ARISTOTLE'S ARGUMENT FOR THE NECESSITY OF WHAT WE UNDERSTAND

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1. We think we only understand necessities?

ARISTOTLE FAMOUSLY introduces unqualified understanding or *epistēmē haplōs*, the central intellectual achievement he will be concerned with in *Posterior Analytics* 1, as follows:

[1] *Ἐπίστασθαι δὲ οἰόμεθ' ἕκαστον ἁπλῶς, ἀλλὰ μὴ τὸν σοφιστικὸν τρόπον τὸν κατὰ συμβεβηκός, ὅταν τήν τ' αἰτίαν οἰώμεθα γινώσκειν δι' ἣν τὸ πρᾶγμά ἐστιν, ὅτι ἐκείνου αἰτία ἐστί, καὶ μὴ ἐνδέχεσθαι τοῦτ' ἄλλως ἔχειν.* (*Post. An.* 1. 2, 71^{b}9–12)

> We think we understand [*ἐπίστασθαι*] something without qualification (and not in the sophistical way, incidentally) whenever we think we know the explanation because of which the thing is, that it is its explanation, and also that it cannot be otherwise.[1]

On the interpretation favoured by most commentators, Aristotle is claiming that this intellectual achievement requires not only grasping some fact together with its explanation; the fact whose explanation

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[1] For the text of the *Prior* and *Posterior Analytics* I rely on W. D. Ross (ed.), *Aristotle's* Prior *and* Posterior Analytics [*Prior* and *Posterior Analytics*] (Oxford, 1949). Translations from the *Posterior Analytics* are based on J. Barnes, *Aristotle:* Posterior Analytics, 2nd edn [*Posterior Analytics*, 2nd edn] (Oxford, 1993), with some modifications. Other translations are my own, unless marked.

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we grasp must itself be necessary.[2] Aristotle frequently repeats the claim that what we have *epistēmē* of—the *epistēton* or object of understanding—is necessary or 'cannot be otherwise',[3] and this claim serves as an important premiss in several arguments he gives in *Posterior Analytics* 1.[4] Aristotle's reasons for holding it, however, are not easy to discern.

Aristotle presents his characterization of what it is to understand in [1] as a point of general agreement, something 'we think' (*οἰόμεθ'*,

[2] See J. Barnes, *Posterior Analytics*, 2nd edn, 90–1; R. D. McKirahan, *Principles and Proofs* (Princeton, 1992), 23; W. Detel, *Aristoteles:* Analytica posteriora [*Aristoteles*], 2 vols. (Berlin, 1993), ii. 37–8; G. Fine, 'Aristotle on Knowledge', *Elenchos*, 14 (2010), 121–55, reprinted in ead., *Essays in Ancient Epistemology* (Oxford 2021), 221–42 at 223; D. Bronstein, *Aristotle on Knowledge and Learning:* The Posterior Analytics [*Aristotle on Knowledge and Learning*] (Oxford, 2016), 36; and M. Burnyeat, 'Aristotle on Understanding Knowledge', in E. Berti (ed.), *Aristotle on Science:* The Posterior Analytics (Padua, 1981), 97–139 at 98; but see also L. Angioni, 'Aristotle's Definition of Scientific Knowledge', *Logical Analysis and History of Philosophy* 19 (2016), 140–66 for an unorthodox interpretation according to which Aristotle only means that a cause of a scientifically known fact is necessarily that cause and no other. I will assume the orthodox interpretation here. Two other ambiguities about this passage deserve brief mention. First, the scope of *γινώσκειν* is ambiguous in [1], which makes it unclear whether the last clause says only that the things of which we have *epistēmē* are in fact necessary or that we know that they are. Most interpreters favour the latter, but I won't take a stand on this issue here. My interest is in the claim that it is of necessities, which follows on all of the orthodox interpretations listed above. Second, Aristotle's term *πρᾶγμα* is general enough to cover not just propositional knowledge, and so not just 'facts' known, but also e.g. knowing the eclipse. See discussion in Bronstein, *Aristotle on Knowledge and Learning*, 55 and, on this issue in the context of *Post. An.* 1. 33, see G. Fine, 'Aristotle's Two Worlds: Knowledge and Belief in *Posterior Analytics* 1. 33' ['Aristotle's Two Worlds'], *Proceedings of the Aristotelian Society*, 110 (2010), 323–46, reprinted in ead., *Essays in Ancient Epistemology*, 243–61 at 247–8. Aristotle is *at least* saying that we understand necessary facts or states of affairs, whether or not he also thinks that we know some other kind of 'necessity', and my focus here will be on the claim about factual knowledge. See Detel, *Aristoteles*, ii. 38 and Angioni, 'Aristotle's Definition of Scientific Knowledge', 142–5 for reasons to take Aristotle to be talking exclusively about knowledge of facts in [1].

[3] See *Post. An.* 1. 4, $73^{a}22$ and 1. 33, $88^{b}31$, $89^{a}10$ for 'necessary' (*ἀναγκαῖον*). 'Cannot be otherwise' renders a number of closely related expressions: *μὴ ἐνδέχεσθαι . . . ἄλλως ἔχειν* (1. 2, $71^{b}12$), *ἀδύνατον ἄλλως ἔχειν* (1. 2, $71^{b}15$–16; 1. 4, $73^{a}21$; 1. 33, $89^{a}7$), *οὐ δυνατὸν ἄλλως ἔχειν* (1. 6, $74^{b}6$), *οὐκ ἐνδέχεται ἄλλως ἔχειν* (1. 33, $88^{b}32$). Expressions rendered by 'necessary' and 'cannot be otherwise' appear to function as ways of saying the same thing in a technical and a non-technical register: See 1. 2, $71^{b}9$–16; 1. 4, $73^{a}21$–3; and 1. 33, $88^{b}30$–$89^{a}10$.

[4] In particular at *Post. An.* 1. 4, $73^{a}21$, where it is used to argue that the premisses of demonstrations must hold *per se*; at 1. 6, $74^{b}5$–6, where it is employed in order to establish that the principles of demonstrations must also be necessary; and at 1. 33, $88^{b}30$–1, where this conclusion is then used to argue that *epistēmē* and *doxa* have distinct objects. I discuss these passages below.

Post. An. 1. 2, 71^{b}9), or, as he says elsewhere, that 'we all presume' (*πάντες . . . ὑπολαμβάνομεν*).[5] This presumption is correct, he tells us, since all people take themselves to satisfy the characterization in [1] when they have *epistēmē*, and people who really have *epistēmē* truly do satisfy it, concluding (*ὥστε*, 71^{b}15) that 'that of which we have unqualified understanding cannot be otherwise' (*οὗ ἁπλῶς ἔστιν ἐπιστήμη, τοῦτ' ἀδύνατον ἄλλως ἔχειν*, 71^{b}15–16). While this might serve to elicit assent from those who already accept this claim, perhaps without having reflected upon their acceptance of it, this statement will obviously not convince anyone who doubts that *epistēmē* is of necessities. It takes as a premiss that people who have *epistēmē* really are in the condition described in [1], which is to say *inter alia* that what people understand is a necessity. As an argument for the claim that *epistēmē* is of necessities, it is plainly circular.

Given this, we might wonder whether Aristotle is simply reporting a feature of the way the verb *ἐπίστασθαι* is used in Greek. As Jonathan Barnes points out, however, Aristotle's claim does not capture how this verb functions any more than it describes how 'know' functions in English.[6] There is, in both languages, the 'epistemic' use of modal language, as when in English we say that something 'must' be so in order to express that we take what we know to imply it.[7] But to say that what we know is 'necessary' in this sense is to say only that any fact known is implied by the sum total of our knowledge.[8] This is clearly not all that Aristotle means: in elaborating the claim that *epistēmē* is of necessities, he adds that they are 'eternal' (*ἀίδια*) and 'subject neither to generation nor corruption' (*ἀγένητα καὶ ἄφθαρτα*, *NE* 6. 3, 1139^{b}24; cf. *Post. An.* 1. 8, 75^{b}24–30). There is little reason to think that ordinary Greek speakers would have assented to such characterizations of what

[5] *NE* 6. 3, 1139^{b}19–20. See also *Post. An.* 1. 2, 71^{b}9, 13–15 and 1. 33, 89^{a}6–9.

[6] Barnes, *Posterior Analytics,* 2nd edn, 91. Cf. R. Bolton, 'Science and Scientific Inquiry in Aristotle: A Platonic Provenance' ['Science and Scientific Inquiry'], in C. Shields (ed.), *The Oxford Handbook of Aristotle* (Oxford, 2012), 46–59 at 46–7, Fine, 'Aristotle's Two Worlds', 251.

[7] For examples of *δεῖ* used to express epistemic necessity, see E. Ruiz Yamuza, *Tres verbos que significan 'deber' en griego antiguo* (Zaragoza, 2008), 107–13. On the use of modal predicates to express epistemic necessities in ancient Greek see also S. Danesi, C. Johnson, and J. Barðdal, 'Where Does the Modality of Ancient Greek Modal Verbs Come from?', *Journal of Greek Linguistics*, 18 (May 2018), 45–92.

[8] On this, see also A. Kratzer, 'What "Must" and "Can" Must and Can Mean', *Linguistics and Philosophy*, 1 (1977), 337–55.

they knew any more readily than speakers of English will.[9] Why, then, does Aristotle hold that the object of *epistēmē* is a necessity—let alone present this as a point of general agreement?

Scholars who do not put Aristotle's claim down to confusion[10] often point out that Aristotle is not attempting to capture every way that *epistēmē* and its cognates were legitimately used.[11] Aristotle only means to be talking about what we aim for in science and other systematic endeavours. This requires a principled understanding of some topic or field;[12] it is the type of knowledge we ascribe when we praise people as knowledgeable, rather than when we say that someone knows how to get home. 'Scientific knowledge', 'disciplinary mastery', and 'understanding' have, with good reason, been suggested as alternative translations,[13] and I will speak here of 'understanding' or 'scientific understanding'[14] to distinguish Aristotle's topic from other sorts of knowledge.[15]

[9] R. Pasnau, 'Epistemology Idealized', *Mind*, 122 (2013), 987–1021 at 991 remarks: 'No conversation with an ordinary Athenian, no matter how one-sided, could plausibly have elicited the result that knowledge concerns a proposition that is necessary and universal.' But see J. Hintikka, 'Time, Truth and Knowledge in Ancient Greek Philosophy', *American Philosophical Quarterly*, 4 (1967), 1–14 at 7 for a different view.

[10] For a pessimistic appraisal, see T. Ebert, 'Review of Mignucci, *L'argomentazione dimostrativa in Aristotele* and Barnes, *Aristotle:* Posterior Analytics' ['Review of Mignucci'], *Archiv für Geschichte der Philosophie*, 62 (1980), 85–91 at 89–90, who takes Aristotle's theory of science to rest on a scope fallacy. Ebert takes Aristotle to slide from the correct but mundane observation that if S knows p, it necessarily follows that p is true, to the erroneous thesis that if S knows p, then p is necessarily true.

[11] See Barnes, *Posterior Analytics,* 2nd edn, 91, as well as Detel, *Aristoteles*, ii. 54, M. Mignucci, *L'argomentazione dimostrativa in Aristotele* (Padua, 1975), 16–17, Bolton, 'Science and Scientific Inquiry', 52 and C. C. W. Taylor, 'Aristotle's Epistemology', in S. Everson (ed.), *Epistemology* (Cambridge, 1990), 116–42 at 116.

