The Scope of Non-Contradiction: A Note on Aristotle's 'Elenctic' Proof in Metaphysics Γ 4

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Aristotle's proof in *Metaphysics* Γ 4 of the principle of non-contradiction (PNC) is a notorious crux. Not least of the worries is the very fact that Aristotle offers a proof in the first place, especially given his summary dismissal of those who would demand a demonstration of the principle. They are, he avers, under-trained in analytic methodology. Aristotle is aware of the worry, for he promises only that PNC can be demonstrated 'in the manner of a refutation'. This demonstration, the so-called 'elenctic proof', occupies roughly the first half of Γ 4. The proof itself is beset by a number of problems, including what Aristotle understands by the very notion of an elenctic proof.[1] In this note, however, I shall focus just on the final stage of the elenctic proof, at 1006b28-34, where PNC finally makes an explicit appearance in the proof.[2] Specifically, I am interested in the manner of the principle's appearance, for Aristotle appears to argue in this final stage only that PNC holds for essential predications about substances. This has lead a number of commentators to suppose that Aristotle backs away from a fully general version of PNC. This

1 For some discussion of these, see Wedin 'Some Logical Problems in *Metaphysics* Gamma', forthcoming; and for some of the literature on the topic see the Bibliographical Appendix.

2 I actually take the elenctic proof to extend to 1007b18, but the shortening will do no harm here. On this see Wedin, 'Some Logical Problems'.

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would not be a welcome result. In what follows, I suggest a way to extend the result of the elenctic proof to a fully general version of PNC.[3]

Here is the passage in question:

> It is accordingly necessary, (α) if it is true of anything to say that it is a man, that it be a two-footed animal (for that was what "man" signified); and (β) if that is necessary, it is not possible that the same thing should not be, at that time, a two-footed animal ... Consequently, (γ) it is not possible that it should be simultaneously true to say that the same thing is a man and is not a man. (1006b28-34)[4]

The argument proceeds by example but is meant to be general in effect. Just how general will depend on exactly what is proved and this requires a careful look at the argument's form. Aristotle begins in (α) with a premise that has been taken in two ways by commentators. Depending on whether necessity is given wide or narrow scope, we have

1a. 'M' signifies $T \to \Box(x)(Mx \to Tx)$,

or

1a′. 'M' signifies $T \to (x)(Mx \to \Box Tx)$.

Choice of (1a) or (1a′) will yield slightly different versions of the argument. With (1a) the argument continues:

1b. $\Box(x)(Mx \to Tx) \to \neg\Diamond(\exists x)(Mx \wedge \neg Tx)$,

1c. $\neg\Diamond(\exists x)(Mx \wedge \neg Tx) \to \neg\Diamond(\exists x)(Mx \wedge \neg Mx)$,

and, thus, given that 'M' signifies *T*, we may conclude

1d. $\neg\Diamond(\exists x)(Mx \wedge \neg Mx)$,

which is just the ontological version of PNC. So here, finally, we appear to have our proof. Because it gives wide scope to the necessity operator, I shall refer to (1a) - (1d) as the 'wide-scope' version of the proof.

3 An earlier discussion is available in Wedin, 'Aristotle on the Range of the Principle of Non-Contradiction,' *Logique et Analyse* 97, 1982, 87-92.

4 Kirwan translation, *Aristotle's Metaphysics: Books* Γ, Δ, Η (Oxford).

The 'narrow-scope' version of the proof, so-called because it begins in (1a′) with a narrow-scope reading of the necessity operator, continues in parallel with the first version:

1b′. $(x)(Mx \rightarrow \Box Tx) \rightarrow \neg(\exists x)(Mx \wedge \Diamond\neg Tx)$.

But in order to get the crucial counterpart to (1c), it requires two additional assumptions:

1b″. $\neg(\exists x)(Mx \wedge \Diamond\neg Tx) \rightarrow \neg(\exists x)(Mx \wedge \Diamond\neg Mx)$,

and

1b‴. $\neg(\exists x)(Mx \wedge \Diamond\neg Mx) \rightarrow \neg\Diamond(\exists x)(Mx \wedge \neg Mx)$.

With these two assumptions we get, parallel to the first version,

1c′. $\neg(\exists x)(Mx \wedge \Diamond\neg Tx) \rightarrow \neg\Diamond(\exists x)(Mx \wedge \neg Mx)$,

and, again on the assumption that 'M' signifies *T*, we conclude as before

1d′. $\neg\Diamond(\exists x)(Mx \wedge \neg Mx)$.

