

**Does Aristotle’s differentia presuppose the genus it differentiates?
The troublesome case of *Metaphysics* x 7**

Abstract

There seems to be an inconsistency at the heart of Aristotle’s *Metaphysics*: a differentia is said both to presuppose its genus (in vii 12) and to be logically independent from it (in x 7). I argue that the relation of analogy resolves this inconsistency, restores the coherence of the concepts of differentia and species, and gives x 7 its rightful place in the development of the *Metaphysics*.

Does Aristotle’s differentia presuppose the genus it differentiates?¹ As far as the *Metaphysics* is concerned, the answer seems to be in the affirmative.² As is well known, in vii 12, Aristotle unifies the different elements of a definition by arguing that each differentia presupposes the prior differentia, up to the initial genus. And this is generally believed his official position on the relationship between the differentia and the genus in the *Metaphysics*.³

¹ A differentia presupposes its genus if and only if it applies only to the members of that genus. I use the term ‘presuppose’ instead of ‘entail’, the term commonly favoured by commentators when discussing the relation between a differentia and its genus (e.g., Granger 1980 and n3 below; Barnes 2003, 348-350). I opt for ‘presuppose’ because the relation of entailment holds between propositions, while the relation of presupposition can be used for relations between terms or between the things to which these terms refer (cf. Searle 1953, 149-150). Since the differentia and the genus are predicables rather than propositions, ‘presuppose’ better suits the connection between them.

² I leave aside the treatment of this issue in the *Organon*, where the question of the relationship between differentia and genus was debated as early as Alexander of Aphrodisias (see Rashed 2007, 104-127). A *crux* is *Topics* vi 6.144b12-30, where Aristotle, having said that a differentia ‘brings in’ (ἐπιφέρει) its genus, seems to modify this rule. For a discussion of this passage and other evidence from the *Organon*, see Falcon 1996 and Schiaparelli 2023, 168-173. For a discussion of the relationship between differentia and genus in the *Organon* in general, see also Granger 1984, 1-13.

³ See Granger 1980, 46, ‘Now, in my judgment Aristotle continues to adhere to the entailment position [*sc.* the view that a differentia presupposes its genus] to the end of his career, since, as far as I can ascertain, no later discussion [*i.e.* no later discussion than *Metaphysics* vii 12] reveals that he gives it up’. See also Gill 2010, 98, 103, and *passim*, who argues that Aristotle’s conception of the relationship between genus and differentia in vii 12 is necessary for understanding the unity of composites in viii 6.

In my first section, however, I show that, in *x 7*, Aristotle commits himself to the view that the differentia does not presuppose the genus it differentiates. Thus, there seems to be an inconsistency at the heart of Aristotle's *Metaphysics*.⁴

This inconsistency raises serious questions. As we shall see, Aristotle's claims about differentiae in *vii 12* and *x 7* occur, in both cases, in a context where the constitution of a species (*eidōs*) is discussed. Moreover, both chapters are general in scope and deal with species-constitution *tout court*, not with the constitution of certain types of species. On the one hand, in *vii 12*, Aristotle says that a species is made up of several components that are not logically independent: the differentia and the genus it presupposes. On the other hand, in *x 7*, he says that a species is made up of several components that are logically independent: the genus and the differentia. To frame this in contemporary philosophical terms, Aristotle oscillates between a conjunctive model of determination, in which the more determinate species is obtained through the conjunction of two independent properties, and a non-conjunctive one, akin to the relation between a determinable and a determinate, in which the determinate form is *not* a conjunct of the determinable and another independent property.⁵

My goal is to explain the inconsistency between Aristotle's claims about differentia in *vii 12* and *x 7*. At the same time, it aims to identify the natural place of *x 7* in the development of Aristotle's argument.

One possible response to the difficulty consists in suggesting that book 10 is not part of the same project as book 7, or that Aristotle's commitments either in *vii 12* or in *x 7* can be dismissed with regards to the overall argument of the *Metaphysics*. In section 2, I show that

⁴ It is possible that there are places other than *x 7* in the *Metaphysics* where the differentia and the genus are conceived as logically independent. Chapter 3 of book 3 could be taken as a candidate for such a view, since Aristotle says there (at 998b24-26) that the genus without the species is not predicated of the differentia. However, it is important to remain cautious, since a term A can very well presuppose a term B without it being the case that B is predicated of A. As I will try to show, the logical independence of the differentia is harder to deny in *x 7*.

⁵ On the distinction between these two models of determination, see Johnson 1921 (part I, chapter XI); Prior 1949; Searle 1953. Wilson 2021 cautiously considers Aristotle to be an originator of the determinable-determinant relation.

such an explanation is untenable. Contemporary research on the *Metaphysics* takes book 10 to be an integral part of the project, and the text itself unequivocally attaches x 7 to the rest of the book and to the *Metaphysics* as a whole. Similarly, vii 12 contributes to the argumentative unity of book 7 and contains claims about differentiae that resurface elsewhere in the *Metaphysics*. Aristotle's inconsistent commitments about differentiae in these chapters cannot be easily dismissed.

In section 3, I consider two ways of reconciling vii 12 and x 7. According to the first, the differentiae in x 7 are homonymous and presuppose their genus after all. According to the second, the relation of analogy in x 7 unifies differentiae across non-identical genera. I argue that while the first view has no textual support within book 10, the analogical reading is solidly supported by textual evidence, restores the coherence of the concepts of differentia and species, and shows that x 7 fits naturally into the progression of the *Metaphysics*.

I. The tension between vii 12 and x 7

To analyze Aristotle's understanding of the relationship between the genus and differentiae in vii 12 and x 7, I provide an outline of each chapter and then extract from this outline Aristotle's views on the relation between the genus and differentiae. I demonstrate that while vii 12 supports the scholarly view according to which the differentia presupposes its genus in the *Metaphysics*, Aristotle's argument in x 7 suggests otherwise.