[12] See Burnyeat, 'Aristotle on Understanding Knowledge', 106, and J. H. Lesher, 'On Aristotelian *ἐπιστήμη* as "Understanding"' ['*Ἐπιστήμη* as "Understanding"'], *Ancient Philosophy*, 21 (2001), 45–55 at 50.

[13] See Ross, *Prior and Posterior Analytics*, for 'scientific knowledge'; Burnyeat, 'Aristotle on Understanding Knowledge', for 'understanding'; and Lesher, '*Ἐπιστήμη* as "Understanding"', for 'disciplinary mastery'. Fine, 'Aristotle's Two Worlds', 246, takes Aristotle to be talking about 'High-Level Knowledge', at least in *Post. An.* i. 33, but Fine, 'Aristotle on Knowledge', 225–6 is ambivalent about how to take Aristotle elsewhere.

[14] I use the modifier 'scientific' only for emphasis; in what follows, the terms 'understanding' and 'scientific understanding' should be taken to be synonymous.

[15] In translating *epistēmē* as 'understanding', I do not mean to endorse Burnyeat's thesis that Aristotelian *epistēmē* should be thought of as understanding *rather than* knowledge (Burnyeat, 'Aristotle on Understanding Knowledge', 102). As Fine has

If it is only understanding in this narrow sense that Aristotle takes to be of necessities,[16] then Aristotle's claim does not rule out other types of knowledge or understanding having contingencies as their objects. Hence, it need not be taken to defy ordinary language. When Aristotle cites this as a point of general agreement, he may be indicating agreement regarding this specific kind of knowledge between himself and his philosophical peers.[17] It would then be understandable that Aristotle moves over the claim swiftly. Even if we grant all this, however, we are still far from understanding the motivation for this view. Why should Aristotle—or any philosopher—take *necessities* to be what we understand in this specific sense? What is it about *epistēmē* in the sense at issue which restricts its objects to necessities?[18]

pointed out, Aristotle's close association of *epistēmē* with explanation does not show that he is not using it to describe a kind of justified true belief. He might be understood as giving an account of justification which requires grasping an appropriate explanation, and an account of knowledge which requires this sort of justification (Fine, 'Aristotle on Knowledge', 232). In that case, we could say that *epistēmē* is a kind of knowledge tantamount to understanding. For further recent discussion of this issue with a focus on Plato, see W. Schwab, 'Explanation in the Epistemology of the *Meno*', *Oxford Studies in Ancient Philosophy*, 48 (2015), 1–36 and id., 'Understanding *epistēmē* in Plato's *Republic*', *Oxford Studies in Ancient Philosophy*, 51 (2016), 41–85.

[16] This is presumably part of what Aristotle means when he specifies that he is 'speaking in a precise way' (*ἀκριβολογεῖσθαι*, *NE* 6. 3, 1139^{b}19) or referring to *epistēmē* in an 'unqualified' sense (*ἁπλῶς*, *Post. An*. 1. 2, 71^{b}9).

[17] Proposals vary regarding who in particular Aristotle might have taken himself to agree with: Plato (Bolton, 'Science and Scientific Inquiry'); 'the Academy' (S. Broadie (pers. comm.) and C. Rowe (trans.), *Aristotle:* Nicomachean Ethics [*Nicomachean Ethics*] (New York, 2002), 365); or Aristotle's own school (J. Barnes, *Aristotle's* Posterior Analytics, 1st edn [*Posterior Analytics*, 1st edn] (Oxford, 1975), 97). Ebert, 'Review of Mignucci', 90, Barnes, *Posterior Analytics,* 2nd edn, 91, and Burnyeat, 'Aristotle on Understanding Knowledge', 108 n. 23, on the other hand, reject the interpretive hypothesis that Aristotle means to restrict his claim to some group of philosophical peers.

[18] This is a question which we must ask even if, like Robert Pasnau, we take Aristotle to be describing the 'ideal limit of human inquiry', rather than a cognitive state that Aristotle thinks he or perhaps anyone has actually achieved (Pasnau, 'Epistemology Idealized', 994). If Pasnau's hypothesis is correct, then it is perhaps easier to see why Aristotle takes *epistēmē* to require a grasp of an explanation, since it is plausible to think that the best cognitive grasp of reality as a whole would include knowing not just facts but understanding the reason why these facts hold (Pasnau, 'Epistemology Idealized', 995). Pasnau does not, however, explain why Aristotle requires *epistēmē* to be only of necessities, and the supposition that Aristotle is talking about an ideal cognitive state does little to explain this. Why should the ideal type of knowledge consist in only knowing a certain type of fact (*viz*. necessities)? It seems, on the face of it, equally plausible to say that the ideal

In Myles Burnyeat's view, the fact that *epistēmē* in the relevant sense is scientific understanding explains this immediately. Since, according to Burnyeat, science is concerned to explain '*general* regularities' and such regularities are 'lawlike', the objects of scientific knowledge are 'necessary connections'.[19]

If this is Aristotle's intended argument, it is nowhere made explicit. Further, the view that science is concerned only with the general and necessary is less common now than it was when Burnyeat was writing; it is, in any case, not self-evident.[20] Aristotle's own views regarding the place of particulars in scientific knowledge are not straightforward,[21] but even if we grant that Aristotle takes only generalizations to be susceptible to scientific explanation, that still does not explain why he should take scientific understanding to be only of necessities. For, famously, Aristotle distinguishes two kinds of scientific generalization: those which occur merely 'for the most part' (ὡς ἐπὶ τὸ πολύ) and those which occur 'of necessity' (ἐξ ἀνάγκης).[22] For Aristotle, then, scientific generalizations are *not* to be equated with 'necessary connections': there are also explicable regularities which permit of exceptions. Hence, even if Burnyeat is right that Aristotle takes science to deal only with generalizations, this does not explain why he restricts scientific understanding to necessities.[23]

aim of inquiry should be to know the world in all of its contingent detail. For this reading, see also Taylor, 'Aristotle's Epistemology', 122, and discussion in Fine, 'Aristotle on Knowledge', 224–6.

[19] 'What gets explained in the sciences . . . is *general* regularities and connections: lawlike regularities in the modern jargon, necessary connections in Aristotle's' (Burnyeat, 'Aristotle on Understanding Knowledge', 109).

[20] This is stressed in N. Cartwright, 'Why Trust Science?', *Proceedings of the Aristotelian Society*, 120 (2020), 237–52. Burnyeat's points of reference seem to be proponents of the Deductive-Nomological model defended in the middle of the century by Carl Hempel and those building on this account (see especially C. G. Hempel, 'Aspects of Scientific Explanation', in id., *Aspects of Scientific Explanation and Other Essays in the Philosophy of Science* (New York, 1965), 331–469; M. Friedman, 'Explanation and Scientific Understanding', *Journal of Philosophy*, 71 (1974), 5–19).

[21] Aristotle consistently treats scientific knowledge of particulars as secondary in the *Post. An.* (see especially 1. 8, $75^{b}24$–6; 1.31, $87^{b}30$–$88^{a}2$), but he never denies that facts about particulars can be explained, and $87^{b}39$–$88^{a}2$ presupposes that they can be, at least in some cases. He also seems to take a different view in *Metaph. M.* 10, $1087^{a}15$–21, and possibly *Pr. An.* 2. 21, $67^{a}27$–$67^{b}5$.

[22] *Metaph. E.* 2, $1026^{b}27$–35. See also *Post. An.* 1. 30, $87^{b}19$–25; 1. 32, $88^{b}7$–8; and *Pr. An.* 1. 13, $32^{b}18$–22.

[23] This criticism could be extended to L. P. Gerson, *Ancient Epistemology* (Cambridge, 2009), 67–9 and B. van Fraassen, 'A Re-Examination of Aristotle's Philosophy of Science', *Dialogue*, 19 (1980), 20–45 at 25–8, who both emphasize

Robert Bolton takes a different approach to this problem. He argues that both Aristotle's claim and his argument for the claim are carried over from Plato.[24] While he does not deny that understanding must, for Aristotle, be accompanied by scientific explanation, he differs from Burnyeat in taking the 'root idea' ('Science and Scientific Inquiry', 50) motivating Aristotle's various assertions about *epistēmē* and its objects to be a Platonic view that knowledge possesses 'a certain, strong reliability' and is such as to 'not ever rationally let you down' (53).

In Bolton's view, this motivates the restriction of scientific knowledge to necessities in the following way: the only sort of knowledge which is absolutely reliable is, for Plato and Aristotle, a grasp of a thing's essence, or some knowledge that derives in an appropriate way from this grasp. But Aristotle takes all of the facts

that what is explained in science is a non-incidental regularity in their respective expositions of Aristotle's view.

[24] F. Solmsen, *Die Entwicklung der Aristotelischen Logik und Rhetorik* (Berlin, 1929), 143, also argues that the theory of demonstration, together with its requirement that *epistēmē* be of necessities, was an expression of Aristotle's early Platonism and that the theory was only later refined into a more distinctive view in the *Prior Analytics*. This interpretation is criticized in Ross, *Prior and Posterior Analytics*, 6–22, but Ross does not address Solmsen's specific claim that Aristotle's association of *epistēmē* with necessity in the *Posterior Analytics* is a Platonic holdover. I will not here try to establish whether Plato held that *epistēmē* or some other kind of knowledge was only of necessities. In any case, the evidence Bolton cites is not decisive. As he admits (Bolton, 'Science and Scientific Inquiry', 48), Plato tends not to use the word 'necessary' (*ἀναγκαῖον*) to describe the special character of knowledge of what a thing is, preferring to describe the object of this type of knowledge as what 'is', in a technical sense that is opposed to what 'becomes' (for example at *Tim.* 27 D 5–28 A 1). Even if this is in some sense a precursor to Aristotle's notion of necessity, Aristotle's claim is that the objects of scientific knowledge have a particular *modal status*; Plato's claim in the *Timaeus* is that they have a kind of being that is excluded from becoming. While Plato's distinction between objects of *epistēmē* and objects of *doxa* in *Republic* 5 has traditionally been interpreted as expressing a close relative of Aristotle's view that *epistēmē* is of a necessity, Gail Fine has argued that Aristotle 'restricts *epistēmē* to what's necessary, whereas Plato does not do so' (Fine, 'Aristotle on Knowledge', 232; see also ead., 'Knowledge and Belief in *Republic* V', *Archiv für Geschichte der Philosophie*, 60 (1978), 121–39). In fact, Aristotle's talk of necessity in epistemic contexts more closely echoes language used by Parmenides, who takes the object of the favoured path of inquiry to be bound by 'powerful Necessity' (*κρατερή . . . Ἀνάγκη*, Parmenides D 8. 35–6 in the edition of A. Laks and G. W. Most, *Early Greek Philosophy* (Cambridge, MA, 2016); cf. D 6. 2). For interpretations on which Parmenides holds a thesis about knowledge similar to that of Aristotle as I interpret him, see H. White, *What Is What-Is? A Study of Parmenides' Poem* (New York, 2005) and especially J. Palmer, *Parmenides and Presocratic Philosophy* (Oxford, 2009).

about a thing's essence to be necessary. Hence, anything that we know with the strong reliability characteristic of *epistēmē* must be a necessity ('Science and Scientific Inquiry', 51–2).

