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ARISTOTLE'S COMPARATIVE LOGIC: A MODEST PROPOSAL*

1. INTRODUCTION: THE PROBLEM

Both W.D. Ross's and J. Brunschwig's editions of Aristotle's *Topics* contain the following passage:

ἔτι εἰ τοῦ αὐτοῦ τινος τὸ μὲν μᾶλλον τὸ δὲ ἧττον τοιοῦτο· καὶ εἰ τὸ μὲν τοιούτου μᾶλλον τοιοῦτο, **τὸ δὲ μὴ τοιούτου**, δῆλον ὅτι τὸ πρῶτον μᾶλλον τοιοῦτο. (Γ 119 a20-2)

The passage is translated in the revised Oxford translation as follows: 'Moreover, if in any character one thing exceeds and another falls short of the same standard; also, if the one exceeds something which possesses the character, **while the other exceeds something which does not**, then clearly the first thing exhibits that character in a greater degree'.[1]

However, in most manuscripts the second, problematic, sentence of this passage runs as follows:

καὶ εἰ τὸ μὲν τοιούτου μᾶλλον τοιοῦτο, **τὸ δὲ μὴ τοιούτου τοιοῦτον,** δῆλον ὅτι τὸ πρῶτον μᾶλλον τοιοῦτο.

This was clearly the text read by Boethius when he wrote his translation:

amplius si eodem aliquo hoc quidem magis illud autem minus tale; et si hoc quidem tali magis tale, ***illud uero non tali tale****, manifestum quoniam primum magis tale*.[2]

As is already evident in Boethius' literal translation, the Greek expression τὸ δὲ μὴ τοιούτου τοιοῦτον is not straightforward. The deletion of τοιοῦτον after τὸ δὲ μὴ τοιούτου, which was first proposed by H. Bonitz and is indirectly attested in a manuscript (P) of Alexander of Aphrodisias' commentary on the *Topics*, seems beneficial and is indeed accepted in both Ross's and Brunschwig's editions. This emendation certainly makes the expression less difficult, but does not help the reader to understand the exact meaning of the passage, which remains problematic.

The aim of this short paper is to present a philosophical and philological discussion of the above passage: we will show that (almost) all available translations are

* We thank Carlo Natali, Tobias Reinhardt, Carlos Steel and *CQ*'s anonymous referee(s) for their comments on a previous draft of this paper. The authors are responsible for any remaining mistakes or shortcomings.

[1] *The Complete Works of Aristotle. The Revised Oxford Translation*, edited by J. Barnes (Princeton, 1984), 199.

[2] *Aristoteles Latinus. V 1–3. Topica. Translatio Boethii, fragmentum recensioni alterius, et translatio anonyma*, ed. L. Minio-Paluello (Bruxelles-Paris, 1969), 59. Cf. also the Renaissance version of Pacius: 'si alterum sit tali re magis tale, alterum non sit tali re tale, manifestum est', etc. (*Aristotelis Stagiritae Peripateticorum Principis Organum: hoc est, libri omnes ad Logicam pertinentes, Greaece et Latine Jul. Pacius a Beriga recensuit* [Hanau, 1623], 603).

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unsatisfactory and that most of them are unsound, and will propose our own translation and interpretation.

Moreover, we will show that this passage was understood in the same way that we understand it by some ancient commentators of Aristotle, such as Alexander of Aphrodisias and the scholiast, whose gloss was incorporated in the text that was preserved by some medieval manuscripts.

Finally, on the basis of a linguistic analysis of elliptical contrasts in Aristotle, we will claim that Aristotle's text as printed by Ross and Brunschwig does indeed support our interpretation, but at the same time we propose a simple emendation which would avoid ambiguities.

2. MODERN TRANSLATIONS

The interpretation implied by the Oxford translation is widespread in modern versions of Aristotle's *Topics*.

For instance, Jacques Brunschwig translates as follows: 'en outre, si une chose est plus telle, une autre moins telle qu'un même terme de référence; ou encore (avec deux termes de référence) si l'une est plus telle qu'un terme lui-même tel, l'autre plus telle qu'un terme lui-même non tel, il est clair que c'est la première qui est plus telle'.[3]

Similarly, Giorgio Colli has: 'Inoltre, se un oggetto è più siffatto di un qualcosa e l'altro oggetto è meno siffatto del medesimo qualcosa, come pure, se un oggetto è più siffatto di un siffatto qualcosa e l'altro oggetto è più siffatto di un qualcosa non siffatto, sarà evidente che il primo oggetto è più siffatto del secondo'.[4]

Finally, in their recent edition Wagner and Rapp translate: 'Ferner, wenn gegenueber demselben das eine mehr und das andere weniger so beschaffen ist. Auch wenn das eine mehr so und so beschaffen ist als ein so und so Beschaffenes, das andere aber (lediglich mehr so und so beschaffen ist) als ein nicht so und so Beschaffenes, dann ist klar, dass das erste mehr so und so beschaffen ist'.[5]

These translations, which all take μὴ as negating τοιούτου ('something which does not [possess the character]', 'non tel', 'un qualcosa non siffatto', 'als ein nicht so und so Beschaffenes'), might seem linguistically correct, but they fail to understand Aristotle's point: they solve some of the obscurities of the Greek original text, but the resulting argument is logically flawed.[6] The flaw is implicitly observed by T. Waitz in his commentary on Aristotle's *Topics*. In his note ad loc. he construes the passage in the same

[3] *Aristote Topiques Livres I-IV*, texte établi et traduit par J. Brunschwig (Paris, 1967), 74. In his notes on this passage, at 161 of his edition, Brunschwig acknowledges that all readings in the extant manuscripts and Alexander's lemma have the same meaning; however, Brunschwig fails to acknowledge that this meaning, as it has been rendered by his translation, contains a logical mistake of a certain magnitude.