Now both versions of the argument make use of a notion of signification, in (1a) and (1a′), and it is clearly the notion that is at work in the first stage of the elenctic proof. There, at 1006a31-4, Aristotle shows a clear preference for a modally laden notion of signification, in effect opting registered for

2a. 'M' signifies one thing, $T \equiv (x)(x \text{ is } M \rightarrow T \text{ is what it is to be } x)$.

rather than the weaker formulation

2b. 'M' signifies one thing, $T \equiv (x)(x \text{ is } M \rightarrow x \text{ is } T)$.

We now see why: the notion of signification in (1a)/(1a′) must support an explicit modal claim and (2a) seems tailor-made for this purpose. Moreover, the second stage of the elenctic proof also gets a role in the story.[5] On the assumption that 'not-M' signifies *not-T*, the second stage, 1006b13-28, shows that one could not hold that an *x* that is *M* could also

5 For more on how the first and second stages function in the overall argument, see Wedin (forthcoming).

be T and *not-T*. This figures as something like a deep assumption behind, for example, (1b). Thus, we may fairly paraphrase Aristotle's remark in (β): '... if that is necessary, it is not possible that the same thing should not be, at that time, a two-footed animal (otherwise, "man" and "not-man" would have the same signification, which they cannot).'

If these considerations confirm that the elenctic argument is governed by a unified strategy, it is confirmation at a cost. For just as the notion of signification in (2a) is suited for essential predication, so the final proof appears to hold for 'Mx' as an essential predication. If so, the elenctic proof as a whole may prove at most that PNC holds for things and their *essential* properties. This is troubling because a chief effect of the elenctic proof is to confirm the *firmness* of PNC by supporting, albeit 'elenctically', the principle that was used in Γ 3's Indubitability Proof to prove its own firmness, and this must be an unrestricted version of PNC because it must be a principle that is immune to *all* error.

We can get clearer on what is at issue here by considering Kirwan's (1971) view of Stage 3 of the argument. The narrow-scope version requires additional premises, (1b″) and (1b‴). This plus Aristotle's wording in (α) of the text, cited above, favor the wide-scope reading. But Kirwan has a more serious objection to the narrow-scope version, namely, that 'Mx' can imply '$\Box Tx$', only if the first arrow in (1b′) is read as strict implication and, hence, only if 'Mx' is an essential predication. In short, (1b′) is satisfied only by essential predications and so also for the conclusion, (1d′). According to Kirwan, however, (1b) is not so restricted and so the wide-scope version of the argument holds out hope for proving an unrestricted version of PNC.

But even if its '$\rightarrow$' is not read as strict implication, surely (1b)'s modal formula, $\Box(x)(Mx \rightarrow Tx)$, is satisfied only by Aristotelian essential predications. For interpretation of the formula is governed by (2a), which requires that T be the essence of x. This is clear from instantiating the formula with non-essential T. So far from being even contingently true, it is plainly false that if Callias is white that he is a color, while it is true, and necessarily so, that if he is a man, he is a two-footed animal. So the truth of (1b)'s antecedent also depends on construing 'Mx' as a schema for essential predication.

In either version, then, the elenctic argument would prove PNC for a restricted class of predications. Łukasiewicz (1910a, 1910b) and Anscombe (1963) reduce these to essential predications about substances.[6] By thus construing the range of values for the universal quantifiers of (1b) and (1b′) to be substance individuals, they preclude any interpretation relating Stage 3 to a general defense of PNC. But notice that even were Łukasiewicz, Anscombe, and their followers, correct about the force of the elenctic proof, it would not follow that Aristotle affirms PNC as a restricted principle.[7] Łukasiewicz is tempted to do this when he declares (1910b, 502) that PNC is not a general ontological law but rather a metaphysical one holding primarily for substances but not, at least not obviously, for appearances as well. However, there simply is no evidence that Aristotle would entertain such a restriction. Indeed, *On Interpretation* features just such predicates in offering, as standard *contradictory* assertions, 'Socrates is white' and 'Socrates is not white.' Moreover, a good deal of the argument of Γ 5 aims to establish that the perceptible domain does not fall outside the scope of PNC.

Even taking the elenctic proof as it stands, there is no reason to restrict its conclusion substance individuals only. Allowing accident individuals to count as values does not vitiate the argument and, more importantly, opens the way to a fully general PNC.