Even if we grant that Aristotle is committed to the premisses of this argument, I do not think this adequately captures the way that he argues. Bolton does not point to a passage where Aristotle presents this line of reasoning,[25] and in fact, the way that Aristotle introduces the notion of essential predication into his discussion of understanding and its objects suggests a different and incompatible order of explanation. In the *Posterior Analytics*, essentialist notions are principally theorized in 1. 4, where Aristotle defines what it means for predications to hold 'in themselves' or *per se* (*καθ' αὑτά*) and 'universally' (*καθόλου*) as certain types of essential predication.[26] He prefaces this discussion with the following remark:

[2] *Ἐπεὶ δ' ἀδύνατον ἄλλως ἔχειν οὗ ἔστιν ἐπιστήμη ἁπλῶς, ἀναγκαῖον ἂν εἴη τὸ ἐπιστητὸν τὸ κατὰ τὴν ἀποδεικτικὴν ἐπιστήμην· . . . ἐξ ἀναγκαίων ἄρα συλλογισμός ἐστιν ἡ ἀπόδειξις. ληπτέον ἄρα ἐκ τίνων καὶ ποίων αἱ ἀποδείξεις εἰσίν. πρῶτον δὲ διορίσωμεν τί λέγομεν τὸ κατὰ παντὸς καὶ τί τὸ καθ' αὑτὸ καὶ τί τὸ καθόλου.* (*Post. An.* 1. 4, 73[a]21–7)

Since it is impossible for that of which there is understanding *simpliciter* to be otherwise, what is understandable in virtue of demonstrative understanding will be necessary. . . . A demonstration, then, is a deduction which proceeds from necessities. We must see, then, from what items, i.e. from what kind of items, demonstrations proceed. First let us define what we mean by 'of every case', by 'in itself', and by 'universally'.

This is not the remark we would expect if Aristotle's intention were to argue that *epistēmē* must be of necessities *because* it consists in a grasp of essences. Instead, Aristotle says that we must consider these essentialist notions *because* scientific knowledge is of necessities. When, in *Posterior Analytics* 1. 6, he goes on to argue that the

[25] Bolton, 'Science and Scientific Inquiry', 51–2, takes Aristotle to be following Plato in making these claims.

[26] Aristotle introduces four senses of *per se*, but connects only two of these with the character of the object of understanding, at least explicitly (73[b]16–17; see, however, M. Ferejohn, *The Origins of Aristotelian Science* (New Haven, 1991), 109–31 and id., *Formal Causes* (New York, 2013), 91–4 on the relevance of the other senses). In these first two senses, predications hold *per se* when the predicate occurs 'in the account saying what [the subject] is' (*ἐν τῷ λόγῳ τῷ λέγοντι τί ἐστιν*) or, conversely, when the subject occurs in the predicate's essence-specifying account (73[a]34–[b]3). 'Universal' (*καθόλου*) is then defined in this chapter as being *per se* and said of all cases (73[b]26–7).

premisses of demonstrations must, in fact, have the status of *per se* predications, he explicitly calls on the necessity of what we understand as a premiss:

[3] *Εἰ οὖν ἐστιν ἡ ἀποδεικτικὴ ἐπιστήμη ἐξ ἀναγκαίων ἀρχῶν (ὃ γὰρ ἐπίσταται, οὐ δυνατὸν ἄλλως ἔχειν), τὰ δὲ καθ' αὑτὰ ὑπάρχοντα ἀναγκαῖα τοῖς πράγμασιν . . ., φανερὸν ὅτι ἐκ τοιούτων τινῶν ἂν εἴη ὁ ἀποδεικτικὸς συλλογισμός· ἅπαν γὰρ ἢ οὕτως ὑπάρχει ἢ κατὰ συμβεβηκός, τὰ δὲ συμβεβηκότα οὐκ ἀναγκαῖα.*

Ἢ δὴ οὕτω λεκτέον, ἢ ἀρχὴν θεμένοις ὅτι ἡ ἀπόδειξις ἀναγκαίων ἐστί, καὶ εἰ ἀποδέδεικται, οὐχ οἷόν τ' ἄλλως ἔχειν· ἐξ ἀναγκαίων ἄρα δεῖ εἶναι τὸν συλλογισμόν. (*Post. An.* 1. 6, 74^{b}5–15)

If demonstrative understanding proceeds from necessary principles (for what we know cannot be otherwise), and what holds of an object in itself is necessary . . . then it is clear that demonstrative deductions will proceed from certain items of this sort [*viz. per se* predications]; for everything holds either in this way or incidentally, and what is incidental is not necessary.

We must either argue like this or else posit as a principle that demonstration is of necessities, i.e. that if something has been demonstrated it cannot be otherwise—the deduction, therefore, must proceed from necessities.[27]

In this passage, Aristotle is assuming a strict dichotomy between *per se* predications, which are necessary, and incidental predications, which are not. On the basis of this assumption (whose problems need not concern us here),[28] he presents two paths of argument to the conclusion that the premisses of demonstrations are *per se* predications: either we argue from the claim that the premisses of demonstrations (what demonstrations are 'from') are necessary

[27] Here I read *ἀναγκαίων* at 74^{b}14 with the OCT against Barnes's reading of *ἀναγκαίον*. This gives a clearer contrast between the two alternatives (we argue either from the premiss that a demonstration is *from* necessities or from the premiss that it is *of* necessities), but the sense does not depend on this choice, since Aristotle makes explicit that he means that 'if something has been demonstrated, it cannot be otherwise' (*εἰ ἀποδέδεικται, οὐχ οἷόν τ' ἄλλως ἔχειν*, 74^{b}14–15).

[28] Among other problems, the so-called 'common axioms', like the principle of non-contradiction, are apparently necessities in Aristotle's view, but not necessities grounded in the essence of any given thing. On this issue, see R. Bolton, 'Aristotle on Essence and Necessity', *Proceedings of the Boston Area Colloquium in Ancient Philosophy*, 13 (1997), 113–38, esp. 117–19; M. Peramatzis, 'Aristotle on How Essence Grounds Necessity', in D. Bronstein, T. Johansen, and M. Peramatzis (eds.), *Aristotelian Metaphysics, Ancient & Modern* (Oxford, forthcoming), and M. Peramatzis, 'Aristotle on Knowledge & Belief: *APo.* I. 33' ['Aristotle on Knowledge & Belief'] (unpublished), esp. 15–16.

truths or we argue from the claim that the conclusions of demonstrations (what they are 'of') are necessary.[29] In neither case is his strategy to argue that what we understand is a necessity on the basis that it is a grasp of the essence of something; rather, he claims that we must argue for the essentiality of demonstrative premisses on the basis of the necessity of demonstrative premisses or conclusions.

The same pattern persists throughout the *Posterior Analytics*: Where we might expect to find an argument, we instead find Aristotle assuming the necessity of what we understand as a premiss. This is true in particular of 1. 33, which is devoted to clarifying the claim that understanding is of necessities while opinion (*doxa*) is of contingencies.[30] Opinion is of contingent truths, Aristotle says, because opinion and understanding (in its demonstrative and non-demonstrative varieties) are the only cognitive states that are of truths,[31] but understanding (of both these sorts) is of necessities ($88^{b}33$–7). Clearly, again, the necessity of the object of understanding is a premiss rather than a conclusion. The bulk of the chapter is then devoted to explaining 'how it is possible to opine and understand the same thing' (*πῶς . . . ἔστι τὸ αὐτὸ δοξάσαι καὶ ἐπίστασθαι*, $89^{a}11$), given that understanding is of necessities, while opinion is of contingencies. Aristotle's answer to this question, which has been interpreted in a variety of ways, need not concern us here.[32] The point is that this whole discussion is predicated on the claim that understanding is of necessities. The closest Aristotle provides to an argument for this is that it 'agrees with how things appear' (*ὁμολογούμενον . . . τοῖς φαινομένοις*, $89^{a}4$–5) because:

[29] Cf. Barnes, *Posterior Analytics,* 2nd edn, 126.

[30] See J. Moss and W. Schwab, 'The Birth of Belief', *Journal of the History of Philosophy*, 57 (2019), 1–32, esp. 6–7, for the translation of *doxa* as 'opinion' here.

[31] This is what I take him to mean by saying that they are the only states that are 'true' (*ἀληθές*) at *Post. An.* 1. 33, $89^{a}2$. There is a difficulty in reconciling this with his view at *NE* 6. 3, $1139^{b}15$–17, where he appears to recognize a wider variety of true cognitive states, which I will not attempt to resolve here.

[32] On Fine's preferred reading (Fine, 'Aristotle's Two Worlds', 261), Aristotle argues for a 'Two Worlds Theory' according to which we can have *doxa* only of propositions of the form 'it is contingent that . . .' and *epistēmē* only of propositions of the form 'it is necessary that . . .'; they are 'of' the same thing only in that the subjects of these statements can be the same. B. Morison, 'Aristotle on the Distinction between What Is Understood and What Is Believed' (unpublished), and Peramatzis, 'Aristotle on Knowledge & Belief' both defend a view on which we can have *epistēmē* of propositions that do not include an explicit necessity operator so long as we understand the proposition as being rendered necessary by essential facts. See also L. Angioni, 'Knowledge and Opinion about the Same Thing in *APo* A-33', *Dois Pontos*, 10 (2013), 255–90.

[4] *πρὸς δὲ τούτοις* (i) *οὐδεὶς οἴεται δοξάζειν, ὅταν οἴηται ἀδύνατον ἄλλως ἔχειν, ἀλλ' ἐπίστασθαι·* (ii) *ἀλλ' ὅταν εἶναι μὲν οὕτως, οὐ μὴν ἀλλὰ καὶ ἄλλως οὐδὲν κωλύειν, τότε δοξάζειν, ὡς τοῦ μὲν τοιούτου δόξαν οὖσαν, τοῦ δ' ἀναγκαίου ἐπιστήμην.* (*Post. An.* 1. 33, 89^{a}6–10)

In addition, (i) no one thinks they have an opinion in relation to something when they think that something cannot be otherwise; rather, they think they understand it. (ii) On the other hand, when [people think] that something is so but nothing prevents it from being otherwise, then [people think] they have an opinion, since opinion is of the former sort of thing, while understanding is of necessities.[33]

On the one hand, Aristotle says, echoing the language of [1], people think they have *epistēmē* rather than *doxa* when they think that something cannot be otherwise. He adds that people think they have opinion rather than understanding whenever they take something to be contingent. Aristotle accepts these 'appearances', as Gail Fine notes, but this acceptance hardly amounts to a defence of the position that understanding is of necessities.[34]

It may be tempting to conclude that Aristotle never really attempts to defend his claim that *epistēmē* is of necessities beyond these appeals to consensus. This, however, would be a mistake. We do find one explicit, albeit brief argument for the claim that the object of understanding is a necessity in the corpus which is not clearly question-begging or merely an appeal to consensus. It occurs in *NE* 6. 3, in the course of Aristotle's discussion of the intellectual virtues:

[5] *πάντες γὰρ ὑπολαμβάνομεν, ὃ ἐπιστάμεθα, μηδ' ἐνδέχεσθαι ἄλλως ἔχειν· τὰ δ' ἐνδεχόμενα ἄλλως, ὅταν ἔξω τοῦ θεωρεῖν γένηται, λανθάνει εἰ ἔστιν ἢ μή. ἐξ ἀνάγκης ἄρα ἐστὶ τὸ ἐπιστητόν.* (*NE* 6. 3, 1139^{b}19–23)

We all think that what we understand cannot be otherwise. With what can be otherwise, we do not know whether it is or not whenever it goes out of view. Therefore, the object of understanding is of necessity.[35]

[33] I have numbered the sentences (i) and (ii) for the purposes of exposition.