An outline of vii 12. Having established the importance of definition for substances in the first part of book 7 (chapters 4-6), Aristotle, in chapter 12, tries to achieve the unity of the different components of a definition. At first glance, there appear to be three distinct components in a definition of a given species (*eidos*): the initial genus, *n* intermediate genera, and the final differentia. Aristotle first notes that the Platonic model of participation does not advance our understanding of how these components form a unity (1037a18-24). He then

argues that these three apparently distinct components can be reduced to one: the final differentia.

To begin with, every intermediate genus is in fact the preceding genus plus a differentia (1037b30-1038a4). Hence, the problem of the unity of the components of a given species concerns two components in the definition: the genus and the (possibly many) differentia(e) differentiating this genus. However, the genus, Aristotle suggests, might not exist separately from its species, or only as matter (1038a5-6).⁶ What is left in the definition, then, is the chain of many differentiae obtained by division (a8-9). Yet, in the rest of the chapter (a9-35), Aristotle argues that each differentia, if it is not an accidental differentia, presupposes the preceding one, so that the last differentia presupposes all the other differentiae. Since a definition is made up of a chain of differentiae and the last differentia presupposes all the other differentiae, the definition of a species is reduced to one and only one component: the final differentia (1038a25-26).

The differentia presupposes the genus in vii 12. The reasoning in vii 12 shows that, in this chapter, Aristotle regards a differentia as presupposing the genus it differentiates. First, it is clear that, at every step of the division, the differentia presupposes what it differentiates. For instance, cloven-footed presupposes footed, which is to say that cloven-footed things are all footed. Second, Aristotle certainly believes that the members of the species (*eidōs*) of a given genus must also be members of that genus. But vii 12 shows that the *eidōs* actually is the final differentia. Hence the final differentia is only said of the members of the genus. In other words, the final differentia presupposes the genus.

⁶ The comparison, or identification, between genus and matter has sparked exegetical controversies, beginning with Rorty 1973. However, these controversies do not affect my argument according to which the genus is not independent from the *eidōs*, and thus not independent from the differentia that, as we see shortly, is identified with the *eidōs* at the end of vii 12.

Metaphysics vii 12 therefore supports the thesis that a differentia presupposes the genus it differentiates. However, as I now show, this thesis directly clashes with Aristotle's argument in x 7.

An outline of x 7. In x 3-10, Aristotle wants to show that differentiae are contraries (cf. the neat conclusion of x 8.1058a16: ἡ ἄρα διαφορὰ ἐναντίωσίς ἐστιν). Nevertheless, Aristotle is also aware that, in some genera at least, contrary species allow intermediates (x 4-5) that are not obviously the result of contrary differentiae. His goal in x 7 is therefore to show that these intermediates are also made up of contrary differentiae, so that every species, even intermediates, indeed results from a contrary differentia. Chapter 7 can helpfully be divided into three parts, which I shall label [a], [b] and [c] for convenience.

[a] Aristotle first claims that intermediates, in general, are to be conceived of as different steps in a process of change occurring within a genus and between two opposites that admit of intermediates, namely, between two contraries (1057a18-b2).

[b] He then stipulates that the contrary species of this genus are made up of the genus and of contrary differentiae, which are, in one sense at least, prior to these species (1057b4-11).⁷ For instance, the contrary species of colour, black and white, are made up of the genus, colour (which Aristotle here depicts, like Plato in the *Timaeus*, as a body made up of the internal visual ray and the gentle light of the day), and the contrary pair of differentiae, *sunkritikê* (compression) and *diakritikê* (separation), respectively.⁸

Aristotle then argues that intermediate species have the same formal structure as the contrary species. They are also made up of a genus and a differentia. However, since intermediate species are not the contrary species, the differentiae of intermediate species are not the contrary differentiae; rather, they are intermediates between these contrary differentiae.

⁷ Probably in the sense that if the species is known, the genus and the differentia must be known as well, but not *vice-versa*, so that the genus and the differentia are better known than the species, on which see *Topics* vi 4.141b29-34.

⁸ I return to the *Timaeus* and to this definition of colour below.

Since not all colour is black and not all colour is white, the intermediates between white and black are made up of colour and differentiae intermediate between compression and separation (1057b12-19). The last part of the chapter focuses on these contrary differentiae and their intermediates.

[c] Crucially, the intermediates between two contrary differentiae can be said to be more than one contrary differentia and less than another. For instance, a given intermediate between compression and separation can be said to be more compressed than separation and less compressed than compression (and also more separated than compression, but less so than separation). Aristotle takes this state of affairs to be sufficient grounds to conclude that the intermediates between contrary differentiae are constituted of the contrary differentiae.

Since the intermediates between contrary differentiae are made up of the contrary differentiae, the intermediates between the contrary species, which result from the intermediates between contrary differentiae (plus the genus), are also made up of the contrary differentiae. Hence every intermediate is made up of contrary differentiae (1057b22-34).

Once again, *x 7* plays a crucial role in Aristotle's agenda in book 10. If successful, Aristotle's reasoning demonstrates that every intermediate species is made up of contraries. However, there are three reasons to believe that, contrary to the equally important *vii 12*, the differentia in *x 7* does not presuppose the genus it differentiates.