That the argument's validity is unaffected by allowing '$\Box(x)(Mx \rightarrow Tx)$' to range over non-substantial individuals is clear from example. Let 'α' be the name of a color individual. Then it is a necessary truth that if α is white then α is a color. Likewise, for the narrow-scope formula, $(x)(Mx \rightarrow \Box Tx)$. If α is white, then α is necessarily a color. Moreover, because it is a *color* individual, α is essentially white and so the constraint on essential predication is satisfied on both versions of the argument.[8]

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6 They appear to be followed by Furth ('A Note on Aristotle's Principle of Non-Contradiction', *Canadian Journal of Philosophy* 16 [1986] 371-82), Hutchison ('L' Épistémologie du Principe de Contradiction chez Aristote', *Revue de Philosophie Ancienne* 6 [1988] 213-227), and Cresswell ('Non-Contradiction and Substantial Predication', forthcoming).

7 *Were* the argument to establish PNC for substances only, one would rather seek to explain this restriction in a way that related it to Aristotle's program in *Metaphysics* Γ. Thus, Cresswell, 'Non-Contradiction', suggests that the argument's focus on substances reflects the fact that Γ installs them at the center of the science of being *qua* being. But this just gives an additional reason *not* to take Aristotle to have held, in general, that PNC is a restricted principle.

8 Compare this paragraph with Furth, 'Note', who offers a more sanguine opinion of Anscombe's view as 'an interesting and ... too-little-attended case for the thesis that the argument *requires* that the "one thing" be the essence of a substantial kind.' No such requirement is at hand. Although it is not clear that he recognizes the fact, Lear (*Aristotle and Logical Theory* [Cambridge 1980], 108-9) also appears committed to restricting the proof to essential predications about substances. For this is a conse-

How does this enable us to extend the range of PNC? Begin by explicitly registering the restriction on the conclusion with subscript '$_E$': $\neg\Diamond(\exists x)(Mx_E \wedge \neg Mx_E)$. Here we may read 'M' as standing for any standard predicate because, for Aristotle, any such predicate is essentially predicated of something.[9] The trick now is to use this fact to extend the elenctic proof of PNC to accidental predications.

Consider, then, a standard accidental predication, for example, 'Socrates is white'. For Aristotle the truth conditions for such a predication are not just that Socrates exist and be white. There must also obtain what I shall call a fine ontological configuration of the following sort: $(\exists x)(\exists y)$(x is a substance particular $\wedge$ x=Socrates $\wedge$ y is a color individual $\wedge$ y is in x $\wedge$ Wy_E). That is, in addition to Socrates there exists a second individual, a color individual, that is present in Socrates and that is essentially white.[10] Suppose now we consider what sort of fine configuration would have to obtain were it possible that Socrates be simultaneously white and not white. Aristotle, I suggest, requires that the following hold: $(\exists x)(\exists y)$(x is a substance particular $\wedge$ x=Socrates $\wedge$ y is a color individual $\wedge$ y is in x $\wedge$ $Wy_E \wedge \neg Wy_E$). But since the restricted conclusion of the elenctic argument, $\neg\Diamond(\exists x)(Mx_E \wedge \neg Mx_E)$, holds for any predicates whatever, it is impossible that there be a y such that $Wy_E \wedge \neg Wy_E$. Therefore, the ontological configuration that would have to obtain were it possible that Socrates be white and not white is, by the elenctic proof, an impossible ontological configuration.

The rough principle, then, that extends the elenctic proof to a fully general PNC is this:

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quence of his explanation of the modal-ladenness of (2a): 'It is the notion of substance, not signifying, which enables Aristotle to make the distinction between signifying one thing and signifying about one thing.' But this simply assumes that the pair, 'man' and *two-footed animal*, cannot serve to exemplify the general relation between a thing and its essence.

9 By a standard predicate I mean a categorial predicate, that is, a predicate from any category. For more on this see Wedin, 'The Strategy of Aristotle's *Categories*', *Archiv für Geschichte der Philosophie* 79 [1997] 1-26, and *Aristotle's Theory of Substance: The Categories and Metaphysics Zeta* (Oxford, forthcoming).