[34] Fine, 'Aristotle's Two Worlds', 259–60. [4] (i) is, explicitly, another appeal to consensus; depending on whether we take the final clause of [4] (ii) to fall within the scope of *οἴηται*, [4] (ii) is either another appeal to consensus or an argument that this appearance is correct, since understanding really is of necessities. In the latter case, the restriction of understanding to necessities serves again as a premiss rather than a conclusion.

[35] For the text of the *NE* I rely on I. Bywater (ed.), *Aristotelis* Ethica Nicomachea (Oxford, 1894).

This passage is seldom a point of focus in the literature, probably owing to its brevity. As Bolton reads this passage, Aristotle's 'thesis that *epistêmê* is of necessary truths is defended on the ground that *epistêmê* is something you should be able to reliably count on even apart from continued observation of the state of affairs in question to see that it does not change' ('Science and Scientific Inquiry', 53). Aristotle's first premiss, on this reading, is that *epistēmē* is something we can 'count on'—a state that we can continue to possess and employ—whether or not we observe the state of affairs we know. Given that he draws the conclusion that understanding is of necessities, Aristotle must be assuming, on this reading, that if *epistēmē* were of contingencies, then it could not be reliable in this way, since we would then need to 'observe' the relevant state of affairs in order to see whether it holds.

Aristotle says nothing here about an object of understanding being something that you can 'count on', however. Instead, he talks about the circumstances under which we cease to have knowledge of contingencies. Even if the idea that *epistēmē* is reliable in some way motivates Aristotle's premiss in [5]—and I will argue that it does—it is not accurate to gloss what Aristotle claims in [5] in this way. More to the point, Bolton does not explain on what grounds Aristotle might hold the extra premiss needed to make his argument valid. Why, that is, should knowledge of contingencies be unreliable unless we engage in some kind of ongoing observation of the state of affairs in question? At least on the face of it, this is implausible: it seems that I can know, for example, the contingent fact that Socrates died by drinking hemlock. This requires observation neither for its acquisition nor for its continued retention.

It is my object in this paper to elucidate Aristotle's reasoning in [5], and thus to explain the argument Aristotle actually gives for his claim that understanding is of necessities. While I agree with Bolton that the reliability of *epistēmē* is one of the central ideas underlying Aristotle's argument in [5], I maintain that there is another, equally basic element of Aristotle's conception of *epistēmē* which we must take into account in order to understand his reasoning. This is the idea that *epistēmē* is a *relative*, and thus depends on the existence of its object. These two features of *epistēmē* are outlined in *Categories* 7–8, which places *epistēmē* in the category of relatives and classifies it as a permanent state. Text [5] presupposes that *epistēmē* is both a relative and a permanent state, and in effect

argues that it can have the features characteristic of both of these classes only if it is of what is necessary. Aristotle's view may thus be understood as an attempt to reconcile two theses that emerge from his analysis of understanding in the *Categories*.

I proceed as follows. First (Section 2), I examine Aristotle's claim that understanding is a 'relative' (*πρός τι*) in *Categories* 7. Then (Section 3), I consider the grounds on which Aristotle categorizes understanding as a 'state' (*ἕξις*) in *Categories* 8. I argue that these two characterizations lead to a tension. In Section 4, I explain why one tempting way to resolve the tension is not available to Aristotle. In Section 5, I show how the assumption that understanding is both a relative and a permanent state underlies Aristotle's argument that the object of understanding is a necessity in [5]. Objections to the argument are considered in Section 6, and I say something about the upshot for how we should understand Aristotle's linguistic remarks and his debt to his predecessors in closing.

2. Understanding as a relative

Understanding is assigned to the category of *relative* in *Categories* 7, the category which includes 'all such things as are said to be just what they are, *of* other things, or in some other way *in relation to* something else',[36] as with the larger (6^a38), the double ($^a39$), and master and slave ($^b29$–30). Understanding passes this test for being a relative: just as a larger thing is said to be larger *than* something, and a double the double *of* something, so too 'understanding is understanding of something' (*ἡ ἐπιστήμη τινὸς ἐπιστήμη*, $^b5$).[37]

[36] *Cat.* 7, 6^a36–7: *τὰ τοιαῦτα λέγεται, ὅσα αὐτὰ ἅπερ ἐστὶν ἑτέρων εἶναι λέγεται ἢ ὁπωσοῦν ἄλλως πρὸς ἕτερον*. For the text of the *Categories* I rely on L. Minio-Paluello (ed.), *Aristotelis* Categoriae *et liber* De Interpretatione (Oxford, 1949). Translations of the *Categories* are my own, but I have consulted J. L. Ackrill (trans.), *Aristotle:* Categories *and* De Interpretatione [*Categories* and *De Interpretatione*] (Oxford, 1975) and sometimes follow his translation closely.

[37] Typically, the qualification is given by a genitive expression, but Aristotle gives no indication that the correlative must always occur in the genitive: His use of *ὁπωσοῦν ἄλλως* at 6^b7–8 in fact suggests that he means to allow other grammatical cases or prepositional constructions. Occasionally he also uses examples with the dative: a similar thing is a relative because it is said to be similar *to* something else (*τινί*, 6^b9). Philoponus explicitly allows the correlative to be in the dative (*In Cat.* 106. 8–11 Busse).

Aristotle makes clear that relatives are not substances.[38] Like all beings outside the category of substance, relatives depend on an underlying subject which they exist 'in' (*ἐν*), and this may be one respect in which relatives exist in relation to something else.[39] In the case of understanding, Aristotle takes the relevant subject to be an animal capable of understanding (5, 3^a4–5; 7, 7^a37) or, more precisely, that animal's soul (2, 1^b1–2). The distinctive type of dependency that characterizes relatives, however, is not their inherence in subjects but their dependency on correlatives, beings that they are said to be 'of', 'than', or 'otherwise in relation to'. To call something the larger, for instance, is in Aristotle's view *ipso facto* to call it larger *than* something else. In correspondence to this grammatical fact, Aristotle sees a metaphysical reality: 'relatives are those things for which to be is the same as to be related to something in a certain way'.[40]

This statement can be understood in two ways. On the one hand, Aristotle might mean that for a relative to exist is for it to be related

[38] 8^a16–18. Aristotle speaks here of primary substances, but the context makes clear that he wishes to deny also that secondary substances are relatives. I will not take a stand here on whether it is best to view relatives as relational objects (M. Duncombe, *Ancient Relativity: Plato, Aristotle, Stoics and Sceptics* [*Ancient Relativity*] (Oxford, 2020)) or as relational properties (D. Yates and A. Marmodoro, 'Introduction: The Metaphysics of Relations', in A. Marmodoro and D. Yates (eds.), *The Metaphysics of Relations* (Oxford, 2016), 1–18): I maintain only that relatives are the kind of item that exists 'in' a substance, whatever those turn out to be. If relatives are properties, however, they will on my interpretation need to include *particular* qualities (so, not just being larger or understanding in general, but the particular being-larger of a larger squirrel and the particular understanding of a particular student, etc.).

[39] Cf. F. Morales, 'Relational Attributes in Aristotle', *Phronesis*, 38 (1994), 255–74 at 257–258, 261; and P. M. Hood, *Aristotle on the Category of Relation* (Lanham, 2004), 7–8.

[40] *Cat*. 7, 8^a31–2: *τὰ πρός τι οἷς τὸ εἶναι ταὐτόν ἐστι τῷ πρός τί πως ἔχειν*. The relationship of this definition to the one given at 6^a36–7 has been discussed since antiquity. I remain neutral here on whether, as most ancient and many modern commentators contend, the difference between linguistic usage and metaphysics is primarily what is at issue when Aristotle provides his revised definition (for this view, see Hood, *Aristotle on the Category of Relation*, 39; Morales, 'Relational Attributes in Aristotle', 260; Ackrill, *Categories* and *De Interpretatione*, 101), or whether Aristotle is making a different distinction and merely clarifying *en passant* that questions about relatives are questions of a metaphysical nature (as argued in D. Sedley, 'Aristotelian Relatives', in M. Canto-Sperber and P. Pellegrin (eds.), *Le style de la pensée: Recueil de textes en hommage à Jacques Brunschwig* (Paris, 2002), 324–52). On either reading, Aristotle's considered view is that being a relative is, when we are speaking in the strictest sense, a matter of metaphysics and not only language.

to something in a certain way. Alternatively, we might take Aristotle to mean that for some subject to be R (where R is a relative) is for that subject to be related to something else in a certain way. Aristotle's examples fit better with the second option. It is not the case that for a slave to *exist* is for that slave to be related in a certain way to a master: a slave does not cease to *exist* when liberated; rather, that person simply ceases to be a slave. It is, however, plausible that *for a person to be a slave* is for that person to be related in a certain way to another person who is a master. I will take Aristotle to hold, in general, that for any relative R with correlative C, for some subject S_R to be R requires S_R to bear an appropriate relationship to some S_C that is C.

We might notice that, in a case like master and slave, the converse also holds: not only does something being a slave require something else to be a master; it is also true that something can be a master only if something else is a slave. Aristotle asks whether this holds in general by introducing the notion of being 'simultaneous in nature' (*ἅμα τῇ φύσει*):

[6] *Δοκεῖ δὲ τὰ πρός τι ἅμα τῇ φύσει εἶναι. καὶ ἐπὶ μὲν τῶν πλείστων ἀληθές ἐστιν· ἅμα γὰρ διπλάσιόν τέ ἐστι καὶ ἥμισυ, καὶ ἡμίσεος ὄντος διπλάσιόν ἐστιν, καὶ δούλου ὄντος δεσπότης ἐστίν· ὁμοίως δὲ τούτοις καὶ τὰ ἄλλα. καὶ συναναιρεῖ δὲ ταῦτα ἄλληλα· μὴ γὰρ ὄντος διπλασίου οὐκ ἔστιν ἥμισυ, καὶ ἡμίσεος μὴ ὄντος οὐκ ἔστι διπλάσιον· ὡσαύτως δὲ καὶ ἐπὶ τῶν ἄλλων ὅσα τοιαῦτα.* (*Cat.* 7, 7^{b}15–22)

> Relatives seem to be simultaneous in nature. And in most cases, this is true: at the same time there is a double, there is a half, and when there is a half, there is a double, and when there is a slave, there is a master. Likewise with the others. And they also are eliminated together with each other: when there is no double, there is no half, and when there is no half, there is no double, and likewise in all other cases of this sort.[41]

Aristotle uses the term 'simultaneous in nature' (I will write 'simultaneous' for short) for a type of bidirectional dependence that holds between a relative R and its correlative C. On the interpretation of relatives I have offered, this condition comes to the following: for any time t, (i) if something is R at t, then something is C at t, and conversely (ii) if something is C at t, then something is R at t. The second sentence states an immediate corollary: in order

[41] Cf. *Cat.* 13, 14^{b}27–32.

for *R* and *C* to be simultaneous, it must be the case that (iii) if all *C*s cease to be *C*, then all *R*s cease to be *R*, and also (iv) if all *R*s cease to be *R*, then all *C*s cease to be *C*.