The differentia does not presuppose the genus in x 7. It is unclear how *sunkritikê* (compression) and *diaktrikê* (separation), the prime example of differentiae in *x 7*, can be taken to presuppose colour. *Diakrinein* applies, according to Aristotle, to the four elements, to exhalations, to food, to eggs, to blood, to the general term *sustaseis*, and perhaps to everything else.⁹ Moreover, it is certainly not an analytical truth in Greek or indeed in philosophical Greek

⁹ See the list of reference given by Bonitz 1870, 181-182; for *diakrinein* as applied to everything, see *Metaphysics* xii 10.1075a23.

that *diakritikê* presupposes the genus colour. Plato, who remarks in *Timaeus* 67d-e that *diakritikê* applies to colour, also says in the *Statesman* that *sunkritikê* and *diakritikê* go through *all arts*, not only through the kind colour (cf. κατὰ πάντα at *Statesman* 282b6-7). Neither Plato nor Aristotle, then, seem to regard *diakritikê* and *sunkritikê* as presupposing the genus colour. And yet *diakritikê* and *sunkritikê* are differentiae in x 7. To be sure, one should be careful about generalizing from a single example, especially since Aristotle's examples are notoriously difficult to fit into the rule they are meant to illustrate. However, the existence of differentiae that do not presuppose the genus they differentiate certainly puts pressure on the thesis that a differentia presupposes the genus it differentiates in x 7.¹⁰

Moreover, Aristotle insists in [b] that the formal structure of any *eidōs* consists of both a genus and a differentia (ἐκ γὰρ τοῦ γένους καὶ τῶν διαφορῶν τὰ εἶδη, 1057b7). Such a claim would be hard to understand if the differentia and the genus were not logically independent. If the differentia presupposed the genus, then why emphasize the importance of both in defining a particular species? If, as in vii 12, the differentia presupposes the genus, mentioning the differentia alone would suffice to constitute the species.¹¹

To this reasoning, one might object that, at least in some contexts, it is not hard to see why Aristotle would say that an entity consists of two elements that are not logically independent. For example, in *De anima* ii 1, the soul is defined partly in terms of the body and is presumably not logically independent of the body. And yet, it is not hard to see why Aristotle would say that an animal is made up of both a body and a soul. Nevertheless, in the context of a definition by genus and differentia, which is that of both vii 12 and x 7, Aristotle makes it clear that one should be careful 'not to repeat the same thing more than once, because it is superfluous' (vii 12.1038a20-21). Now, Aristotle's example of saying the same thing more than once is precisely

¹⁰ In section 3, I examine the view that *diakritikê* and *sunkritikê* are shorthand for some more specific property applicable only to colour, and reject it for lack of textual support.

¹¹ For a similar line of reasoning about passages from the *Topics*, cf. Granger 1980, 39-40.

a case of mentioning two elements that are not logically independent: to say that something is footed and two-footed is to say the same thing twice, because two-footed presupposes footed (a22-23). Since Aristotle explicitly warns against mentioning two elements that are not logically independent in a definition of a species, it would indeed be strange for him to insist that a species is made up of both the genus and the differentia if they were not logically independent of each other.

Finally, in the sentence marking the transition from [b], where Aristotle focuses on contrary species and their intermediates, to [c], where he enquires about contrary differentiae and their intermediates, Aristotle claims that one must study ‘these primary contraries which are not within a genus’ (ταῦτα πρῶτα ζητητέον ὅσα ἐναντία μὴ ἐν γένει, 1057b19-20; see also 1057b4). These contraries that are not in the genus must be the contrary *differentiae*, for they are called the ‘primary contraries’, and these were identified in the previous line with the primary differentiae (αἱ πρῶται δὲ διαφοραί, b18-19). Now, in at least one Aristotelian sense of the locution ‘to be in’, A is in B only if it applies only to things that are B, that is, only if it presupposes B (this is the sense of ‘to be in as a whole’ at *Prior Analytics* i 1.24b26-28).¹² But if presupposing something implies ‘to be in this thing’, as some Aristotelian texts suggest, then the fact that contrary differentiae are not in the genus in $x \ 7$ implies by contraposition that they do not presuppose the genus either.

Aristotle’s prime examples of differentiae in $x \ 7$, his insistence on the presence of both the genus and the differentia in the formal structure of the *eidos*, and his claim that contrary differentiae are not in the genus, build a good cumulative case indicating that the differentia

¹² As far as I can tell, no sense of ‘to be in’ distinguished in *Physics* IV.3, nor elsewhere in the corpus, contradicts the implication according to which, if A presupposes B, then A is in B. Note that my argument is neutral with respect to how one interprets the locution ‘to be in as whole’ in the *Prior Analytics*. Whether ‘for A to be in B as a whole’ is construed as saying that every individual A is B (as in the orthodox interpretation of the *dictum de omni et nullo*) or that every subclass of A is B (as in the heterodox interpretation of the *dictum*), what matters for my purposes is that a differentia that applies only to the members of this genus (whether individuals or subclasses) is in this genus. For a discussion of the distinction between the orthodox and heterodox interpretations of the *dictum*, see e.g. Morison: 2008, 212-215.

and the genus are logically independent from each other in x 7, contrary to what was the case in vii 12.

A careful analysis of Aristotle's commitments about the relation between a genus and the differentia in these two chapters therefore reveals a tension in Aristotle's views about differentiae in the *Metaphysics*. This tension in turn impacts the consistency of the concept of species (*eidos*). In vii 12, the final differentia is said to be sufficient to constitute a species, since it presupposes the preceding differentiae up to the initial genus, whereas in x 7, a species is made up of a differentia *and* an independent genus. In both chapters, Aristotle's argument is general. It is not limited to certain types of species. The definition of human in vii 12 and of black and white in x 7 are offered as *instances* of general principles about the constitution of species (see how οἶον introduces (i) the example of human at vii 12.1037b12 and (ii) the examples of black and white at x 7.1057b8).¹³ The problem, however, is that these principles seem inconsistent: either the components of the species are logically independent or they are not. The concept of species, therefore, threatens to be internally contradictory.

In an effort to resolve the tension, scholars have been tempted to treat x 7 as a belonging to an earlier phase of Aristotle's thinking, which he allegedly overcomes in vii 12.¹⁴ This interpretative strategy, and other similar strategies, such as those that insulate the whole of book 10 from the rest of the *Metaphysics*, or vii 12 from the rest of book 7, only resolve the tension by excising Aristotle's commitments about differentiae in vii 12 and/or x 7 from the *Metaphysics*. I now show that such strategies fail and are unjust to the texts.