10 These are the items demarcated in the *Categories* as present in, but not said of, a subject. On the claim that such items are nonrecurrent particulars, see Wedin ('Nonsubstantial Individuals', *Phronesis* 38 [1993] 137-165).

$$3.\ \Diamond(\exists x)(Fx \wedge \neg Fx) \rightarrow \Diamond(\exists x)(\exists y)(y{=}x \vee y{\in}x \wedge Fy_{\mathrm{E}} \wedge \neg Fy_{\mathrm{E}}),$$

where '$\in$' is read as the *Categories* 'in but not as a part'. But given the elenctic argument's prohibition against joint predication of any essential predicate and its negate, we may conclude

$$4.\ \neg\Diamond(\exists x)(\exists y)(y{=}x \vee y{\in}x \wedge Fy_{\mathrm{E}} \wedge \neg Fy_{\mathrm{E}}),$$

and so

$$5.\ \neg\Diamond(\exists x)(Fx \wedge \neg Fx).$$

In (5) we are free to read Fx as a general predicative schema accommodating accidental as well as essential predication. Thus, if Aristotle implicitly supposes something like (3), restriction of the conclusion of Stage 3 of the elenctic proof does not show him to regard PNC as a restricted principle. Indeed, it is part of proving the fully general version registered in (5).

This proposal, first suggested in Wedin (1982), has been resisted by Cresswell (forthcoming) on the grounds that 'it seems to depend on analyzing Socrates' not being white as his having in him something which is not a whiteness. But Socrates can have many such things in him and still be white.' Such reluctance would be well placed and it does appear to be invited by (3). But (3) is only a rough principle. Once we explain how it is to be interpreted, the grounds for Cresswell's reluctance are removed.

I say that (3) is a rough principle because, where $y \in x$, what can serve as the value of y depends on the predicate, F. Thus, where F is white, y will be a color individual; where F is sweet, y will be a taste individual. So understood, (3) demands, at most, that Socrates has in him a *color individual* that is not a *whiteness*. The existence of a *color* individual that is not white is incompatible with Socrates' being white. So the account does not welcome, as values of y, items that fail to exhibit the required incompatibility with Socrates's *whiteness*.[11]

11 Somewhat more fully, the idea behind (3) is that, where $x{=}y$, y will be a substance individual and F will be a species or genus that holds of it essentially; and, where $y{\in}x$, y will be a nonsubstantial individual of a certain kind, say a bit of white, and F will be a universal such as *white* or *color* that holds of it essentially. So y will always be an individual from a determinate range, in the case at hand, a *color individual*. Cases where x is a nonindividual with F holding of it essentially could be handled by adding a proviso corresponding to the *Categories said-of* relation.

A second objection to extending the result of the elenctic proof to a fully general PNC is that the possibility of Socrates' simultaneously being white and not white could as well be explained by the possibility that an essentially white color individual exist and not exist. Rather than (3) we would have

3a. $\Diamond(\exists x)(Fx \wedge \neg Fx) \rightarrow \Diamond((\exists x)(\exists y)(y{=}x \vee y{\in}x \wedge Fy_{\mathrm{E}}) \wedge \neg(\exists x)(\exists y)(y{=}x \vee y{\in}x \wedge Fy_{\mathrm{E}}))$.

While the consequent of (3a) is false, and so would imply $\neg\Diamond(\exists x)(Fx \wedge \neg Fx)$, its falsity is due to straightforward infringement of PNC. Here it is not obvious how the elenctic proof can be brought to bear on a general version of PNC.

Now, one response to this situation would be to simply insist that we *do* have an interpretation that extends the result of the elenctic proof and, hence, we need not follow Łukasiewicz and others in saddling Aristotle with the thesis that PNC holds only for essential predications — *even if* the conclusion of Stage 3 is so restricted. But we want something stronger, something that reflects Aristotle's settled view that PNC *must* not be so restricted.

Suppose we begin with an instance of the general formula that starts (3a), say, the proposition *that Socrates is white and not white*. Representing subject and predicate in the standard way, we replace (3a), which is shorthand anyway, with the more fine-grained formulation,

3a′. $\Diamond(Fa \wedge \neg Fa) \rightarrow \Diamond((\exists x)(\exists y)(x$ is a substance individual $\wedge\ x{=}a \wedge y$ is a color individual $\wedge\ y{\in}x \wedge Fy_{\mathrm{E}}) \wedge \neg(\exists x)(\exists y)(x$ is a substance individual $\wedge\ x{=}a \wedge y$ is a color individual $\wedge\ y{\in}x \wedge Fy_{\mathrm{E}}))$.