Aristotle states in [6] that *most* relative-correlative pairs are simultaneous, indicating that some are not.[42] This is consistent with what we have seen so far. For although Aristotle holds that relatives as such depend on their correlatives in the manner described in (i) and, consequently, (iii), he does not claim that the mere existence of the correlative is in general *sufficient* for a relative to be what it is. While something's being larger is sufficient for something else to be smaller, and vice versa,[43] the inherence of a relative in its subject may in other cases require more than the bearer of its correlative continuing to be such. It may also depend on the bearer of the relative having further, non-relational properties.[44] Having the relative attribute *R* might, in other words, only in part be a matter of there being something that is *C*, so that the persistence of the correlative is necessary, but not sufficient for the persistence of the relative. In that case, while the relative will still depend on its correlative, the correlative will not depend on the relative in a symmetrical way, so that (ii) and consequently (iv) fail to hold.[45]

[42] *Cat*. 7, 7^{b}22; but see n. 45 below. Duncombe, *Ancient Relativity*, 106–12, takes there to be two conditions discussed in [6], 'simultaneity in nature' and an unnamed relation of temporal concurrence. He takes Aristotle to introduce the former relation without further explaining it and takes [6] from *καὶ ἐπὶ μὲν τῶν πλείστων ἀληθές ἐστιν* onwards to describe this unnamed relation. It would be strange for Aristotle to introduce a relation, not discuss it, and then immediately discuss a different, unnamed relation. I think it is more plausible to take [6] to concern a single relation called 'simultaneity in nature'. In this respect my reading is closer to Hood, *Aristotle on the Category of Relation*, 34. My reading, however, agrees with Duncombe's on the substantive point that a correlative does not always exist at the same time as the relative (see *Ancient Relativity*, 112).

[43] Cf. *Metaph*. *I*. 6, 1057^{a}1–2.

[44] Cf. Morales, 'Relational Attributes in Aristotle', 257–9.

[45] Simplicius has a different interpretation of [6]. He takes all relatives to be simultaneous. In order to make this fit with the text, he points to Aristotle's use of the word 'seems' (*δοκεῖν*) in stating his conclusions at 7^{b}15 and 24 and claims on this basis that the counter-examples Aristotle presents are not meant as genuine counter-examples to the simultaneity of relatives (Simpl., *In Cat*. 193. 33–4 Kalbfleisch). Aristotle's conclusion that 'in *most* cases it is true' (*ἐπὶ μὲν τῶν πλείστων ἀληθές ἐστιν*, 7^{b}15–16, emphasis added) that relatives are simultaneous is, however, unhappy on Simplicius' reading, since this carries the conversational implicature that there are *some* cases in which it is not true. If Aristotle took it to be true in all cases, we would not expect him to say merely that it was in most cases true. I will thus work on the

2.1. *Understanding is not simultaneous with its object*

Aristotle takes simultaneity to fail, in particular, in the case of understanding and its object:

[7] *οὐκ ἐπὶ πάντων δὲ τῶν πρός τι ἀληθὲς δοκεῖ τὸ ἅμα τῇ φύσει εἶναι· τὸ γὰρ ἐπιστητὸν τῆς ἐπιστήμης πρότερον ἂν δόξειεν εἶναι…τὸ μὲν ἐπιστητὸν ἀναιρεθὲν συναναιρεῖ τὴν ἐπιστήμην, ἡ δὲ ἐπιστήμη τὸ ἐπιστητὸν οὐ συναναιρεῖ· ἐπιστητοῦ γὰρ μὴ ὄντος οὐκ ἔστιν ἐπιστήμη—οὐδενὸς γὰρ ἔτι ἔσται ἐπιστήμη—ἐπιστήμης δὲ μὴ οὔσης οὐδὲν κωλύει ἐπιστητὸν εἶναι.* (*Cat.* 7, $7^{b}22$–31)

> It is not held to be true in all cases of relatives that they are simultaneous in nature: the object of understanding might be held to be *prior* to understanding.… When the object of understanding is eliminated, understanding is eliminated with it, but when understanding is eliminated, the object of understanding is not eliminated with it. For if there is no object of understanding, there will be no understanding—there will be nothing for understanding to be *of*—but if there is no understanding, there is nothing to prevent there still being an object of understanding.

Aristotle states, as we should expect, that understanding and its object satisfy condition (i) of simultaneity. Whenever someone's soul is in a condition of understanding, then something else, the correlative of that understanding, is an object of understanding. That implies that understanding also satisfies (iii): for if, at any time, the correlative is no longer an object of understanding, then at that time the state of the soul will no longer be a state of understanding it; otherwise we would have a violation of (i).

Understanding and the object of understanding do not, however, constitute a simultaneous relative-correlative pair, because they fail condition (ii) and, by the same token, condition (iv). The fact that something is an object of understanding does not, for Aristotle, imply that anything actually understands it: he says that there is 'nothing to prevent there still being an object of understanding' (*οὐδὲν κωλύει ἐπιστητὸν εἶναι*), even if there is no understanding of it ($7^{b}30$–1 [7]). Hence, we cannot reason, as in the case above, that the destruction of the relative, the understanding,

assumption that Aristotle means to endorse these as genuine counter-examples. The use of 'seems' (*δοκεῖ*) can be explained, as Simplicius himself notes (189. 27–9), in other ways: as an expression of uncertainty or, more plausibly, as expressing that it is widely (but, Aristotle thinks, falsely) believed that all relatives are simultaneous.

would bring about an elimination of the object of understanding. Instead, an object of understanding can both pre- and post-exist understanding of it.

Aristotle illustrates how the object of understanding can exist before understanding of it with the example of 'squaring the circle' (*ὁ τοῦ κύκλου τετραγωνισμός*), which he assumes, at least for the sake of argument, to be possible but undemonstrated (7^b31–2). The theorem is, then, an object of understanding in the sense that it is the type of thing which can be understood, but understanding of it does not yet exist, because it has not been demonstrated.[46]

Aristotle provides another case to illustrate a different way that the simultaneity condition fails for understanding and its object:

[8] *ἔτι ζῴου μὲν ἀναιρεθέντος οὐκ ἔστιν ἐπιστήμη, τῶν δ' ἐπιστητῶν πολλὰ ἐνδέχεται εἶναι.* (*Cat.* 7, 7^b33–5)

> Again, if an animal ceases to exist, its understanding will not exist, but many of the objects of its understanding may still exist.

This sentence illustrates the failure of condition (iv) of simultaneity for understanding and its object. Aristotle has us consider what takes place upon the death of an animal that understands something. The animal's death is sufficient for its understanding perishing, because, as noted above, understanding is dependent on the animal as well as being dependent on its object: understanding can only exist 'in' that animal's soul, and hence for as long as that animal is alive.[47] Yet the death or other psychic harm to an animal with understanding need induce no change in the object of its understanding, the worldly thing that it understands. Nor do these cease to be objects of understanding when the animal dies: they remain intelligible, ready to be understood by others, even though they are no longer actually understood by that animal.[48]

[46] Cf. Philop., *In Cat.* 121. 15–16 Busse.

[47] I take no stand here on whether Aristotle takes the soul to be immortal. If he does, Aristotle could maintain that the soul ceases to exist *as a subject for understanding* when the animal dies, while continuing to exist in some other way. On the immortality of the soul in Aristotle, see S. Menn, 'Aristotle's Definition of Soul and the Programme of the *De Anima*', *Oxford Studies in Ancient Philosophy*, 22 (2002), 83–139 at 87.

[48] On an alternative reading suggested by the translation of Ackrill, *Categories* and *De Interpretatione*, 21, Aristotle is considering a scenario in which the entire genus of animal perishes, rather than one particular animal (cf. *Cat.* 13, 15^a6–7). In this case, Aristotle's point is basically the same but more emphatic: even if *every*

Understanding thus fails to be simultaneous with its correlative, because an object of understanding remains an object of understanding even after the one who understands it—and thus the understanding of it—is eliminated.[49]

Unlike the double and the half, then, understanding and the object of understanding are not on a par as relatives. The object of understanding can both pre-exist it and post-exist it. Aristotle elaborates on this point in his treatment of relatives in *Metaphysics* Δ. 15, where he draws a distinction between a relative that is 'relative because that which it is itself is said to be that very thing of [*sc.* in relation to] something else'[50] and that which is only relative because 'something else is said to be relative to it'.[51] Relatives of the first type, which Aristotle calls relatives *per se* (*καθ' αὑτά*, *Metaph.*

animal were to go out of existence, many of the things that these animals understood would remain things that *could* be understood.

[49] Simplicius, in line with his view that all relatives are simultaneous (see n. 45), takes this to be a merely apparent counter-example to the simultaneity of relatives. He remarks: 'one should compare what is potential with what is potential, and what is actual with what is actual, and in this way say that relatives are simultaneous [*sc.*, in all cases]' (*ἔδει γὰρ τὸ μὲν δυνάμει πρὸς τὸ δυνάμει παραβάλλειν, τὸ δὲ ἐνεργείᾳ πρὸς τὸ ἐνεργείᾳ, καὶ οὕτως ἅμα λέγειν τὰ πρός τι*, Simpl., *In Cat.* 196. 28–9 Kalbfleisch, trans. Fleet). Simplicius' remark is embedded in a complex discussion of the views of Philo and Diodorus, which it would exceed the scope of this paper to consider, but his idea seems to be that we can distinguish between an actual and a potential object of understanding, and that the actual object of understanding is the correlative of actual understanding, while the potential object of understanding is the correlative of potential understanding. Both of these relative–correlative pairs are simultaneous. Even if all animals cease to exist, Simplicius holds, only actual objects of understanding are eliminated, not potential objects of understanding. Since the actually understanding animals and the potential objects of understanding do not form a relative–correlative pair, this is not a genuine counter-example to the simultaneity of relatives. However, it is not clear why elimination of all of the animals eliminates only actual understanding and not also potential understanding, since the capacity of all of these animals to understand is also, presumably, thereby eliminated. Simplicius bolsters his point by appealing to the understanding 'in the unmoved cause' (*ἐν τῷ ἀκινήτῳ αἰτίῳ*, 194. 22), but he himself seems to admit that this reading is difficult to square with the text when he claims that Aristotle 'sets this out better and more systematically in the *Metaphysics*' (*βέλτιον δὲ αὐτὸς καὶ πραγματειωδέστερον ἐν τοῖς Μετὰ τὰ φυσικὰ περὶ τούτων διατάττεται*, 194. 3–4) and that the *Categories*' treatment of relatives serves only 'to exercise the minds of his readers in anticipation' (*προκεκινῆσθαι ἤδη τὴν διάνοιαν τῶν ἀκροατῶν*, 194. 10).

[50] *πρός τι τῷ ὅπερ ἐστὶν ἄλλου λέγεσθαι αὐτὸ ὅ ἐστιν*, *Metaph. Δ.* 15, 1021^{a}27–8; see Jaeger's note in the apparatus criticus on *αὐτὸ ὅ ἐστιν* in id. (ed.), *Aristotelis* Metaphysica (Oxford, 1957), which I use for the Greek text of the *Metaphysics*.

[51] *τῷ ἄλλο πρὸς ἐκεῖνο*, *Metaph. Δ.* 15, 1021^{a}28–9. Cf. *Metaph. I.* 6, 1056^{b}36–1057^{a}1.