¹³ Thus, Aristotle's point in these chapters is *not* that the species of qualities are composed of two logically independent components, while the species of substances are composed of components that are not logically independent.

¹⁴ This possibility is mentioned by Chiaradonna 2005, 162n23.

II. Neither x 7 nor vii 12 can be excised from Aristotle's argument in the *Metaphysics*

While the hypotheses regarding different stages in Aristotle's philosophy have lost their bite in recent years, they still provide possible explanations for resolving apparent tensions or inconsistencies between some of his commitments. I discuss three developmental and compositional hypotheses that, if true, could offer a solution to the tension between Aristotle's positions in vii 12 and x 7: (i) the view that book 10 is independent from the rest of the *Metaphysics*; (ii) the proposition that x 7 in particular is independent from the rest of book 10; (iii) the assertion that vii 12 is independent from the rest of book 7. These hypotheses have all been defended in the literature, either in direct reaction to inconsistencies in Aristotle's thinking about differentiae, or in attempts to solve other internal contradictions in his argument.¹⁵ I show in what follows that (i)-(iii) remain unpersuasive, which calls for a new solution that I expound in my final section.

(i) One possibility for resolving the tension between Aristotle's commitments about differentiae in vii 12 and x 7 is to consider book 10 an independent treatise.¹⁶ Given this book's autonomy, we need not be overly concerned about potential conflicts with other parts of the *Metaphysics*. For example, the view presented in x 7 regarding differentiae could be the archaic remnant of Aristotle's previous views on a differentia and its relationship with the genus it differentiates. Perhaps, then, Aristotle gradually replaced this archaic view, which regards the differentia as logically independent from the genus, with another perspective on differentiae that posits a differentia as presupposing the genus it differentiates. This new view, in this hypothesis, is the one we find fully articulated in vii 12.

¹⁵ In my discussion of (i) and (iii), I demonstrate that the view about differentiae expressed in vii 12 resurfaces in book 10. Thus, even if we were to entertain the possibility of a fourth viewpoint, stipulating (iv) that book 7 as a whole is not part of the same project as the rest of the *Metaphysics* or that it makes a purely negative contribution, there still exists a tension internal to book 10 that poses a risk of inconsistency.

¹⁶ See 'das ebenfalls recht selbständige Buch I' in Frede and Patzig 1988, i 29.

Yet, this first approach to resolving the tension between *x* 7 and *vii* 12 raises several challenges. To begin with, many contemporary interpretations of Aristotle's *Metaphysics* suggest that book 10 is intricately woven into the overall structure of the treatise. For instance, some argue that *x* 3-10 contributes to the investigation on principles introduced in books 1 and 3. It does so by presenting arguments against the Academic philosophers' view according to which contraries and the genus can be the principles of all things. The reason why they cannot be principles of all things is that contraries and the genus are not independent from each other, while principles in the strict sense are independent things.¹⁷

According to other scholars, *x* 3-10 serves to demonstrate how the repeated applications of the principle of non-contradiction (established in book 4) to an indeterminate genus unfolds and actualizes the *eidos* of a given substance. This approach suggests that book 10 builds upon and advances the philosophical agenda of the central books on substances in the *Metaphysics* (see Delcomminette 2018, 487-498).

Still others view the study of the relation between the one and the many in I.1-2 as an elucidation of the notion of focal *unity*. This concept enables Aristotle (in book 4 and 7) to establish metaphysics as a unified science of being *qua* being, despite the existence of many senses of being (see Couloubaritsis 1983). Recent interpretations of the *Metaphysics* therefore propose that book 10 should be taken as an integral part of the entire treatise.¹⁸

Independently from the growing scholarly consensus concerning the book's intricate connection to the treatise as a whole, the text of book 10 directly refers to the beginning of the *Metaphysics* on several occasions. In the context of an argument to the effect that the one is not a substance, *x* 2 offers a solution to the eleventh *aporia* in *iii* 3.1001a4-8, which is regarded as the most challenging *aporia* (although it must be conceded that a solution to the puzzle was

¹⁷ See Menn forthcoming, Ig2bc, 16. Menn does not comment, however, on the problem I raise in section 1 regarding contrary differentiae independent from the genus in *x* 7.

¹⁸ See also Castelli 2018, xii-xxv that offers an extensive and useful discussion of how book 10 is connected to the rest of the *Metaphysics*.

already offered in vii 13 and 16, to which x 2.1053b17-18 refers). In x 4.1055a19-21, Aristotle establishes that contrariety is a dyadic relation, providing an answer to a previously unresolved question from iv 2.1004b3 and iii 1.995b26-27. The discussion in x 10 regarding the destructible and the indestructible picks up the tenth *aporia* in iii 4.1000a5-1001a3 concerning the principles of the destructible and indestructible. Overall, given its systematic examination of the one, the many, and the contraries that follow them (sameness, otherness, difference, contrariety), x 1-6 can be considered to fulfill (at least partially) the programme set up in iv 2 with a view to the coextensive character of being and unity and of the grounding role of the contrary pair one/many.¹⁹ On purely textual grounds, then, it is incorrect to classify book 10 as an independent treatise.

One might perhaps retort that while book 10 is indeed integrated into the fabric of the *Metaphysics*, it was initially conceived of as an independent treatise that was *then* integrated into the overall structure of the *Metaphysics*, by Aristotle or a later editor.²⁰ In this case, it could be seen as preserving an older view of differentiae that is in tension with other parts of the *Metaphysics*.

If I am correct in identifying a tension between the conceptions of differentiae in x 7 and vii 12, however, this retort simply acknowledges that Aristotle or an editor failed seamlessly to integrate book 10 into the overall argument of the *Metaphysics*. As we have seen, in x 7, the differentia is logically independent from its genus, while in the central book 7, the differentia presupposes the genus it differentiates. Therefore, whether or not book 10 was later integrated into Aristotle's *Metaphysics*, inconsistent views regarding differentiae in vii 12 and x 7 threaten the overall integration of book 10 into the plan of the *Metaphysics*.