[4] *Aristotele, Organon*, a cura di G. Colli (Torino, 1955), 472.

[5] *Aristoteles, Topik*, übersetzt und kommentiert von T. Wagner und C. Rapp (Stuttgart, 2004), 111.

[6] Most translations are equivalent to Brunschwig's and to Barnes's revised Oxford translation: see also *Aristotle. Organon V. Les Topiques*, édite par J. Tricot (Paris, 1950), 113 and *Aristoteles. Topik. Topik, neuntes Buch oder Über sophistischen Widerlegungsschlüsse*, herausgegeben, übersetzt, mit Einleitung und Anmerkungen versehen von H.G. Zekl (Darmstadt, 1997), 129; A. Zadro (*Aristotele. I Topici* [Napoli, 1974]) and M. Zanatta (*Aristotele. Analitici Secondi, Topici, Confutazioni sofistiche* [Torino, 1996]) did no better. Other translations are slightly better, in the sense that they are not logically flawed; we will discuss them later.

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way as modern translators do, adding that this is the first attestation of this problematic rule: 'ei loco quem habemus vs. 21 nullus est similis eorum qui praecesserunt: nam si eum transferas ad τὸ αἱρετόν, sic se habebit: εἰ τὸ μὲν αἱρετοῦ αἱρετώτερον, τὸ δὲ μὴ αἱρετοῦ αἱρετώτερον, καὶ ἐκεῖνο τούτου ἔσται αἱρετώτερον'.[7]

In order to better understand the problems of this interpretation, it is now useful to recall what Aristotle is expounding in these chapters of the third book of the *Topics*.

3. THE CONTEXT

In the sections preceding our passage, Aristotle has been expanding his comparative logic,[8] and has already presented some of the properties of the relations 'more than', 'less than' and 'equal to' (cf. *Top*. B 114 b37 – 115 a26).

These properties are expanded further by the τόποι concerning comparative relations; the τόποι should be understood as schemes of arguments, which can be used in a dialectical disputation.[9] Even though Aristotle states at the beginning of the *Topics* that dialectic makes use of syllogisms, and syllogisms are defined as they were defined in the *Prior Analytics* (A 24 b18-20), the τόποι do not have the structure of a syllogism, but seem rather to be other forms of argument.[10]

[7] *Aristotelis Organon Graece*, Pars Posterior. Analytica Posteriora, Topica, edidit T. Waitz (Leipzig, 1846), 470. Waitz's main concern seems to be that the τόπος at Γ 119 a20-2 is not paralleled in the previous discussion on the 'preferable' (τὸ αἱρετόν). Therefore, Waitz suggests to treat the τόπος as if it were dealing with the 'preferable': his paraphrase, which echoes Alexander of Aphrodisias' commentary, makes explicit the logical flaw of the common reading of this passage. It is difficult to establish whether Waitz intentionally stressed this inconsistency; we think, however, that his reading is not completely accurate: Aristotle is not talking any longer about τὸ αἱρετόν at Γ 119 a20-2, but he wants to make a claim on comparison in general (be it a comparison between two or more αἱρετά or not). We thank the journal's referee for discussion on this point.

[8] Comparative logics are presented in a formal way by E. Casari in his paper 'Comparative logics', *Synthese* 73 (1987), 421–49. In this paper Casari underlines that Aristotle was the first to develop a comparative logic. On Aristotle's own comparative logic, see E. Casari, 'Note sulla logica aristotelica della comparazione', *Sileno* 10 (1984), 131–46; J.M. Gambra Gutiérrez, 'The topoi from the greater, the lesser and the same degree: an essay on the σύγκρισις in Aristotle's *Topics*', *Argumentation* 26 (2012), 413–37.

[9] The only attempt at defining the status of the τόποι in Aristotle's works has to be found in *Rhet.* B 26, 1403 a17-19. On the status of the τόποι see T. Reinhardt, *Das Buch E der aristotelischen Topik. Untersuchungen zur Echteitsfrage* (Göttingen, 2000), 46. For a map of contemporary literature on the controversial nature of the τόποι see M. Schramm, *Die Prinzipien der aristotelischen Topik* (Munich and Leipzig, 2004), 89–107.

[10] Oliver Primavesi defended the idea that the τόποι are forms of reasoning through which, given a certain proposition which needs to be proved, we can built a dialectical syllogism. Primavesi developed his theory on the basis of the dialogical argumentation theory, which Aristotle expands in *Topics* Θ; cf. O. Primavesi, *Die aristotelische Topik. Ein Interpretationsmodell und seine Erprobung am Beispiel von Topik B* (Munich, 1996), 83–101. Even though the τόποι do not have the structure of standard syllogism, we should not forget that Aristotle thought that *all* sound inferences may in principle be reduced to syllogistic (cf. *Prior Analytics* A 23 and A 32), but it is hard to see how this may be true in the case of many τόποι. In particular, in *Topics* Γ Aristotle expands a series of τόποι whose status is difficult to explain for two reasons:

> (a) if we take this book as a treaty on comparative logic, all the rules that Aristotle introduces are theorems of a logic which is stronger than first-order logic (comparative logic, as it has been presented by E. Casari [n. 8], is an extension of first-order logic); however, since categorical syllogistic proves only a proper subset of the theorems of first-order logic (cf. on this J. Łukasiewicz, *Aristotle's Syllogistic from the Standpoint of Modern Formal Logic* [Oxford, 1957^2], especially 77–99; A. Rini, *Aristotle's Modal Proofs.*

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The relations 'more than' and 'less than' are intuitively transitive, and Aristotle clearly maintains that these relations have this property of being transitive in *Top.* Γ 119 a20-2.

The logical argument introduced by the first sentence of our passage states that if A is more ϕ than B, and C is less ϕ than B, then A is more ϕ than C (ἔτι εἰ τοῦ αὐτοῦ τινος τὸ μὲν μᾶλλον τὸ δὲ ἧττον τοιοῦτο […] δῆλον ὅτι τὸ πρῶτον μᾶλλον τοιοῦτο, *Top.* Γ 119 a20-2), a rule which is logically correct.