I. 6, 1056[b]34),[52] are those that are principally theorized in *Categories* 7: relatives which are 'just what they are' (*αὐτὰ ἅπερ ἐστίν*) by being of something else (6[a]36–7). The object of understanding is given as an example of the latter type of relative in *Metaphysics Δ.* 15 as well, along with the object of thought (*διανοητόν*, 1021[a]31) and the object of measurement (*μετρητόν*, 1021[a]29; cf. *Metaph. I.* 6, 1057[a]7–8). These are called relatives only by courtesy of having something else that is essentially relative being relative to them.[53] These items have the superficial features of a relative (an object of understanding is said to be the object of understanding 'of' something understood or capable of being understood), but they lack the metaphysical dependence on another characteristic of *per se* relatives, just as a measurable object does not depend in any real way on its being measured.[54]

The main claims of *Categories* 7 and *Metaphysics Δ.* 15 as they regard understanding are, therefore, the following: (1) understanding is a relative *per s*e, (2) as such, part of what it is for someone's soul to be in a condition of understanding is to bear an appropriate relation to the object of understanding, and so (3) someone having understanding implies the existence of something that is the object of their understanding; (4) the object of understanding is also a relative, however only by courtesy of understanding being relative to it, and so (5) the existence of the object of understanding does not imply that there is any understanding of it. For our purposes, the most important of these is (3), which I will call the *dependency principle*.

2.2. *What are the objects of understanding?*

In order to clarify the import of the dependency principle, we must ask what type of entity Aristotle takes an object of understanding to be, and what precisely it means for this type of entity to exist. We might assume that Aristotle is talking about objects in the sense of primary substances—things like Socrates, the moon, or a plant. Aristotle's dependency principle would then state that scientific understanding of Socrates, for instance, requires Socrates to exist.

[52] I am not claiming that this coincides with what Aristotle calls relatives *καθ' ἑαυτά* at *Metaph. Δ.* 15, 1021[b]3–4.

[53] T. Kiefer, *Aristotle's Theory of Knowledge* (London, 2007), 29, calls these 'relative relatively'.

[54] *Metaph. I.* 6, 1057[a]9–12. Cf. Kiefer, *Aristotle's Theory of Knowledge*, 31–2.

However, Aristotle's usage suggests that he has in mind objects with predicative structure, things that consequently may be said to hold or fail to hold.[55] We have already seen one example of this kind. The squaring of the circle is not an 'object' in the sense of a primary substance, as a circle perhaps is, but rather a predicative entity that may be said to exist just in case a certain mathematical object, the square, has the property that it can be constructed with area equal to that of a given circle. Aristotle also uses the phrase 'object of understanding' to refer to entities with predicative structure throughout the *Posterior Analytics*, where the objects of understanding are what one grasps when one grasps the conclusion[56] or, sometimes, a premiss of a demonstration.[57] The premisses and conclusions of demonstrations are sentences, paradigmatically subject–predicate sentences of the form '*P* holds of *S*'. Thus, what one grasps in knowing a premiss or conclusion of a demonstration is presumably something with the structure corresponding to a predicative sentence rather than a substance.

I will take Aristotle to mean 'object' in this sense when he claims that the objects of understanding are 'necessary'.[58] I will not attempt

[55] At *Top.* 4. 4, 125^{b}4, Aristotle entertains, counterfactually, that a man or a soul might be the object of understanding. The counterfactual context means we should not place too much weight on this, however: Aristotle may be talking about the types of things that others might treat as objects of understanding rather than the types of things that he thinks are properly described as such. Together with *Cat.* 7, 7^{b}31, these are the only places I have found where Aristotle gives an explicit example of the type of thing he means by 'object of understanding' (*ἐπιστητόν*).

[56] *ἐπιστητόν* is used to refer to what one grasps when one grasps a conclusion of a demonstration at *Post. An.* 1. 4, 73^{a}22; 1. 24, 86^{a}6–7; and 1. 33, 88^{b}30.

[57] *Post. An.* 1. 4, 73^{b}16–18. This may be what Aristotle calls 'non-demonstrative' (*ἀναπόδεικτος*) understanding at *Post. An.* 1. 33, 88^{b}36. Without the qualification, Aristotle usually means the understanding of a demonstrative conclusion, but see Bronstein, *Aristotle on Knowledge and Learning*, 51–61. Since demonstrative understanding is not tied to the grasp of any particular token demonstration but rather the ability to produce a given type of demonstration (e.g. the ability to demonstrate that triangles have their characteristic angle sum), what one grasps corresponds to the conclusion or premiss of a given type of demonstration.

[58] Fine, 'Aristotle's Two Worlds', 246–8 argues for a similar thesis with respect to the objects of *epistēmē* in *Post. An.* 1. 33, adducing as evidence that Aristotle explicitly refers to *doxa* as being 'of a proposition' (*προτάσεως*, *Post. An.* 1. 33, 89^{a}2–4). In the *Categories*, Aristotle does occasionally describe a theory or a body of knowledge like grammar (*γραμματική*) or the arts (*μουσική*) as what our understanding is 'of', as at *Cat.* 8, 11^{a}29–31, but this does not make them *objects* of understanding, at least not in the sense which is here at issue. Aristotle tends to avoid the word *ἐπιστητόν* for these bodies of knowledge like grammar and the arts, and prefers to call them 'sciences' (*ἐπιστῆμαι*, *Cat.* 8, 11^{a}25–32). This is also his preferred word for bodies of

here to specify their nature fully.[59] For our purposes, the important points are only these: first, 'objects' in this sense have distinct parts corresponding to a subject (like 'the circle') and a predicate (like 'being squarable', i.e. having the property that a square of equal area can be constructed using a straight edge and compass) and are responsible for the truth of the corresponding predicative sentences. Second, Aristotle does not conceive of the relationship between the subject- and predicate-entities in a predicatively structured entity statically.[60] Rather, he seems to think of a predicatively structured entity as something that may exist at one time but not at another. In particular, it exists when the entity corresponding to the predicate *holds* of the entity corresponding to the subject, and it does not exist when the entity corresponding to the predicate fails to hold of the entity corresponding to the subject.[61] Thus, for the object of understanding to depend on its object means that it depends on the ongoing obtaining of the state of affairs understood.

In light of this, the meaning of the dependency principle that we extracted from *Categories* 7 can be further specified. If a person understands that *S* is *P*, then that person's psychic condition can only count as understanding *at those times* when *S* is, in fact, *P*. If ever *S* is not *P*, the object of understanding will fail to 'exist', and, being a relative, that person's condition will no longer count as one of understanding.

2.3. *Is the dependency principle specific to scientific understanding?*

Another question which will be important for comprehending Aristotle's argument is the following: to what extent does the

knowledge like harmony, medicine, geometry, and arithmetic in the *Post. An.* (1. 10, $76^{b}16$–25; 1. 13, $78^{b}32$–$79^{a}16$). Thus, when Aristotle claims that the object of understanding is a necessity, he probably means that it is a predicatively structured entity which is a necessity, not that the object of understanding is a body of knowledge or a theory which is in some sense 'necessary' (although, to be sure, it follows that the sentences which make up such a theory will express necessary truths).

[59] For a careful attempt to do so, see P. Crivelli, *Aristotle on Truth* (Cambridge, 2004), 45–76.

[60] This is not the same claim as that objects in this sense *change*. I am only claiming that Aristotle takes objects of understanding to belong to an ontological category whose members do not constitutively hold or fail to hold once and for all. See further below and Crivelli, *Aristotle on Truth*, 183–97.

[61] Cf. *Metaph. Θ.* 8, $1050^{a}13$–15.

dependency principle reflect a special feature of scientific understanding? Does Aristotle take something similar to hold of other types of knowledge and cognitive states?

If the reading offered so far is correct, we should expect Aristotle to hold a version of the dependency principle for any factive mental state.[62] Further, since Aristotle's grounds for holding understanding to be a relative are fairly abstract (we say that understanding is understanding of something), we should expect him to be willing to classify any object-directed cognitive state as a relative.[63]

Aristotle's texts indicate that he would indeed be willing to extend this principle widely. In *Categories* 5, he holds that even true belief depends on its objects in the manner of a relative:

[9] *ὁ γὰρ αὐτὸς λόγος ἀληθής τε καὶ ψευδὴς εἶναι δοκεῖ, οἷον εἰ ἀληθὴς εἴη ὁ λόγος τὸ καθῆσθαί τινα, ἀναστάντος αὐτοῦ ὁ αὐτὸς οὗτος ψευδὴς ἔσται· ὡσαύτως δὲ καὶ ἐπὶ τῆς δόξης· εἰ γάρ τις ἀληθῶς δοξάζοι τὸ καθῆσθαί τινα, ἀναστάντος αὐτοῦ ψευδῶς δοξάσει τὴν αὐτὴν ἔχων περὶ αὐτοῦ δόξαν.* (*Cat*. 5, 4[a]23–8)

The same sentence seems to be both true and false, for example, if the sentence that someone is sitting is true, then the same sentence will be false when they get up. Likewise with beliefs: if someone truly believes that someone is sitting, they will have a false belief about them if they have not changed their mind when the person gets up.

Where a contemporary philosopher might take there to be a *different* belief corresponding to the assertion that Socrates is seated now, when he is, and the later assertion that he is seated, when he is not,[64] Aristotle prefers to think of there being a *single* belief that is made true when Socrates is sitting and false when he is not.[65] This implies that one may acquire a false belief in one of two rather different ways. First, one may acquire a false belief by changing one's mind about something true: if, at first, I truly believe that Socrates is sitting and then for whatever reason change my mind

[62] Whether other cognitive states are simultaneous with their objects is, of course, a different question, and one I will not broach here.

[63] As we have seen, Aristotle explicitly classifies perception (*Cat*. 2, 6[b]2) and thought (*διάνοια*, *Metaph*. *Δ*. 15, 1021[a]31) as relatives; he also lists sight (*ὄψις*, 1021[a]33–[b]1).

[64] See the comparison of Aristotle with W. V. O. Quine in Hintikka, 'Time, Truth and Knowledge in Ancient Greek Philosophy', 2. See also J. Hintikka, 'Time, Truth and Knowledge in Aristotle and Other Greek Philosophers', *Time and Necessity: Studies in Aristotle's Theory of Modality* (Oxford, 1973), 62–92.

[65] Aristotle also emphasizes the sameness of the belief at *Metaph*. *Θ*. 10, 1051[b]13–14.

while Socrates stays in his seat, I thereby acquire a false belief and thus lose my true belief. Call this way of losing a true belief a 'primary loss'.

I can also, on this view, lose a true belief in a rather different way. Even if I do not change my mind, Aristotle holds, the belief that Socrates is sitting will become a *false* belief if Socrates gets up. This is the way of losing a true belief and acquiring a false one that Aristotle is discussing in [9]. What is responsible for the acquisition of a false belief in this case is not explained by any psychological change in me, the believer (I have not reconsidered things, been persuaded otherwise, etc.). Instead, it is the fact that the truthmaker that previously secured the truth of my belief (the complex consisting of the subject Socrates and the quality of being seated) has ceased to exist.[66] The believer and the belief undergo in this case a mere 'Cambridge' change,[67] but the true belief is nevertheless lost on account of the *same* belief[68] losing its object and thus becoming false. I will call this a 'secondary loss'.[69]

Now, since belief is not factive, these sorts of changes do not, as in the case of understanding, bring about the loss of the belief itself: the belief simply goes from being a true one to a false one. On the other hand, [9] gives us reason to think that *true* belief depends on the ongoing existence of its object, where 'existence' amounts to the ongoing obtaining of a state of affairs, in just the same way as understanding. Should the relevant state of affairs cease to obtain, the psychic condition will, for that reason, cease to count as a condition of that kind (as a true belief or a condition of understanding), without any real change needing to occur in the knower or believer. In this respect understanding is on a par with true belief, and Aristotle ought to extend similar reasoning to any factive cognitive state. However, understanding is also crucially different from true belief, in a way that stands in tension with this requirement. Let us turn to this now.

