the mind of the artisan is of the same species as the form of the house which exists in matter, or, rather, its species; for one is not going to understand what a donkey or a horse is through the species of a human” (*Summa contra gentiles*, III.49; for formal sameness, see Kretzmann 1993; Perler 2002; Klima 2004).

The cognitive and sensory powers of the potency model were taken to function in the service of the intentional attitudes of knowledge and perception, but the phenomenology of intentionality was hardly conceptualized in this context. Medieval thinkers made use of the terminology of metaphysical correspondence between objects and activating forms rather than between objects and the content of intentional attitudes (see Anonymous, *Quaestiones in libros Aristotelis De anima*, III.5: 311 and III.9: 321; Anonymous, *Quaestiones super Aristotelis librum De anima*, III.8: 481–482, 493; (Pseudo) Peter of Spain, *Expositio libri De anima*: 331–332). It was assumed that the formal sameness makes cognition metaphysically correct, bringing the world into the mind just as it formally is. How this would shed light on the intentional grasp of content was not explained, as noticed by Duns Scotus: “For the cognitive power must not only receive the species of the object, but also tend through its act toward the object. This second is more essential to the power since the first is required because of the imperfection of the power. And the object is the object because the power tends to it rather than because it impresses a species” (*Quaestiones super libros Metaphysicorum Aristotelis*, VII.14: 29).

Scotus distinguishes between the ontological theory of cognitive potencies and their actualization through abstracted species and the theory of intentionality which in his view is more relevant to understanding the role of sensory and cognitive faculties in human life. While Scotus’s predecessors did not develop any significant theory of the relationship between formal sameness and intentionality, there were some psychological considerations of how the presence of the abstracted species in the intellect is related to the act of intellection.

Aquinas thinks that when the reception of the form makes the possible intellect actual, the first act of understanding is to conceive the common nature in a universal way, i.e. without attending to the individuating factors. The universality of this act is derived from the abstracted activating species. This first stage is the kernel of understanding which is then developed further by simple definitions sufficient for using universal terms, which primarily signify concepts and through

them things in the world: “For in the first place there is the passion of the possible intellect as informed by the intelligible species, and then, being informed in this way, it forms a definition, or a division, or a composition, signified by a word. Wherefore the concept (*ratio*) signified by a name is a definition and an enunciation signifies the division or composition of the intellect. Words do not therefore signify the intelligible species themselves, but that which the intellect forms for itself for the purpose of judging of external things” (Thomas Aquinas, *Summa theologiae* I.85.2, ad 3). Aquinas says elsewhere (*De potentia* 8.1) that what the universal word signifies can also be called a concept (*conceptio*) or an intellectual word. A concept is not simply an act of the possible intellect produced by an abstracted species; it is associated with a more or less definite definition. The elementary grasp of the intelligible nature is normally correct, but the possibility to improve it shows that the automatic abstraction of intelligible species provides only limited intellectual information (*Summa theologiae* I.85.6).

Medieval thinkers usually assumed that the acquisition and use of concepts was associated with concrete sensory phantasms of things, regardless of how other aspects of cognitive activity were analyzed. According to Aquinas, turning to phantasms (*conversio ad phantasmata*) was required for any later use of formerly acquired concepts as well (*Summa theologiae* I.84.7). Intellectual representations were stored as habitual concepts in the intellectual memory of the possible intellect (*Summa theologiae* I.79.6), and the agent intellect could activate a habitual concept only through a species which it abstracted from phantasms. But turning to phantasms had also the function of showing that abstract concepts were about the nature of the things with which one was acquainted through sensory experience: “When our intellect considers the nature of things in a universal way, it abstracts the intelligible species from phantasms, but it understands them in the phantasms, for it cannot understand the things of which it abstracts the species without turning to the phantasms” (*Summa theologiae* I.85.1, ad 5). Aquinas says that the phantasms are “examples in which as it were one examines that which one desires to understand.” They show which kinds of things occur under the universal concept one has in mind (*Summa theologiae* I.84.7).

Apart from the psychology of concept acquisition, Aquinas dealt with abstraction in many other contexts. One of these was his discussion of Aristotle’s indirect proofs with impossible premises. Averroes argued that when Aristotle used an accidentally impossible proposition in an argument, it was supposed to be true “in so far as it is possible, not in so far as it is impossible.” For example, the impossible premise “There is a body larger than the heavens” is possible as such, as regards a body *qua* body, but accidentally impossible in relation to the universe. Averroes and Aquinas held that a combination is accidentally impossible if incompatible elements taken as such, without their particular conditions, would not exclude each other. Aquinas calls such combinations possibilities through abstraction, explaining that the possibilities of things can be evaluated from the point of view of their genus, species, or individuated nature. “For example, in speaking of animals I can state that it is contingent that every animal is winged, but if I descend to the consideration of human beings, it would be impossible for this animal to be winged” (*In octo libros Physicorum Aristotelis expositio* VII.2, n. 896). That all humans are winged is an accidental impossibility but an abstract possibility when humans are treated as animals, abstracting from their species nature (see Knuuttila and Kukkonen 2011).

### Nominalist Theories

In the ontological theory of William Ockham, there are in the world only individual beings from the categories of substance and quality. Some other features of reality may be real as well, but they are not beings. Ockham required such an additional factor in dealing with relations, for example, in answering the question of why the reference of universal mental concepts is not merely fictitious

when they are said to refer to individuals which are more similar to each other than other things. In explaining the acquisition of concepts, Ockham assumes that people are first acquainted with things through sensory acts. When an individual thing, say a human, is perceived, the attentive intellect produces an intuitive act about it. He calls this act a similitude, which seems to mean that it is specific with respect to the object. While the intuitive act includes an awareness of the existence of the object, an act of this type with abstraction from existence serves as a common concept that pertains to maximally similar things of this sort. By means of this concept, we conceive of each human indifferently. Ockham describes this process as follows: “First, a human is conceived by a particular sense, then the same human is conceived by the intellect, and due to that cognitive act a general notion common to all humans is acquired. This cognition is called a concept, intention, or passion, being the concept common to all humans. When this cognition is in the intellect, one immediately and without reasoning knows that a human is something” (*Summa logicae* III-2.29: 557). The universality of abstract concepts consists in their indifferent mode of representation in accordance with the ability of the intellect to recognize similarities. The concepts signify neither an abstracted common nature in the intellect nor any individualized or weakly existing nature in external things that the active intellect would abstract.

Ockham rejected the doctrine of intelligible species as a superfluous speculative postulation and also as a hindrance to direct realism in concept formation. The latter charge is not quite obvious, for according to Aquinas and Scotus, the species in the intellect was an activator of the power of understanding rather than its object. Ockham gave up the received model of active and passive intellect as well, regarding concepts as states in which the intellect can be. He developed a theory of mental language in which concepts as the acts of the intellect are mental signs having the basic semantic properties that words have in conventional languages. Simple mental terms signify naturally and uniformly in all minds because they result from universal causal processes; conventional universals of spoken and written language inherit their signification from mental language. Other fourteenth-century nominalists such as John Buridan did not follow Ockham’s refutation of sensory species and his suggestion that sensory objects directly activate a sense-power at a distance, but they followed Ockham’s theory of concept acquisition without abstracted species. And indeed, philosophical innovation continued beyond Ockham. For example, Buridan developed a general theory of meaning in intentional contexts, which Ockham had not done (see Panaccio 2004; Klima 2013; Schierbaum 2014).

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