However, the second sentence (καὶ εἰ τὸ μὲν τοιούτου μᾶλλον τοιοῦτο, **τὸ δὲ μὴ τοιούτου,** δῆλον ὅτι τὸ πρῶτον μᾶλλον τοιοῦτο), as it has been understood by most translators and commentators (see above), would state the following rule:

1) if A is more ϕ than B, and both A and B are ϕ, if there is a C which is more ϕ than D, and C is ϕ, whilst D is not, then A is more ϕ than C.

This rule is plainly wrong. An example will make this clearer: the moon (A) is brighter than this candle (B), and both of them are bright; on the other hand, the sun (C) is brighter than a piece of coal (D), and whilst the sun is certainly bright, coal is not. Now, from this it should follow by the above rule that the moon is brighter than the

> *Prior Analytics A8-22 in Predicate Logic* [Dordrecht, 2011], 11–31), it is clear that the rules that Aristotle expands in *Topics* Γ cannot be reduced to syllogistic;
> (b) the doctrine of the *praedicabilia*, which plays a crucial role in the *Topics* (and, according to some scholars, in Aristotle's *Prior Analytics* too: cf. on this M. Malink, 'A reconstruction of Aristotle's modal syllogistic', *History and Philosophy of Logic* 27 [2006], 95–141), is absent in the section on comparatives in *Topics* Γ.

For these two reasons, it is difficult to establish whether Aristotle was committed to the properties of the comparatives, which he expands in *Topics* Γ (this understanding seems to be implied by Primavesi's interpretation [this note]: if all τόποι are schemes for drawing syllogisms, they should be understood as logical rules, whose validity Aristotle was taking for granted), or whether he simply took these arguments to be dialectical arguments, whose validity was not to be taken for granted, but which should have been able to persuade an opponent in a dialectical debate (this interpretation is suggested by Reinhardt in his monograph [n. 9]). Both possibilities are compatible with the text: the τόποι are in both readings the underlying argumentative forms of dialectical debates; as a consequence, even if we think that Aristotle accepted these arguments as valid logical rules, this does not necessarily mean that he was committed to the truth of the premises of these arguments. Our impression is that Aristotle tried to expand the rules of comparison in a formal way; later, when he tried to turn his (many) logics into a system, he thought that syllogistic could have been the underlying logic of dialectic too (cf. *An. Pr.* A 24 a22-8). This is why Aristotle introduced syllogisms as the standard inference for dialectic too in the very first chapter of the *Topics* (cf. *Top.* A 100 a18-b23). However, this attempt at building a system was not succesful, as we have noted above, when we underlined that comparative logic cannot be reduced to syllogistic. Nevertheless, the τόποι expound properties that Aristotle was presumably endorsing, if our reconstruction is correct. However things might be, the properties of the comparative relations should make appeal to the common understanding of these relations, so that the τόποι concerning comparative relations may usefully result in a dialectical debate. In other words, even though Aristotle might have been sceptical regarding their logical truth, as Reinhardt seems to suggest, these τόποι should be accepted by most people. On the status of dialectic in the context of Aristotle's scientific research, see also W.A. de Pater, *Les Topiques d'Aristote et la dialectique platonicienne* (Fribourg, 1965); J.D.G. Evans, *Aristotle's Concept of Dialectic* (Cambridge, 1977); P. Slomkowski, *Aristotle's* Topics (Leiden, New York and Cologne, 1997); M. Wlodarczyk, 'Aristotelian dialectic and the discovery of truth', *OSAPh* 18 (2000), 153–210.

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sun—and this is clearly not the case. Therefore, the rule by means of which we have inferred this conclusion must be wrong.

It is possible that Aristotle suggested a logically incorrect rule: his corpus is scattered with notions that modern science has proved to be mistaken, and we should not be surprised if *quandoque bonus dormitat Aristoteles*. However, mistakes are not all of the same sort, and if we accept this interpretation, we have to accept the idea that Aristotle has endorsed a rule which is patently wrong: this seems to be at odds with the careful descriptions of the other (correct) rules which govern the logic of comparatives, and which are found in the third book of the *Topics*.

4. SOME PROBLEMATIC SOLUTIONS

A first solution to the problems of rule 1 involves an interpretation of the passage as shown by the following translation:

> if the one exceeds something which possesses the character, while the other exceeds *at best/only* something which does not, then clearly the first thing exhibits that character in a greater degree.

This translation interprets the text as stating the following rule:

> 2) if A is more ϕ than B, and both A and B are ϕ, if there is a C, which is ϕ, that is more ϕ *at best* or *only* than D, where D is any not-ϕ, then A is more ϕ than C.

According to this 'charitable' interpretation, the not-ϕ term (D) compared to C is not just any example of a not-ϕ, but the best case one can provide in which C is more ϕ than something; in this way the counterexample of the sun, mentioned above, would be ruled out, as the bright thing referred to in the second premise (C) would be more bright *only* than a non-bright thing (D), thus never being more bright than another bright thing.

The main problem with this interpretation is that the logical component on which the soundness of rule 2 relies upon, and which indeed distinguishes rule 2 from rule 1, is expressed by a linguistic element (the adverb 'at best' or 'only') which the Greek text does not display.