[66] Cf. *DA* 3. 3, 428^{b}8–9 with Crivelli, *Aristotle on Truth*, 62–71.

[67] Aristotle goes on below to explain that the reception of truth-values at different times does not constitute a *change* in his strict sense, since only substances can undergo changes, strictly speaking: see *Cat*. 5, 4^{a}28–^{b}1. On this, see also Crivelli, *Aristotle on Truth*, 183–9.

[68] Cf. *Cat*. 4^{a}34–^{b}2 in addition to [9].

[69] With the distinction between primary and secondary loss, compare also *Post*. *An*. 1. 33, 89^{a}4–5 with Fine, 'Aristotle's Two Worlds', 249.

3. Understanding as a state

The chapter following Aristotle's discussion of understanding as a relative, *Categories* 8, places understanding in the category of *quality*. Aristotle distinguishes, as two species of quality, '*state* and *condition*' (ἕξις καὶ διάθεσις, 8^b27), giving 'instances of understanding and virtues' (αἵ τε ἐπιστῆμαι καὶ αἱ ἀρεταί, 8^b29) as examples of 'states'. Hence, in addition to being categorized as a relative, understanding is also classified in the category of quality, in particular the type of quality Aristotle calls a *hexis* or 'state'.

There is evidence that this 'doubling up' on the category of understanding is conscious and deliberate on Aristotle's part. Aristotle notes explicitly in *Categories* 7 that there are states in the category of relative,[70] and given the preceding analysis of what it means to call understanding a relative, it should not surprise us to find that it belongs to the category of quality as well. Aristotle's conception of quality is broad: a quality is anything that can be predicated of a subject 'to say what sort of thing it is'.[71] In this broad sense of 'quality',[72] qualities with a relational component are unremarkable. To call a vehicle *roadworthy*, for instance, is at least in part to say that it is deemed acceptable for use on roads by some country's road authority; hence, to say that it bears the relation of *being officially approved for road travel* to the relevant institution or officials within it. In general, there is no reason why saying that something stands in a certain relation cannot be a way of qualifying it, and hence no reason why a relative cannot also be a quality.

There is thus no real tension between Aristotle's claim that understanding is a relative and his claim that understanding is a quality,

[70] *Cat*. 7, 6^b2. We need not take Aristotle here to be claiming that *all* states, or *all* conditions, are relatives (for this reading, see O. Harari, 'The Unity of Aristotle's Category of Relatives', *Classical Quarterly*, n. s., 61 (2011), 521–37). Another piece of evidence that Aristotle is aware and untroubled by understanding occupying two categories is *Cat*. 8, 11^a37–8. I discuss this passage below as part of [11].

[71] *Cat*. 8, 8^b25: ποιότητα δὲ λέγω καθ' ἣν ποιοί τινες λέγονται. For an excellent treatment of Aristotle's category of quality more broadly, see P. Studtmann, 'Aristotle's Category of Quality: A Regimented Interpretation' ['Aristotle's Category of Quality'], *Apeiron*, 36 (2003), 205–27.

[72] Aristotle discusses a narrower notion of quality at *Cat*. 8, 9^b13–32, which comes close to what he elsewhere in *Cat*. 8 calls a *hexis*. On this, see D. S. Hutchinson, *The Virtues of Aristotle* (London, 1986), 14.

properly understood.[73] A tension does, however, develop as Aristotle goes on to explain what it means for understanding to be the specific type of quality he calls a *hexis* or 'state'.[74] Aristotle distinguishes states from more superficial qualities of a subject which he calls 'conditions' (*διαθέσεις*).[75] These, like a person's blushing or being angry, tend to be short-lived and are easily gained and lost without other significant changes in their bearers. A state differs in that it is more 'stable' (*μονιμώτερον*) and 'long-lasting' (*πολυχρονιώτερον*, *Cat*. 8, 8^{b}28). Aristotle goes on to explain why understanding is a state rather than a condition:

[10] *ἥ τε γὰρ ἐπιστήμη δοκεῖ τῶν παραμονίμων εἶναι καὶ δυσκινήτων, ἐὰν καὶ μετρίως τις ἐπιστήμην λάβῃ, ἐάνπερ μὴ μεγάλη μεταβολὴ γένηται ὑπὸ νόσου ἢ ἄλλου τινὸς τοιούτου*. (*Cat*. 8, 8^{b}29–32).

> Understanding seems to be something very abiding and steady whenever someone has even a moderate grasp of their understanding, so long as no great change comes about by illness or something else of this sort.

Aristotle takes understanding to be a state rather than a condition, because it is 'abiding' (*παραμόνιμος*) and 'steady' (*δυσκίνητος*).[76] These terms, while no doubt intended to align with the terms 'stable' (*μονιμώτερον*) and 'long-lasting' (*πολυχρονιώτερον*), are not simply synonyms for them. This language, especially the term 'abiding', echoes the terminology and imagery used to describe the value of *epistēmē* as compared with *doxa* in the *Meno*.[77] This suggests that they are intended as normative descriptions of understanding. They

[73] This may come as a surprise to readers who view the categories as an exclusive taxonomy. For a persuasive case that the textual evidence does not support taking Aristotle's categories to be an exclusive taxonomy, see D. Morrison, 'The Taxonomical Interpretation of Aristotle's *Categories*', in A. Preus and J. P. Anton (eds.), *Essays in Ancient Greek Philosophy*, vol. v: Aristotle's Ontology (New York, 1992), 19–46.

[74] With this term I refer specifically to the notion of *hexis* Aristotle develops in *Categories* 8. A different notion may be at play in the *Metaphysics*: see Hutchinson, *The Virtues of Aristotle*, 8–20.

[75] Aristotle uses the term *διάθεσις* in a number of other ways in *Categories* 8; for discussion see Studtmann, 'Aristotle's Category of Quality'.

[76] *Cat*. 8, 8^{b}30. Cf. 9^{a}5, 9^{a}9–10, 8^{b}34–7.

[77] Compare *παραμονίμων* at *Cat*. 8, 8^{b}30 with forms of *παραμενεῖν* at *Meno* 97 D 10, 97 E 4, 97 E 7, and 98 A 1–2, and compare *δυσκίνητος* at *Cat*. 8, 8^{b}30 with the tether imagery, contrasted with the imagery of something running away. *μονιμώτερον* at *Cat*. 8, 8^{b}28 also parallels *μόνιμοι* at *Meno* 98 A 6. With *πολυχρονιώτερον*, compare *Meno* 97 E 7 and especially 98 A 1.

explain why it meets the definition of a *hexis* and, at the same time, in what way this renders it valuable. Aristotle thinks that understanding is a valuable quality in part because it is the kind of thing that sticks by you and is available when you need it, much like, in Plato's metaphor, a slave or living statue that isn't liable to run away.[78]

Now, Aristotle thinks that understanding can only have this valuable feature if it is a fundamentally different kind of quality from, for example, being hot or cold, qualities which someone might gain or lose by stepping outside.[79] So long as someone has a 'moderate' handle on their own understanding,[80] it is liable to loss only in the face of more radical changes.

Aristotle does not specify the class of things that he takes to be capable of erasing understanding, but rather only gives one example, illness. The example is, however, telling. The pertinent feature of illness in this context cannot be that it is acquired from without, since then Aristotle's claim that we only lose understanding through something like illness would rule out loss of understanding by mental deterioration naturally occurring in old age, which Aristotle does appear to recognize.[81] Instead, the point of adverting

[78] *Meno* 97 E 7. Cf. Bolton, 'Science and Scientific Inquiry', 49.

[79] *Cat*. 8, 8^{b}34–7. Cf. Hutchinson, *The Virtues of Aristotle*, 19–20, who argues that the core idea here is that of being well entrenched and resistant to change, whereas the longevity of understanding serves as evidence for this. I think Hutchinson is right about this, but I would add, following Bolton, that the well-entrenchedness and resistance to change are in turn grounded in the conception of understanding as a reliable state. I would also add that being well entrenched is not the only source of understanding's stability here: the character of its object is, as we will see, equally important.

[80] It is not entirely clear what Aristotle means by 'moderate grasp of one's understanding' (*μετρίως τις ἐπιστήμην λάβῃ*; the phrase could also be translated as 'a moderate grasp of a science'). See, however, *NE* 7. 3, 1147^{a}20–2, where Aristotle is committed to the view that understanding can be defective if it has only been acquired recently. I take it he has in mind the sort of shaky 'understanding' someone might have by, e.g., reading a physics textbook once without doing the exercises, as compared with the sort of understanding a student acquires who has pored over the same textbook in a physics class. Aristotle's claim may be that understanding becomes 'steady' in the manner under discussion here so long as it is subject to sufficient reflection, inculcation, or drill (cf. *Meno* 85 C 9–D 1). Interestingly, if this is correct, then Aristotle's claim concerns not only *expert* understanding, since experts presumably have more than just a 'moderate' grasp of their understanding.

[81] See *Mem*. 1, 450^{b}1–8; also *De long. vit*. 2, 465^{a}19–23 and *GA* 784^{b}30–2. At *DA* 1. 4, 408^{b}19–28, Aristotle claims that cognitive decline in old age comes about as a result of the destruction of organs required for reasoning and contemplating, not as a result of the deterioration of reasoning or contemplating itself, which he takes to

to illness as a paradigm of the sort of change that could cause one to lose understanding is presumably to emphasize that such a change cannot come about via any bodily change that is compatible with the animal's normal, healthy functioning. While intoxication and passions might inhibit the exercise of understanding,[82] only a change that causes some sort of harm or represents some sort of degeneration can bring about a loss of understanding.[83]

Categories 8 thus yields what I will call a *durability principle*:

If *S* understands *O*, then *S* continues to understand *O* so long as she experiences no detrimental changes to the constitution of her cognitive faculties.

3.1. *The tension between the two principles*

At this point we may begin to perceive a tension with Aristotle's claim in *Categories* 7 that understanding is a relative. That discussion gave the impression that, far from being a secure possession, understanding is altogether precarious: one counts as having understanding only when, in addition to one's faculties being in order, the object of one's understanding continues for its part to be such as one understands it to be. How is the requirement that understanding be steady and abiding in such a way as to generally preclude being lost related to the claim that understanding depends, like true belief, on the continued existence of its object?

The point can be focused by noting that the durability principle rules out loss of understanding corresponding to both the primary and secondary loss of true belief. On the one hand, the durability principle expresses the fact that understanding, in the sense at issue when Aristotle classifies it as a state, is deeply ingrained within

be unaffected. It does not follow that Aristotle takes all mental deterioration to result from an external source: the required cognitive machinery might be such as to decline by its own nature.

[82] See *NE* 7. 3, esp. $1147^{a}10$–24 and $1147^{b}8$–17. I discuss this passage below in Section 4.