¹⁹ While it is true that these notions are already examined in book 5, nothing prevents Aristotle from providing a more systematic treatment of these notions in book 10 (in the same way that the entry on *ousia* in book 5 does not rule out the existence of book 7). On this point, see Halper 2009, 16, 18 and Castelli 2018, xix-xx.

²⁰ Menn, forthcoming, I γ 2, 2n.3, mentions this possibility.

What is more concerning is that, *even within* book 10 itself, the concept of differentia is treated along the lines of vii 12. In the immediate sequel of x 7, Aristotle explains that a genus ‘is differentiated in no merely accidental way’ (μὴ κατὰ συμβεβηκὸς ἔχον διαφορὰν, 8.1057b38-1058a1). The same prescription is given in vii 12. There, being differentiated in a no merely accidental way means that the differentia presupposes the genus it differentiates. Additionally, a bit later on in x 8, Aristotle also speaks of the ‘differentia of a genus’ (γένους διαφορὰν, 1058a7-8). It is difficult to believe that such a differentia of a genus does not presuppose its genus or is not essentially connected to it. This resurgence of the commitments of vii 12 at the heart of book 10 makes x 7 all the more mysterious, and in any case confirms that we cannot insulate the entirety of book 10 from comments we find elsewhere in the *Metaphysics* about differentiae.

(ii) But then another solution presents itself. Suppose it is not book 10 as a whole that should be insulated from the rest of the *Metaphysics*, but rather specifically x 7. After all, this chapter seems to be set against a Platonic background. Most glaringly, the very definition of black and white in x 7 is directly extracted from *Timaeus* 67e, where we learn that ‘the names should be assigned accordingly: “white” to what dilates the visual ray, “black” to what contracts it’ (Cornford 1935, 277 trans.). According to the *Timaeus*, the compression and the dilatation of the body made of the internal visual ray and the gentle light of the day contributes to perceiving the colours black and white, respectively.²¹

This Platonic background in x 7 might suggest that Aristotle is arguing dialectically from the point of view of his Academic opponents rather than consistently expressing his mature viewpoint throughout the chapter. Now, for Plato at least, the differentiating factor does not presuppose the genus it differentiates. To be sure, Plato regards *diaktrikê* and *sunkritikê* as the differentiae of colour. However, we recalled in the previous section that, in the *Statesman*, he

²¹ On this theory of colours, see Ierodiakonou 2005.

also regards these differentiae as cutting across *all arts*. And in fact, in the *Timaeus* as well, *diakritikê* and *sunkritikê* are responsible not only for the perception of the colours white and black, but also for what feels hot and cold to the flesh (61d-62b) and for what tastes pungent and astringent to the tongue (65c-66a). So, for Plato, the differentiae *diakritikê* and *sunkritikê* do not presuppose colour and are not ‘in’ colour.²²

But if Aristotle is indeed arguing with Plato and his followers in x 7, it is possible that he is not saying in *propria persona* that there are differentiae outside the genus they differentiate. Instead, he may be making that claim solely within the context of his polemic with Plato and other Platonists. This hypothesis suggests that Aristotle utilizes one of his adversary’s assumptions regarding species constitution, while elsewhere in the *Metaphysics*, he developed his own doctrine according to which the differentia does presuppose its genus. This suggestion resolves the tension between Aristotle’s commitments in x 7 and vii 12.²³ There are, however, three drawbacks to this solution.

First, as some point out, x 7 contains at least one full-fledged Aristotelian doctrine: the definition of an intermediate as what is reached before the extreme term of a change between two contraries (see Chiaradonna 2005, 159). In the initial section of the chapter’s argument ([a] above), Aristotle defines intermediates as that ‘into which that which changes must change’. This definition closely parallels the one found in *Physics* v 3.226b23-25, and plays a crucial role in Aristotle’s demonstration in x 7. This parallel between x 7 and the *Physics* indicates that the chapter is not solely set against an Academic backdrop.

Additionally, the argument presented in x 7 is tightly intertwined with the subsequent chapters of the book. The upshot of x 8, expressed at 1058a16, is that a differentia is a contrariety. But this is true only if the intermediate differentiae can be reduced to contrary differentiae, because they represent degrees of these contraries, which is the conclusion reached

²² As is also clear from *Laws* x 893e.

²³ I am here expanding on a remark made by Frede and Patzig 1988, ii 66.

at the end of x 7. In other words, excising x 7 from book 10 means that the conclusion of x 8 does not hold either, because both conclusions stand or fall together.

Finally, although the definition of black and white in x 7 is Platonic rather than Aristotelian, it does not necessarily imply that Aristotle is arguing on Platonic grounds. It is not uncommon for Aristotle to use a definition to illustrate an important point of his doctrine, even if he is not fully committed to that particular definition—think of the definition of human as a biped animal in vii 12, for instance. Similarly, in the context of x 7, Aristotle might be using the example of the Platonic definition of black and white simply because this definition is one with which his audience is likely to be familiar.²⁴

Regardless, it remains true that x 7 contains features of Aristotle’s own doctrines and is necessary for subsequent steps he takes in book 10, which, as we saw in our discussion of (i), is itself integrated in the *Metaphysics* as a whole.

(iii) A final possibility suggested in the literature is that vii 12 itself is an interpolation within book 7. This hypothesis is not primarily proposed to resolve the tension between books 7 and 10, but rather to explain the specific argumentative progression of book 7 (see Frede and Patzig 1988, i 34; Bostock 1994, 176; Burnyeat 2001, 42-44). If Aristotle’s views on the differentia and genus expressed in vii 12 are unique to this chapter and do not represent his official views on these matters in the *Metaphysics*, then the logical independence of the differentia with respect to the genus in x 7 does not contradict Aristotle’s views on differentiae in the central books.