Another way to solve the problem, envisaged by some scholars, involves a simplification of the logic of the passage. An example of this is found in Rolfes's translation: 'Ferner, wenn das eine bestimmte Beschaffenheit in höherem, das andere in niederem Grade hat als eine und dasselbe Dritte; und wenn das eine sie in höherem, das andere nicht in höherem Grade hat als ein gleichbeschaffenes Dritte, so hat offenbar das erste die betraffende Beschaffenheit in höherem Grade'.[11]

However, both this translation and the resulting interpretation are problematic. Apart from the fact that Rolfes's version hardly corresponds to the Greek, the rule which Aristotle would have suggested, if these were his words, would be a truism:

[11] *Aristoteles. Topik*, neu übersetzt und mit einer Einleitung und erklärenden Anmerkungen versehen von E. Rolfes (Leipzig, 1919), 60. W.A. Pickard-Cambridge's translation had the same reading in its original form, before the revision by J. Barnes (cf. *The Work of Aristotle translated into English*, under the editorship of W.D. Ross, vol. 1 [Oxford, 1928], ad loc.). The Loeb translation by E.S. Forster is more elliptical, but, as will be shown later (cf. n. 28), is probably the most accurate, as regards both language and logic.

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3) if A is more ϕ than B, and C is less ϕ than B, then A is more ϕ than C (first sentence);
if A is more ϕ than B, and C is not more ϕ than B, then A is more ϕ than C (second sentence).

Rolfes's reading would entail a repetition in the second sentence of what Aristotle has just said in the first. As a consequence, one might be tempted to think that the second sentence was simply a gloss. In other words, quite apart from its linguistic problems, this alternative interpretation does not improve our understanding of the passage, although it is logically correct.

5. ALEXANDER OF APHRODISIAS

There is yet another way to solve the problem, without stretching the Greek or simplifying the logic. This interpretation has been strangely neglected by modern scholars, but was apparently clear to ancient commentators.

In his note commenting on the passage, Alexander of Aphrodisias quotes the rule of Aristotle, in a form slightly different from those discussed above, and then presents an exemplifying argument, which proves to be logically correct:

καὶ εἰ τὸ μὲν μᾶλλον τοιούτου τοιοῦτον, τὸ δὲ μὴ τοιοῦτον [*sic* **AD** ***Wallies*** : τοιούτου **P** : τοιούτως τοιοῦτον **B** ***Ald.***], δῆλον ὅτι τὸ πρῶτον ῥηθὲν μᾶλλον τοιοῦτον. τοῦ τόπου τοῦ λέγοντος 'εἰ τὸ μὲν ἀγαθοῦ τινος μεῖζον εἴη ἀγαθόν, **τὸ δὲ ἀγαθὸν μὲν εἴη μηδενὸς δὲ ἀγαθοῦ μεῖζον, αἱρετώτερον τὸ ἀγαθοῦ τινος μεῖζον**' (Alex. Aphr. *in Top.* 277, 17–20)

And if one thing is more of such sort than something of that sort, whereas τὸ δὲ μὴ τοιοῦτον, it is clear that the first thing is more of that sort. As in this argument (τόπος): 'if a certain good is greater than another good, whereas a third good is greater than no other goods, it should be preferred the good which is greater than something else'.

In his τόπος Alexander is clearly suggesting the following rule:

4) if A is more ϕ than B, and both A and B are ϕ, then if there is no D, which is ϕ, such that C is more ϕ than D, then A is more ϕ than C.

This rule presupposes that the degrees according to which a property is shared by its subjects are ordered in a rigid way, namely that for every *a*, for every *b*, if *a* and *b* are different items and share the same property ϕ, either *a* is more ϕ than *b*, or *b* is more ϕ than *a*.[12] This is compatible with the common understanding of comparative relations.

What is worth noting is that, at first sight, Alexander's interpretation does not seem to be compatible with the wording of Aristotle's lemma, and in particular with the problematic second premise, which is here given in yet another form (τὸ δὲ μὴ τοιοῦτον, i.e. τὸ δὲ μὴ τοιοῦτο),[13] which we have, for the moment, left in Greek as it is textually problematic.

[12] In other words, the relation 'more than' (as well as its reverse 'less than') appears to have the property of trichotomy. This aspect is extremely interesting from the logical viewpoint, and if this were what Aristotle had in mind, his remarks would no longer be trivial, or even unsound, but highly relevant.

[13] The forms τοιοῦτον and τοιοῦτο are mere variants, morphologically and semantically equivalent (cf. LSJ ad loc.). Henceforth they will be referred to, without distinction, as τοιοῦτο(ν).

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One might be tempted to emend Aristotle's text by inserting into the second premise the same μηδενός, which Alexander uses in his τόπος (μηδενὸς δὲ ἀγαθοῦ μεῖζον), and which unequivocally introduces the property of trichotomy for comparative relations.

If we were to accept this tempting emendation, Aristotle's passage would look something like this (following Ross's and Brunschwig's editions):

καὶ εἰ τὸ μὲν μᾶλλον τὸ δὲ ἧττον τοιοῦτο· καὶ εἰ τὸ μὲν τοιούτου μᾶλλον τοιοῦτο, τὸ δὲ μη<δενὸς> τοιούτου [τοιούτου τοιοῦτον *pler. codd.* : τοιοῦτον *Alex.* (*AD*) : τοιούτου *Alex.* (*P*) *Bonitz* : τοιούτως τοιοῦτον *Alex.* (*B Ald.*)], δῆλον ὅτι τὸ πρῶτον μᾶλλον τοιοῦτο.

Moreover, if in any character one thing exceeds and another falls short of the same standard; also, if the one, which possesses the character, exceeds something which possesses the [same] character, while the other [exceeds] none which possesses the character, then clearly the first thing possesses that character in a greater degree.'

This minor emendation, although it would explicitly state rule (4), is not palaeographically satisfactory, because it is difficult to admit that a copyist could have misread μηδενός as μή. Moreover, Alexander did not read μηδενός, but he nevertheless understood the passage as referring to the trichotomy of comparative relations (cf. rule 4). The only possibility is therefore to verify whether Aristotle's text (in either of its variants) may actually be interpreted in the same way as Alexander interpreted it, that is, as expressing rule (4), which is most satisfactory from a logical point of view, although it is widely neglected by modern translators and commentators.