(3a′) just combines the Aristotelian truth conditions for 'Fa' and '$\neg Fa$'. So it would be unreasonable to challenge it on this basis. What is at issue is the way to understand the truth conditions for '$\neg Fa$', when this is paired with its contradictory opposite. Contained in the second main conjunct of the consequent of (3a′), these truth conditions can be expanded further. Thus, *that Socrates is not white* is the case, if (i) there exists no substance individual identical with Socrates, or if (ii) there exists no color individual, or if (iii) both exist but the color individual is not in Socrates, or if (iv) both exist and the color individual is in Socrates but is not essentially white. For convenience, represent these disjunctive alternatives as follows:

3b. (i) $\neg(\exists x)(x$ is a substance individual $\wedge\ x{=}a)$;
(ii) $\neg(\exists y)(y$ is a color individual$)$;

(iii) $(\exists x)(\exists y)(x$ is a substance individual $\wedge\ x{=}a \wedge y$ is a color individual $\wedge\ y \notin x)$;
(iv) $(\exists x)(\exists y)(x$ is a substance individual $\wedge\ x{=}a \wedge y$ is a color individual $\wedge\ y \in x \wedge \neg F y_E)$.

The task now is to determine which of these conditions is relevant to the case at hand. That is, which of the four disjuncts can contribute to a description of what the world would have to be like were it possible that Socrates be white and not white. It is important to bear in mind that Aristotle requires, fairly, that this possibility hold for *one and the same thing*. For his version of PNC denies that there could exist something, some one and the same thing, that was white and not white. This excludes the first disjunct. For according to (3b[i]), there will be no one and the same thing that is the putative subject of the contradictory assertions, Fa and $\neg Fa$. The second and third disjuncts are now seen to be hardly more plausible. For this one and the same thing, whose existence is required, will be the subject of contradictory assertions either because there exist no color individuals at all, as in (3b[ii]), or because color individuals exist, but not in the subject in question, as in (3b[iii]). However, these are proposals that Aristotle can hardly accept, for they run afoul of a favored principle governing the relation between basic subjects and their accidents.

The principle is a generalization of propositions like

3c. $(x)(\exists y)(x$ is a substance individual $\wedge\ y$ is a color individual $\wedge\ y \in x)$,

to use the case at hand. (3c) says that any substance individual must in it have some color individual or other. This was just the point made five paragraphs back, in responding to Cresswell. More globally, analogues of (3c) hold for items from the accidental categories generally. Thus, any substance individual must be at some place or other, of some size or other, in relation to some thing or other, etc. Indeed, this generalization arguably lies at the heart of the theory of primary substance developed in the *Categories*.[12] So the second and third disjuncts, (3b[ii]) and (3b[iii]), are not plausible.

12 See Wedin, 'The Strategy of Aristotle's *Categories*' and Moravcsik, 'Aristotle's Theory of Categories', in *Aristotle: A Collection of Critical Essays* (Notre Dame 1967). Actually, (3c) turns out to call for some modification. On this see Wedin, 'Some Logical Remarks'.

We are, thus, left with the fourth alternative, (3b[iv]). This alone could play a role in specifying what the world would have to be like were it possible that Socrates be white and not white. Such a world would have to satisfy

3a″. $\Diamond(Fa \wedge \neg Fa) \rightarrow \Diamond(\exists x)(\exists y)(x$ is a substance individual $\wedge\ x{=}a \wedge y$ is a color individual $\wedge\ y \in x \wedge Fy_{E} \wedge \neg Fy_{E})$;

but this way of the world is precisely what the elenctic proof declares impossible, when it proscribes joint ascription of an essential predicate and its negate. So we are, after all, able to extend this result to a fully general PNC in precisely the manner prescribed by our principle (3). Of course, (3c), and its underlying generalization, introduces additional, non-logical, considerations, but these are entirely neutral with respect to the immediate question. For (3c) is part of an ontological scheme that is proposed quite independently of an interest in PNC and of worries about the range of the principle. At the very least, the principle enhances the Aristotelian credentials of (3a″).[13]

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13 Cresswell (forthcoming) takes the point of restricting the proof to be the establishing of PNC as a metaphysical principle, rather than as a logical law. But surely our (5) can be read as a metaphysical principle and it is completely general. Likewise, we now see, for (3). Proponents of the restricted reading also run up against a textual and an interpretative consideration. Textually, as Cresswell is aware, the canonical formulation of PNC at 1005b18-20 shows no hint of restriction; and, when Aristotle finishes the elenctic proof, his formulation again appears to be fully general. On the interpretive side, it often goes unnoticed, and so bears repeating, that Γ 4 aims to establish PNC *because* it enters as a premise in the proof of its own firmness — Γ 3's Indubitability Proof. Since this concerned a principle that was immune to *all* error, it would be odd, indeed, were Aristotle to admit that certain instances of $\neg(p \wedge \neg p)$ do not enjoy such immunity.

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