This strategy, however, also fails. For a start, many scholars now defend the view that vii 12 is integrated into the argumentative progression of book 7 (see Menn 2001; Delcomminette 2018, 424). The initial chapters establish the close connection between substance and definition, chapters 8-11 demonstrate the existence of parts within definitions, and chapter 12 aims to

²⁴ Aristotle also uses Plato’s definition of colour throughout the *Topics*, cf. Bonitz 1870, 182 (διακριτικὸν χῶμα, 29-30).

explain how these parts form a unity. In fact, vii 12 opens with Aristotle's claim that the chapter will be 'useful for the enquiry about substance' (1037b10). If chapter 12 is an integral part of book 7, then the views expressed there about differentiae should be considered at least part of Aristotle's considered views on this subject in the central books. Consequently, the tension concerning the logical independence of differentiae in x 7 resurfaces once again.

Furthermore, removing vii 12 from the progression of book 7 does not in fact solve the issue at hand. As discussed earlier in relation to point (i), the intrinsic connection between a genus and differentiae, as found in vii 12, can also be found within book 10 itself, when Aristotle explains that a differentia differentiates in a non-accidental way (x 8.1057b38-1058a1; see Menn forthcoming, Ig2bc, 14, n39). Thus, irrespective of the position of vii 12 within the *Metaphysics* (and of book 7 in the *Metaphysics*), there remains a need to explain how, within the same book, Aristotle can maintain that a differentia does not presuppose its genus (in x 7), while also claiming that it does, as it differentiates it in a 'non accidental way' (in x 8).

Given that the different developmental hypotheses examined in this section fail to account for Aristotle's inconsistencies regarding the relation between a genus and a differentia, I now propose and evaluate new hypotheses.

III. New solutions to the tension between vii 12 and x 7

First (A), I examine and dismiss an interpretation suggesting that differentiae in x 7 are homonymous and, contrary to initial appearances, actually presuppose their genus. Second (B), I will argue that in x 7 Aristotle conceives of differentiae in non-identical genera as the same *by analogy*. My contention will be that, once the chapter is read as being concerned with the level of analogical unity, it becomes consistent with vii 12 and fits perfectly into the progression of the *Metaphysics*.

A. Homonymy?

A possible solution for reconciling Aristotle's views in vii 12 and x 7, not yet explored in the literature, is homonymy. Homonymy is a complex phenomenon in Aristotle, and I shall not attempt fully to describe it.²⁵ At the beginning of the *Categories* (1.1a1-6), Aristotle explains that homonyms are things that share a name, but not the definition that corresponds to that name. In the *Topics*, he associates differentiae with homonymy: he says that homonymy occurs when a single name applies to differentiae of genera that are not subordinated to each other. For instance, 'sharp' is homonymous because it applies to the differentiae of sounds and bodies, which are two genera not subordinated to each other (*Topics* i 15.107b19-26).²⁶ On this view, the name 'sharp' is shared by distinct differentiae, each applying only to the members of the genus they differentiate, and thus presupposing their respective genera.

Applying this lesson about homonymy to x 7 resolves the tension with vii 12. For, in this view, what appears as a single differentia logically independent from the genera divided is in fact a name shared by a series of homonymous differentiae, all of which presuppose their respective genera, just as differentiae do indeed presuppose their genera in vii 12. For instance, the differentiae *diakritikê* and *sunkritikê* are names shared by *diakritikê and sunkritikê of colour* and, say, *diakritikê and sunkritikê of wool-working*, and so on for any *diakritikê and sunkritikê of x*, where *x* is a kind divided by *diakritikê and sunkritikê*. Clearly, unlike *diakritikê and sunkritikê tout court*, *diakritikê and sunkritikê of colour and of x* presuppose their respective genera. This restores harmony with vii 12.

While this solution seems promising, it also faces an objection. Indeed, there is no independent textual evidence that Aristotle intended for the differentiae in x 7 to be understood

²⁵ For an illuminating discussion, see Irwin 1981.

²⁶ In the definition of the *Categories*, homonymy applies to things, not to words (see Ackrill 1963, 71, Owens 1978, 112-116, Irwin 1981, 524), but Aristotle sometimes says that a name shared by homonymous things is itself homonymous (see Irwin 1981, 524).

as homonymous. Although Aristotle does link differentiae and homonymy in *Topics* i 15.107b19-26, it is unclear why he would take for granted that his audience in x 7 have this particular passage in mind and understand a differentia as a name shared by homonymous differentiae.

In contrast to a solution based on homonymy as introduced in the *Topics*, I shall argue that a solution based on analogy has better textual support in x 7, in book 10, and in the *Metaphysics* as a whole, while being equally satisfying from a conceptual point of view.²⁷

B. Analogical solutions

In Aristotle, the term ‘analogy’ consistently refers to a relation of the general form ‘A is to B as C is to D’, which applies to items belonging to different genera (this is the definition of analogy given at *Topics* i 17.108a7-12 and *Poetics* 21.1457b17-30). In his biological treatises, Aristotle explains that the genus fish differs from the genus bird not by possessing more or less of a particular feature, as different species within the same genus do, but rather ‘by analogy’. This means that certain parts of these animals are analogically related: what feather is to birds, scale is to fish (see *Parts of Animals* i 4.644a13-23, cf. *History of Animals* i 1.486a14-b21).²⁸ Similarly, a lifespan and a single day can be analogically related, because what old age is to a period of life, an evening is to the part of the day (*Poetics* 21.1457b23-25).

In the *Metaphysics*, Aristotle links the relation of difference and the relation of analogy. In v 9, he explains that things are called different (διάφορα) when they are other (ἕτερα)—i.e., not identical or not the same (two possible translations of μὴ ταῦτά)—but also the same in some

²⁷ Some scholars (e.g. Owens 1978, 116-118) believe that analogy is a form of ‘moderated’ homonymy, i.e., one that occurs when things share their names and have overlapping but not identical definitions. Others (see Shields 1999, 10n3) deny that analogy is a species of homonymy. My reading is compatible with both possibilities. What it rules out, for lack of textual support, is a solution based solely on the connection between homonymy and differentia as expounded in *Topics* i 15.