6. ELLIPTICAL NEGATIONS IN ARISTOTLE AND THE POSITION OF μή

A good starting point is to analyse what would be the most explicit and clear form of the second premise of rule (4) without the emendation μηδενός. This would probably be something like one of the following:

εἰ τὸ μὲν τοιούτου μᾶλλον τοιοῦτο(ν) (sc. ἐστι),
a. τὸ δὲ μή ἐστι μᾶλλον τοιοῦτο(ν) τοιούτου.
b. τὸ δὲ τοιούτου μὴ μᾶλλον τοιοῦτό(ν) ἐστι.
c. τὸ δὲ μή ἐστι τοιούτου μᾶλλον τοιοῦτο(ν).
d. τὸ δὲ τοιούτου μή ἐστι μᾶλλον τοιοῦτο(ν).
e. τὸ δὲ μὴ μᾶλλον τοιοῦτο(ν) τοιούτου ἐστι.

Also, if the one possesses the character in a greater degree than something which possesses the [same] character, while the other does not possess the character in a greater degree than something which possesses the [same] character.

We do not try here to establish which of the above word orders, if any, would be most idiomatic in Greek, nor which one would be most appropriate in the context, given the parallelism with the first premise, but we simply note that most of them seem to be paralleled in the corpus of Aristotle.[14]

[14] For word order *a.* (verb, comparative, second term of comparison) cf. e.g. *Met.* M 1082 b19-21: εἴτε δὲ μὴ ἔστι πλείων ἀριθμὸς ὁ τῆς τριάδος αὐτῆς ἢ ὁ τῆς δυάδος, θαυμαστόν. For word order *b.* (second term of comparison, comparative, verb) cf. e.g. *Pol.* B 1265 b7: ὥστε ἀριθμοῦ τινὸς μὴ πλείονα γεννᾶν. For word order *d.* (second term of comparison, verb, comparative) cf. e.g. *Met.* N 1088 b10-11: οἷον ἡ δεκὰς πολύ, [καὶ] εἰ ταύτης μή ἐστι πλεῖον. Finally, for word order *e.* (comparative, second term of comparison, verb) cf. e.g. [*Oec.*] B 1346 a16: τὸ τἀναλώματα μὴ μείζω τῶν προσόδων γίνεσθαι.

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However, none of the above clauses is likely to have been used by Aristotle; in contrastive comparisons of this kind, in which a sentence is followed by a second sentence that is an exact negative copy of the first, the verb of the second sentence is normally dropped. Cf. for example *An. Post.* A 73 b10-12: ἔτι δ' ἄλλον τρόπον τὸ μὲν δι' αὑτὸ ὑπάρχον ἑκάστῳ καθ' αὑτό, τὸ δὲ μὴ δι' αὑτὸ συμβεβηκός, οἷον εἰ βαδίζοντος ἤστραψε, συμβεβηκός.[15] In particular, the verb ἐστι is hardly ever found in contrastive comparisons of this kind: cf. for instance *An. Pr.* A 30 a23-4: εἰ δὲ τὸ μὲν A B μὴ ἔστιν ἀναγκαῖον, τὸ δὲ B Γ ἀναγκαῖον.[16]

If we eliminate the verb ἐστι from the above sentences, we are left with only three options:

f. τὸ δὲ μὴ μᾶλλον τοιοῦτο(ν) τοιούτου. (= a/e)
g. τὸ δὲ τοιούτου μὴ μᾶλλον τοιοῦτο(ν). (= b/d)
h. τὸ δὲ μὴ τοιούτου μᾶλλον τοιοῦτο(ν). (= c)

However, if options (*f*) and (*g*) are still straightforward and would state rule (4) in clear terms, option (*h*) would be ambiguous. Indeed, the adverb μή could also be taken as negating not the whole predicate phrase τοιούτου μᾶλλον τοιοῦτο(ν) or the implied ἐστι ('*not* possessing the character to a greater degree than another thing that possesses the same character') but only the (nominalized) adjective τοιούτου ('[possessing the character to a greater degree than] another thing that does not possess the same character').[17]

This construction of μή preceding a complex phrase and negating only the word directly following it (in our case a noun phrase with τοιούτου as a head) can be easily paralleled.[18] Cf. for example *Top.* Θ 162 a3-5: εἴη δ' ἄν ποτε λόγος καὶ συμπεπερασμένος μὴ συμπεπερασμένου χείρων[19] (μή is negating συμπεπερασμένου, not συμπεπερασμένου χείρων); *Top.* Γ 119 a16-17: τὸ φύσει τοιοῦτο τοῦ μὴ φύσει τοιούτου μᾶλλον τοιοῦτο[20] (μή is negating φύσει, not φύσει τοιούτου).

In contrast to these types of cases, when the adverb μή is meant to negate the whole phrase, it tends to be attached to the head: cf. for instance *Eth. Nic.* Z 1139 b34-5: εἰ γὰρ μὴ μᾶλλον τοῦ συμπεράσματος, κατὰ συμβεβηκὸς ἕξει τὴν ἐπιστήμην.[21]

[15] 'Again in another sense that which happens to something else in virtue of the latter's own nature is said to happen to it *per se*; while that which does not so happen is called an accident.'

[16] 'But if *AB* is not necessary, but *BC* is necessary.'

[17] For the use of μή with noun, adjectives or participles (a use traditionally explained as being 'generic' as opposed to the 'referential' use of οὐ) see R. Kühner and B. Gerth, *Ausführliche Grammatik der griechischen Sprache: Zweiter Teil* (Hannover and Leipzig 1904), 2.197-203, especially 201-2. For a more recent and sophisticated account see E. Gerö, *Negatives and Noun Phrases in Classical Greek* (Frankfurt am Main, 1997), with her supplementary article in *Glotta* 77 (2011), 38–55. Cf. also J. Wackernagel, Lectures on Syntax, trans. D. Langslow (Oxford, 2009), 729–33, 752–4; A.G. Laird, 'When is generic μή particular?', *AJPh* 43 (1922), 124–45; A.C. Moorhouse, *Studies in the Greek Negatives* (Cardiff, 1959), 36–40. In our passage the conditional context (καὶ εἰ …) would probably be enough to account for the use of μή (on this use see Wackernagel [this note], 750–1).

[18] For the view that in Greek the negative particle is immediately placed before the word that is negatived, cf. e.g. Kühner and Gerth (n. 17), 2.179; LSJ s.vv. οὐ D, μή D. For a criticism of this view as 'misleading oversimplification', cf. Moorhouse (n. 17), 75–6, 89–120.

[19] 'It is possible also that an argument, even though brought to a conclusion, may sometimes be worse than one which is not so concluded.'

[20] 'That which naturally has a certain quality has that quality in a greater degree than that which possesses it not naturally.' Cf. Alex. Aphr. ad loc. (p. 276.9): τὸ φύσει ἀγαθὸν τοῦ μὴ φύσει αἱρετώτερον.

[21] 'If [the principles] are not better known to him than the conclusion, he will have his knowledge only incidentally.'

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Consequently, the fact that in sentence (*h*) the adverb μή is detached from the head of the phrase ([μᾶλλον] τοιοῦτο) might be taken as suggesting that it is negating the adverb τοιούτου ('[that possesses the character more than any other thing] that does not possess the character') and not the whole phrase τοιούτου μᾶλλον τοιοῦτο (or the implied ἐστι or the whole clause)[22] ('*not* possessing the character to a greater degree than another thing that possesses the same character'): consequently, sentence *h* might be construed as expressing rule 1, which, as we have shown, is logically incorrect.

On the other hand, although it has significant syntactic plausibility, the interpretation above (taking μή as negating τοιούτου) is not the only one possible: there are parallels for the use of the adverb μή used to negate a complex noun phrase with the head in last position. Cf. for example Arist. *De An*. A 403 b9-15:

ἢ οὐκ ἔστιν εἷς ὁ περὶ τὰ πάθη τῆς ὕλης τὰ μὴ χωριστὰ μηδ' ᾗ χωριστά, ἀλλ' ὁ φυσικὸς περὶ ἅπανθ' ὅσα **τοῦ τοιουδὶ σώματος καὶ τῆς τοιαύτης ὕλης ἔργα καὶ πάθη.** (…) τῶν δὲ μὴ χωριστῶν μέν, ᾗ δὲ **μὴ τοιούτου σώματος πάθη** καὶ ἐξ ἀφαιρέσεως, ὁ μαθηματικός.[23]

In the passage above, the adverb μή preceding the phrase τοιούτου σώματος πάθη is not negating only the adjective τοιούτου ('regarded as properties [that are] belonging to a body *not* of a given sort', i.e. 'attributes [that are] belonging to a different body') but rather the whole phrase ('regarded *not* as properties [that are] belonging to a body of a given sort'). The phrase τοιούτου σώματος πάθη is a simplified form of the phrase τοῦ τοιουδὶ σώματος καὶ τῆς τοιαύτης ὕλης ἔργα καὶ πάθη stated in the previous sentence, with which it is contrasted by means of the adverb μή. Indeed, the contrast between the two phrases is the reason for the fact that in the second phrase μή is placed in the first position detached from the head, and that no ambiguity is possible.[24]

Therefore, it is not syntactically inconceivable that in the clause (*h*) the adverb μή is negating the whole phrase τοιούτου μᾶλλον τοιοῦτο(ν) (or the implied ἐστι or the whole clause),[25] and thus that the sentence could still be construed as expressing rule

[22] From a semantic (and thus syntactic) point of view, the sentence with the negative particle negating only the predicate phrase (**τοιούτου**) μᾶλλον τοιοῦτο ('is [*not possessing the character to a greater degree*]') is equivalent to both the one with the negative particle negating the (implied) copula ἐστι ('*is not* [possessing the character to a greater degree]') and the one with the negative particle negating the whole clause ('*not* [is possessing the character to a greater degree]').

[23] 'Or shall we rather say that there is no one (who deals) with properties of the matter which are not separable nor yet treated as separable, but the physicist deals with all the active properties or passive affections belonging to a body of a given sort and the corresponding matters? (…) When on the other hand the qualities, though inseparable, are regarded not as properties belonging to a body of a given sort and are treated abstractly, they fall within the province of the mathematician.'

[24] The 'detachment' of the negative particle from the word expectedly negatived (the predicate in a clause or the head in a phrase) is also to be related to a (primeval) tendency of the negative particle to be placed in an initial position: in Herodotus, for instance, in negative conditional protases the particle μή is normally found in first position (87%), often detached from the verb (57%); for these figures and a discussion of the tendency and its development in the history of Greek, see Moorhouse (n. 17), 75–6, 82–120. On the syntax and position of the negative see also Wackernagel (n. 17), 725–34, 751–4.

[25] It is perhaps worth mentioning that, according to the analysis of negation in the Peripatetics, in a proposition the negative adverb always negates the copula (cf. Alex. Aphr. *in An. Pr.* 402.1–405.16). In our case the copula would be the implied ἐστι (μᾶλλον τοιοῦτο), which, if negated by μή, would indeed produce the meaning required by the interpretation we envisage ('*is not* possessing the character to a higher degree …'; cf. above, n. 22). In other words, the explicit view of Aristotle's school on the syntactic role of negation might be compatible with our understanding of the syntactic role of μή in the text under investigation. For the peripatetic analysis of negation see J. Barnes, 'Peripatetic negations', *OSAPh* 4 (1986), 201-14. For Aristotle's analysis see W. Cavini, *La negazione di frase nella*

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4 (‘*not* possessing the character to a greater degree than another thing that possesses the same character’).