²⁸ See Henry 2014 for a thorough discussion of analogical relations in Aristotelian biology.

respect: ‘If X is different from Y, then X is other than, i.e. not the same as Y, but the same as Y either by species or by genus or by analogy’ (cf. v 9.1018a12-19).²⁹

Moreover, Aristotle uses the relation of analogy when he reflects on the nature of principles in *Metaphysics* xii. He argues that the principles of non-identical things can be both the same and not the same. This is because while, for example, matter, form, and privation are not the same for substances and non-substances, or, according to alternative interpretations, are not the same for non-identical natural genera,³⁰ it is still possible to identify a matter, a form and a privation across categories or genera. Thus, the matter, form, and privation that cut across genera are each the same *by analogy*, even though they are not the same in non-identical genera. Therefore, principles are the same ‘by analogy’ and not the same ‘in genus’ (cf. xii 4.1070a31-b21).

The core of my thesis is that differentiae obey the same logic. Like matter, form, and privation, a differentia is not the same in non-identical genera, while it can be the same by analogy. For instance, *diakritikê* is not the same when it differentiates colour, food, and wool-working. In colour, *diakritikê* is white; in wool-working, it is combing (cf. *Physics* vii 2.243b6-7); and when it is applied to food, it refers to the distribution of energy (*Physics* viii 6.259b13). However, white, combing, and distribution of energy can be unified by analogy. One can say that white is to colour as combing is to wool-working, and as distribution of energy is to food: a form of *diakritikê*. From this analogical point of view, *diakritikê* goes beyond the genera it differentiates and does not presuppose them. The only thing it presupposes is an analogical unity between the genera it differentiates.

²⁹ To be sure, Aristotle there speaks of items that are different (διάφορα), not of differentia as such (διαφορά), but he probably sees the two as related, for at x 3.1054b31-32, he says in the same breath that contraries are different (διάφορα) and that contrariety is a kind of difference (διαφορά τις). I will return below to the connection between Aristotle’s analysis of the relation of difference in x 3 and v 9.

³⁰ For a presentation and discussion of these two possibilities, see Judson 2019, 148-153.

This lesson resolves the tension between vii 12 and x 7. Since a non-identity in genus can coexist with an identity in analogy, Aristotle can insist on either one or the other. I will show that this is precisely what he does in vii 12 and x 7.

The case of vii 12 is relatively straightforward. In vii 12, differentiae presuppose their genus. In fact, the final differentia is identified with the species of the genus (vii 12.1038a25-26). Surely this final differentia is not the same in another genus. If it were, then two species of non-identical genera would in fact be the same species. Thus, a differentia in vii 12 is tied to the genus it differentiates and is not the same across genera.

By contrast, there are strong reasons to believe that in x 7, Aristotle is concerned with the level of analogical unity. To begin with, as we saw in section 1, x 7 recognizes two types of contraries: first, the contrary species in the genus ([b] above), and second, the contrary differentiae outside the genus ([c] above). Aristotle's strategy consists in showing that, since the intermediates 'at the highest level' are made up of contrary differentiae, the same is true for intermediates 'at all the levels below' (τὰ κάτω πάντα, 1057b31). Crucially, Aristotle identifies the contrary differentiae occurring at the highest ontological level as *principles* (cf. ἀρχαί, 1057b23), which, as we have just seen, can be the same 'by analogy' and not the same 'in genus'. Considering that contrary differentiae in x 7 function as principles, they can also be the same by analogy, but not the same across genera.

One could perhaps observe that the association between principles and analogy in book 12 comes *after* the identification of differentiae as principles in book 10. However, the connection, emphasized in the previous section, between book 10 and the rest of the *Metaphysics* becomes particularly relevant at this point. For, at x 3.1054b31-1055a2, Aristotle explains that the relation of contrariety is a kind of difference. In the course of this discussion, he states that difference obtains between items that are either the same in genus or other in genus (1054b33-

1055a2).³¹ He then immediately refers back to ‘other texts’ (ἐν ἄλλοις, 1055a2) to clarify what he means by this. To be sure, this cross-reference is not entirely transparent, but scholars generally agree that it must include at least book 5, where what is to be the same or other in genus is discussed (see Ross 1924, 289; Castelli 2018, 118). In fact, the mention of ‘things whose genus is other’ appears in v 9 (*pace* Castelli 2018, 118), which is precisely where Aristotle discusses difference and asserts that difference obtains between items that are the same *by analogy*, despite being other in genus.³² Thus, through his cross-reference at the end of x 3, Aristotle *explicitly* reminds his audience that things other in genus can also be said to be the same by analogy. It is reasonable to assume that Aristotle expects his audience to remember this lesson three chapters later.

Lastly, recall that x 7 is in part a foray into Platonic territory. In x 7, Aristotle endorses, at least for the sake of argument, the position that the colours black and white come from a compression and a dilatation of the visual ray, respectively. As I have previously discussed, *diakritikê* and *sunkritikê* in the *Timaeus* account not only for the perception of the colours white and black, but also for the sensation of heat and cold on the flesh (61d-62b) as well as for the taste of pungency and astringency on the tongue (65c-66a). Since Plato nowhere says that a differentia presupposes the genus it differentiates, he is under no pressure whatsoever to explain why *diakritikê* and *sunkritikê* do not presuppose a single genus, but differentiate non-subordinated genera like taste, touch, and vision. However, Plato interestingly refers to *diakritikê* and *sunkritikê* in these various kinds as ‘sisters’ (ἀδελφά, 67e2). They produce the same affections (παθήματα...τὰ αὐτά) in different kinds (ἐν ἄλλῳ γένει, 67e3). Plato’s relation of sisterhood unifies *diakritikê* and *sunkritikê* across different genera. Given the Platonic

³¹ There is another reading of 1054b34 (ταῦτά instead of the ταῦτα printed by Ross), which is in fact even more favourable to my interpretation, since the mention of the ‘same’ in relation to items that are different recalls Aristotle’s characterization of difference in v 9.1018a12-19, where items that differ are the same in one respect and where analogy explicitly appears. For a discussion of this textual variant, see Castelli 2018, 259.