Interestingly, option (*h*) is actually found in this form in two manuscripts of Aristotle (Vaticanus Barberinianus 87 and Parisinus 1843) and is printed by Forster in his Loeb edition (with an elliptical but correct translation; cf. n. 28): this reading is probably a simplification of the original text, originating from the insertion of an explanatory gloss of the scholiast in the text. Consequently, the reading could be considered as evidence for another ancient commentator interpreting the passage in the same way as Alexander, an interpretation which, as we have seen, seems to be the correct one.

Going back to sentences (*f*), (*g*) and (*h*), it must be pointed out that it is still unlikely that they represent the original text of Aristotle. Indeed, the readings of the majority of the manuscripts and of Alexander suggest that the original text displayed a further degree of ellipsis. In particular, it seems evident that the adverb μᾶλλον was not repeated in the second sentence. The omission of μᾶλλον would produce the following sentence:

i. τὸ δὲ μὴ τοιοῦτο(ν) τοιούτου. (< *f*)
j. τὸ δὲ μὴ τοιούτου τοιοῦτο(ν). (< *g/h*)

and, with a further degree of simplification,

k. τὸ δὲ μὴ τοιοῦτο(ν) (< *f/g/h*)
l. τὸ δὲ μὴ τοιούτου (< *f/g/h*)

Sentence (*j*) is the text transmitted in most manuscripts of Aristotle and probably lying behind the corrupt reading τοιούτως τοιοῦτον found in MS B of Alexander (also printed in the Aldine edition); sentence (*k*) is transmitted in one branch of the tradition of Alexander (MSS A and D) and printed by his editors; sentence (*l*) is transmitted in another of Alexander’s manuscripts (MS P) and printed by several editors of Aristotle. Again, all these sentences would not be at variance with the *usus scribendi* of Aristotle. Indeed, the simplification of the wording of the second member of a contrastive comparison is not limited to the omission of the verb.

It is difficult to determine which of these readings (*i*, *j*, *k and l*) was the original one, since all present some problems and all could be explained palaeographically as corruptions of another reading (*k* and *l* as deriving from each other by confusion of final ν/υ, or from *i* or *j* by haplography; *i* and *j* as deriving from insertion in the text of *k,* to be construed as a marginal or interlinear variant of *l*, or vice versa).

However, options (*i*) and (*j*) are not satisfactory from a linguistic point of view: given the fact that the adverb μᾶλλον functions as a syntactic bridge between τοιοῦτο(ν) and τοιούτου, through its individual bond with each of them (μᾶλλον τοιοῦτο(ν) ‘the same character to a greater degree’; μᾶλλον τοιούτου ‘to a greater degree than another thing that possesses the same character’), its omission would be problematic in a context where τοιοῦτο(ν) and τοιούτου would both be present.

Option (*k*) is linguistically more sound, but only if one takes τοιοῦτο(ν) as having not the meaning it has in the previous sentence (‘of such sort’, ‘possessing the character/quality’), but rather the anaphoric meaning of ‘such as this’, with reference to what has just been said, i.e. τοιούτου μᾶλλον τοιοῦτο(ν); the resultant translation would be:

logica greca, in W. Cavini, M.C. Donnini Macciò, M.S. Funghi, D. Manetti (edd.), *Studi su papiri greci di logica e medicina* (Florence, 1985), 7–126, especially 7–45.

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If the one is possessing the character in a greater degree than something which possesses the [same] character, while the other is not such as this [i.e. such as one possessing the character in a greater degree than something which possesses the [same] character].

This option is advantageous in many respects, since the reading μὴ τοιοῦτο(ν) is well attested in manuscripts and the text would express unambiguously rule 4. The only problem with this reading is the fact that in the context the adjective τοιοῦτο(ν) is being constantly used (more than fifteen times in section 119a alone) in the non-anaphoric indefinite sense of 'possessing a certain quality', 'possessing such-and-such a quality' (or similar), and not in the anaphoric sense of 'such as this [i.e. what has just been said]'): such a sudden change of meaning within a sentence, from the non-anaphoric (εἰ τὸ μὲν τοιούτου μᾶλλον τοιοῦτον) to the anaphoric sense of τοιοῦτο (τὸ δὲ μὴ τοιοῦτον) would be unexpected and difficult to defend.

We are thus left with option (*l*), which is the reading printed by modern editors of Aristotle and already found in one branch of the tradition of Alexander (MS P). As we have seen above, this sentence (*l*) is problematic since it displays some degree of ambiguity, as the adverb μή may seem to negate only the adjective.

Nevertheless, this sentence (*l*) could still be construed as a simplified form of sentences (*a*)–(*h*), i.e. as expressing, in an elliptic form, rule 4. This would be possible if one took the adverb μή as negating the implied copula or the predicate phrase τοιούτου [μᾶλλον τοιοῦτο(ν)], whose omitted head (μᾶλλον τοιοῦτο) would be implied by the contrast of the second premise with the preceding sentence. There are parallels of a similar use of μή in elliptic sequences, attached to a complement but negating some omitted material. Cf. for example *An. Pr.* A 29 a6-9:

οὐδ' ἂν ἑκάτερος τινὶ τῷ μέσῳ ὑπάρχῃ ἢ μὴ ὑπάρχῃ, ἢ ὁ μὲν ὑπάρχῃ ὁ δὲ μὴ ὑπάρχῃ, ἢ ὁ μὲν τινὶ ὁ δὲ **μὴ παντί,** ἢ ἀδιορίστως, οὐκ ἔσται συλλογισμὸς οὐδαμῶς.[26]

In the sentence above, the adverb **μὴ** (in bold) is not negating only the word **παντί** ('it applies to the not-whole') but the whole verb phrase παντὶ ὑπάρχῃ ('it does not apply to the whole'), whose omitted head (ὑπάρχῃ) is implied, in a sequence of contrastive sentences.