³² In particular, τῶ γένει... ἕτερα at x 3.1055a2 seems to refer back to ὧν ἕτερον τὸ γένος at v 9.1018a13-14.

background in x 7, it is plausible to imagine that Aristotle also has in mind a relation that unifies *diakritikê* and *sunkritikê* across the genera they act upon. But, as we saw, analogy is the relation of the form ‘A is to B as C is to D’ which specifically applies to items across non-identical genera.³³

The reference to what, most likely, includes book 5, which introduces sameness by analogy and otherness in genera; the characterization of differentiae as principles that are the same by analogy and other in genera; and the Platonic inclination to unify *diakritikê* and *sunkritikê* as the same affections in non-identical genera, all indicate that Aristotle is considering identity by analogy in x 7.

Accordingly, I propose that Aristotle’s statements about differentiae in x 7 and vii 12 should be understood to be qualified. Aristotle, like Plato, knows perfectly well that endowing seemingly contradictory statements with distinct and compatible qualifications can dissolve the appearance of contradiction (*Sophistical Refutations* 5.166b37-167a20). When Aristotle says in vii 12 that differentiae presuppose the genus they divide, he has in mind the fact that they are not the same across genera. When he says, in x 7, that differentiae do not presuppose their genus, he has in mind an analogical identity of differentiae that extends across genera. Since identity in analogy and non-identity in genera are perfectly compatible, we find no contradiction here, but rather two true statements, given Aristotle’s conception of difference and of principles.

By resolving the inconsistency within differentiae, we at the same time restore the coherence of the concept of species, which relies on differentiae for its constitution. Maintaining that a species is constituted by elements that are and are not logically independent is inconsistent. But, once the proper qualifications are made, the contradiction vanishes. While

³³ In *De sensu* 4.442a17-25, Aristotle establishes a systematic relation of analogy between the colours perceived by the eyes and the flavours tasted by the tongue (cf. Ross 1955, 206; Hesse 1965, 332). While the treatment of colour in *De sensu* and x 7 may differ in the details (although both texts consider colours other than black and white as a mixture of black and white), *De sensu* proves that analogy is clearly on the table when it comes to colour and the senses.

a species is indeed made up of a differentia that presupposes the genus it differentiates, the fact that differentiae of non-identical genera can be one and the same by analogy makes that single differentia independent of each differentiated genus. From this analogical point of view, it is true to say that the species consists of two logically independent elements: the genus and the differentia.

Conclusion

To conclude, let us see how this solution illuminates the role of x 7 in the progression of the argument of the *Metaphysics*.

The received reading of x 7 makes it a troublesome case for the unity of the *Metaphysics*. According to the received reading, after arguing at length for the claim that differentiae presuppose their genus in vii 12, Aristotle changes his mind in x 7 and treats them as logically independent from the genus, only to change his mind immediately in x 8 and again adopt the position of vii 12. If book 10 is a consistent whole integrated with the rest of the *Metaphysics*—and we have seen that there are good reasons to believe that this is so—some qualifications are in order.

I have argued that the differentiae in x 7 should be understood as presupposing an analogical unity. This approach restores the unity of the concept of differentia in the *Metaphysics*.

According to my reading, Aristotle begins, in vii 12, by defending the claim that differentiae presuppose their genus. This claim is true insofar as differentiae in non-identical genera are not the same. Having introduced the dual concepts of potential/actual in book 8 and 9 (with a crucial use of analogy in the latter book), Aristotle then returns to the notion of differentia in x 3-10.

There, his aim is to argue that every differentia is a contrariety. However, Aristotle is faced with the obvious objection according to which some pairs of contraries admit of intermediates between contraries. Aristotle's task is then to show that these intermediates are themselves made up of contraries. Moreover, since he wants to show that any differentia *simpliciter* is a contrary, he has to argue that intermediates between *any type* of contrary differentiae are made up of these contrary differentiae. Aristotle believes that if he can show that this is so for the 'highest case', i.e., for the case of differentiae unified by analogy across genera, he will have shown it for every case ('all things lower down', as he puts it in x 7.1057b31). Hence, having recalled in x 3 his definition of difference in book 5 and the connection he there draws with the relation of analogy, he isolates contrary differentiae at the analogical level, that is, differentiae that apply across genera that are unified by analogy, and shows that *their* intermediates themselves consist of these contrary differentiae. Since this is the case at the analogical level, the highest level, i.e., the level of principles, Aristotle concludes that every intermediate must be composed of contraries, including contrary species. Differentiae at every level, differentiae *simpliciter*, are contraries, as Aristotle can finally conclude in x 8.

Thus, far from being a troublesome case, x 7 becomes, on the proposed reading, an essential piece in Aristotle's demonstration over the course of the book 10 that differentiae are to be understood as contraries, because this chapter considers differentiae at the highest level of unity, that is, at the level of analogical unity.³⁴

³⁴ An earlier version of this paper was presented at the *Workshop in Ancient Philosophy* at the University of Oxford in March 2022. I thank the audience for their feedback, and especially Paolo Fait for his invitation and remarks on the paper. I am also grateful to Sylvain Delcomminette, Jens Kristian Larsen, George Rudebusch, and Pauline Sabrier for their comments on a draft, and to Lea Cantor for proofreading my English. Finally, I would like to thank Ron Polansky and an anonymous reviewer of *Ancient Philosophy*, whose comments helped me to improve the paper.

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