Therefore, even reading (*l*), found in most editions, could be construed as expressing, although in a very elliptic form, rule 4. Reading (*l*) seems preferable to the other options, and, if accepted in Aristotle's text, should also be printed as such in Alexander's text, thus introducing the reading of manuscript P.[27]

There is however, a final degree of simplification, which would entail ellipsis of the whole phrase:

[εἰ τὸ μὲν τοιούτου μᾶλλον τοιοῦτο (*sc.* ἐστι)],
m. τὸ δὲ μή

also, if the one possesses the character in a greater degree than something which possesses the [same] character, while the other does not [possess the character to a greater degree than something which possesses the same character].[28]

[26] 'Furthermore, if both terms apply or do not apply to some of the middle, or if one applies to some and the other does not, or if one applies to some and the other does not apply to all, or if they are related to the middle indefinitely, there will in no case be a syllogism'.

[27] As pointed out by Wallies in the preface of his edition (p. xi), manuscript P (Parisinus 1874, saec. xiii), although often corrupt, is occasionally carrier of good readings.

[28] This translation is essentially the one provided by the Loeb edition, which thus seems to be one of the most correct, although it does not explicitly discuss the issue.

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Editors have not yet suggested this reading, but it might be suitable from both a syntactic and palaeographic point of view.

To begin with, complete simplification of the second member of a contrastive comparison to an elliptical phrase with τὸ δὲ μή (or similar) is very common in Aristotle. Cf. for example:

Top. Η 152 b6-7: ἔτι ἐκ τοῦ μᾶλλον, εἰ τὸ μὲν δέχεται τὸ μᾶλλον, **τὸ δὲ μή**.
Top. Δ 125 b38-9: καθάπερ οὐδὲ τὸ αὐτὸ ζῷον ὁτὲ μὲν ἄνθρωπον εἶναι, **ὁτὲ δὲ μή**.
An. Pr. Β 70 b29: καὶ ἐν οἷς μὴ ὅλοις ἑκάτερον, ὅταν τὸ μὲν ἔχῃ, **τὸ δὲ μή**.
An. Post. Β 100 a2-3: ὥστε τοῖς μὲν γίνεσθαι λόγον ἐκ τῆς τῶν τοιούτων μονῆς, **τοῖς δὲ μή**.
De caelo Α 280 b11-12: Ἕνα δ' εἴ τι ὅλως ἀδύνατον γενέσθαι, ὥσθ' ὁτὲ μὲν εἶναι, **ὁτὲ δὲ μή**.
Eth. Eud. Β 1224 b7-8: ὅταν μὲν γάρ τι τῶν ἔξωθεν παρὰ τὴν ἐν αὐτῷ ὁρμὴν κινῇ ἢ ἠρεμίζῃ, βίᾳ φαμέν, **ὅταν δὲ μή,** οὐ βίᾳ.

All these sentences display an ellipsis of one or more phrases in the second member of a contrastive comparison introduced by μή, which would be the same construction which we find in sentence (*m*).

However, it is easy to imagine how this elliptical construction could have created some problems of interpretation for later readers of the text, who presumably opted for inserting some of the material omitted, as testified to by the various readings found in the manuscripts (τοιούτου τοιοῦτο, τοιούτου, τοιοῦτο(ν) or τοιούτου μᾶλλον τοιοῦτο). These attempts at clarifying the Aristotelian *obscuritas* did not greatly benefit Aristotle in so far as they created a dangerous ambiguity (μή negating τοιούτου), which, if our reconstruction is correct, was not present in the original text, where the adverb μή could only negate the whole of the omitted material (τοιούτου μᾶλλον τοιοῦτο).

7. CONCLUSIONS

To sum up, we believe that Aristotle at *Top.* Γ 119 a20-2 has introduced the property of trichotomy for the relations 'more than' and 'less than', as already understood by Alexander of Aphrodisias (whose τόπος does not allow for any other interpretation of Aristotle's passage). This property can be expressed by the following rule:

4) if A is more ϕ than B, and both A and B are ϕ, then if there is no D, which is ϕ, such that C is more ϕ than D, then A is more ϕ than C.

The translation we propose for the passage would be, after Barnes:

Moreover, if in any character one thing exceeds and another falls short of the same standard; also, if the one exceeds something which possesses the character, **while the other does not exceed anything which possesses the character**, then clearly the first thing exhibits that character in a greater degree.

This translation is faithful to the wording of the Greek text, in both the form printed in most editions of Aristotle (τὸ δὲ μὴ τοιούτου), and in the form printed by Wallies in his edition of the commentary ad loc. of Alexander of Aphrodisias (τὸ δὲ μὴ τοιοῦτον); both of these forms might be correct, although the former is slightly preferable to the second. Other readings (including the simplifying version found in Parisinus 1843 τὸ δὲ μὴ τοιούτου μᾶλλον τοιοῦτο) are linguistically or paleographically unsound and should be emended.

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However, it is possible that Aristotle's original text displayed a further degree of simplification, which involved omission of the whole phrase in the second premise (τοιούτου μᾶλλον τοιοῦτο), with a pattern that is common in Aristotle's contrastive comparisons.

We therefore suggest, although cautiously, printing the following text, in both Aristotle and Alexander:

ἔτι εἰ τοῦ αὐτοῦ τινος τὸ μὲν μᾶλλον τὸ δὲ ἧττον τοιοῦτο· καὶ εἰ τὸ μὲν τοιούτου μᾶλλον τοιοῦτο, **τὸ δὲ μή**, δῆλον ὅτι τὸ πρῶτον μᾶλλον τοιοῦτο.

All the other readings attested in manuscripts and editions might be construed as deriving from attempts at glossing the above text, by inserting the omitted material.

In conclusion, *Top.* Γ 119 a20-2 appears to be the only passage in which Aristotle introduced the property of trichotomy; therefore, if correctly understood, it is important for a better understanding of his comparative logic.

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