[83] We might today think of a brain injury or a degenerative condition. Cf. *NE* 3. 5, $1114^{a}25$–8; 7. 1, $1145^{a}31$; and 7. 5, $1149^{a}4$–12. R. Bodéüs, *Aristote:* Catégories [*Catégories*] (Paris, 2001), 133, taking *epistēmē* here broadly to include also practical knowledge, suggests that Aristotle might have added 'bestial' (*θηριώδη*) affections, which he discusses as an impediment to knowledge at *Nicomachean Ethics* 7. 5, $1149^{a}6$–8. But in that passage, bestial affections are not described as leading to *loss* of knowledge; rather, Aristotle invokes bestial affections there to explain why some people never acquire certain types of knowledge to begin with.

one's web of beliefs, such that one is 'incapable of being persuaded otherwise' (*ἀμετάπειστον*, *Post. An.* 1. 2, 72^{b}3–4) regarding what one understands. One cannot, in other words, lose a piece of understanding by being persuaded that what one understands is false. Yet it is important to see that this is not the only type of loss of understanding Aristotle rules out when he claims that an 'illness or something else of this sort' (*Cat.* 8, 8^{b}32 [10]) would be required to erase understanding. For another event that surely would not count as an illness or something of that sort would be a change in the *object* of understanding leading to the loss of scientific understanding. That is, if it were possible that someone could at one point in time have scientific understanding and at another point fail to have scientific understanding, where the only difference between these two times was that the *object* of that person's scientific understanding had undergone some change incompatible with their continuing to understand it, that would be incompatible with their scientific understanding being stable in the requisite sense. As Aristotle puts it in *Metaphysics Z.* 15, 'understanding cannot sometimes be understanding and sometimes be ignorance; rather, it is opinion that is like this'.[84]

I take Aristotle to mean that whatever cognitive state accounts for our understanding, this cannot be the type of state that sometimes counts as understanding and sometimes counts as mere ignorance.[85] If there are certain intrinsic features of my psyche that are at one time sufficient for me counting as having scientific understanding, then they must *always* suffice for understanding, at least until death or some cognitive misfortune befalls me. To put it differently, according to the durability principle, understanding is not like true belief, where a mere change in the fact of Socrates sitting might erase one's mental state. And yet, insofar as understanding is a relative, it is just like true belief in depending on its object.

This is a tension but not, I will maintain, a contradiction. In the remainder of this paper, I will argue that the claim that

[84] *Metaph. Z.* 15, 1039^{b}32–4: *οὐδ' ἐπιστήμην ὁτὲ μὲν ἐπιστήμην ὁτὲ δ' ἄγνοιαν εἶναι, ἀλλὰ δόξα τὸ τοιοῦτόν ἐστιν*. Cf. *Top.* 5. 3, 131^{b}21–3.

[85] Aristotle's view is most straightforward if we suppose that he takes understanding to be a species of belief. This is how he is read by Moss and Schwab, 'The Birth of Belief' and Fine, 'Aristotle on Knowledge'. We can then say that a primary loss of understanding occurs when a primary loss of the relevant true belief occurs, and a secondary loss of understanding occurs when a secondary loss of the relevant true belief occurs. I will not, however, presuppose any view on whether Aristotle thinks that understanding is a type of belief in this paper.

understanding is only of necessities serves to resolve this tension and render consistent the claim that understanding is a relative and that it is a state. First, however, it is necessary to explore another way that someone might take Aristotle to resolve this tension, and to show why this solution will not work. Doing so will serve to illustrate the depth of the problem generated by the dependency and durability principles and point the way to an alternative resolution which, I will argue, is the one Aristotle actually pursues in *Nicomachean Ethics* 6. 3.

4. A tempting solution

One might try to alleviate the tension between the dependency and durability of understanding by pointing out that Aristotle treats understanding as an intellectual virtue (*NE* 6. 3, $1139^{b}16$–17).[86] In the sense in which it denotes a virtue, understanding is acquired only with significant expenditure of time and effort, since it requires a deep assimilation of specialized knowledge (*Phys*. 7. 3, $247^{b}17$–18; *NE* 2. 1, $1103^{a}15$–17; 7. 3, $1147^{a}22$). Once it is acquired, the possesssor then has distinctive scientific abilities, depending on what specific type of understanding is acquired. These include the ability to construct demonstrations (6. 3, $1139^{b}31$) to teach the relevant science ($1139^{b}25$) and, more generally, the abilities associated with mastery of a complex network of explanatory connections pertaining to a particular scientific domain.[87]

[86] Aristotle does not explicitly call *epistēmē* a virtue there, but he is taken this way by D. Bronstein, 'Aristotle's Virtue Epistemology', in S. Hetherington and N. D. Smith (eds.), *What the Ancients Offer to Contemporary Epistemology* (New York, 2020), 165, and Bolton, 'Science and Scientific Inquiry', 53. R. A. Gauthier and J. Y. Jolif, *L'éthique à Nicomaque: Introduction, traduction et commentaire* [*L'éthique à Nicomaque*], 2 vols. (Leuven, 1959), ii. 163 stresses that Aristotle would deny that *epistēmē* is *the* virtue of the *ἐπιστημονικόν*, since he takes the more complete virtue of *σοφία* to be the best condition of this part of the soul. I agree, but we can distinguish between the state that is the best condition of the *ἐπιστημονικόν* (*the* virtue of this part of the soul), and the states that represent the various ways it may be excellent (the *virtues* of this part of the soul). This observation does not, therefore, deprive *epistēmē* of its status as *an* excellence of this part of the soul. Thanks to Mike Coxhead for discussion on this point.

[87] I am not maintaining that the object of the state is only ever a whole science. The object of understanding can be a single proposition or state of affairs, but it needs to be understood in an appropriate explanatory context, and in certain cases

Like other virtues, understanding may be inhibited or prevented from being manifested properly. Revellers at a symposium might, say, drink so much as to be unable to piece together an explanation and thus in this sense fail to have understanding at a certain time. Aristotle will deny that the cognitive virtue the revellers have is at any point *lost* when this occurs (*Phys*. 7. 3, 247^{b}13–16). Rather, as in the practical case, the possession of the virtue is not enough to ensure that one always exercises it when it is called for.[88] That the drunk botanist cannot explain why broad-leaved plants shed their leaves would mean, on Aristotle's analysis, that she is too drunk to 'employ' or 'make use of' (*χρῆσθαι*, *Phys*. 7. 3, 247^{b}16; cf. *NE* 7. 3, 1147^{a}12) the understanding that she has. And so, while he will grant that there is a *sense* in which such a person does not at that time understand,[89] he also maintains that there is another sense in which the person still has understanding but fails to make use of it.

Now Aristotle surely holds that it is understanding in the former sense, which is not jeopardized by a lapse in memory or a temporary inhibition, that is steady and abiding in the sense at issue in *Categories* 8. His point is that only a more severe sort of memory loss, one which comes from years of letting one's understanding languish, or a repeated and persistent impediment—alcoholism, perhaps—could cause loss of understanding in this sense.[90] While our grasp of one part of the scientific edifice we comprehend in possessing a virtue might be easily lost, our grasp of the edifice as a whole cannot be. Someone who did suddenly lose their grasp of the edifice, without any mitigating factors, would thereby have been shown not to have had a reasonable grasp of what they under-

this explanatory context may include most or all of the science. On this, see further Lesher, '*Επιστήμη* as "Understanding" '.

[88] Compare *NE* 7. 3, 1147^{a}13–14. For some reasons to think that Aristotle's points there are not restricted to practical knowledge, see B. Morison, 'Colloquium 2: An Aristotelian Distinction between Two Types of Knowledge' ['Two Types of Knowledge'], *Proceedings of the Boston Area Colloquium of Ancient Philosophy*, 27 (2012), 29–63.

[89] Cf. *NE* 7. 3, 1147^{a}13: 'in a way [the drunk person] has and does not have [understanding]' (*ἔχειν πως καὶ μὴ ἔχειν*).

[90] Cf. *Cat*. 8, 9^{a}1–3, where Aristotle claims that a quality which typically represents a temporary condition may become a permanent state if it is had for a long enough time. Aristotle may be thinking of the way that a person who is not just temporarily sick but constantly falling ill could be said to have a 'sickly disposition'. For this reading, see Kiefer, *Aristotle's Theory of Knowledge*, 19.

stood[91] to begin with. Aristotle, therefore, does not mean to deny that someone might over a brief period learn or forget a particular fact at the periphery of their web of knowledge. The durability principle only denies that such a change constitutes a change to the person's *understanding* in the sense of the possession of an intellectual virtue.

That may seem enough to resolve the tension between Aristotle's claims that understanding is a relative and that it is an abiding structural quality (a 'state'). For Aristotle distinguishes two senses of *epistēmē*, the word I have been translating as 'understanding', one denoting the *hexis* in virtue of which one is able to exercise certain cognitive capacities, and another denoting the condition one is in when everything is in place to exercise them.[92] What abides and resists change is, for Aristotle, only understanding in the former sense. It may thus seem natural to suppose, conversely, that it is only understanding in the latter sense that has an object and thus is a relative.

If this were correct, then the problem we have been dealing with would turn out to have been merely lexical: it is only because the word 'understanding' is used in one sense to denote a state of capacity and in another sense for its deployment that we end up listing '*epistēmē*' in two categories. That would be no more problematic than the fact that we use 'healthy' to describe both a condition of the body and the things conducive to that condition.[93] No more than in this case, so this response goes, should one expect the properties of 'understanding' in the respective categories to be consistent.

A response of this sort is encouraged by the traditional (but, I will argue, incorrect) reading of a passage at the end of *Categories* 8, in which Aristotle explains why 'we should not be disturbed lest

[91] This is another way we might gloss *μετρίως . . . ἐπιστήμην λάβῃ* (*Cat*. 8, $8^{b}31$).

[92] Whether or not we identify this *hexis* with knowledge in second potentiality as described at *DA* 2. 5, $417^{b}27$–8 (an issue on which I will take no stand here), this distinction should not be conflated with the distinction between first and second potentiality or the distinction between first and second actuality. One can be in a state where one is free to exercise scientific abilities without actually exercising them, so this type of *epistēmē* is not the same as *epistēmē* in second actuality (cf. $417^{a}28$–9). But if this type of *epistēmē* is *epistēmē* in first actuality or second potentiality, then that would leave *epistēmē* as a *hexis* in the role of first potentiality, which is clearly not right: *epistēmē* as a virtue is already an acquired intellectual achievement, whereas knowledge in first potentiality is not (cf. $417^{a}27$, $417^{b}31$–2).

[93] Cf. *Top*. 1. 15, $107^{b}6$–12.

someone should say that though we proposed to discuss quality, we are counting in many relatives (since states and conditions are relatives)'.[94] He says:

[11] *σχεδὸν γὰρ ἐπὶ πάντων τῶν τοιούτων τὰ γένη πρός τι λέγεται, τῶν δὲ καθ' ἕκαστα οὐδέν· ἡ μὲν γὰρ ἐπιστήμη, γένος οὖσα, αὐτὸ ὅπερ ἐστὶν ἑτέρου λέγεται—τινὸς γὰρ ἐπιστήμη λέγεται—τῶν δὲ καθ' ἕκαστα οὐδὲν αὐτὸ ὅπερ ἐστὶν ἑτέρου λέγεται, οἷον ἡ γραμματικὴ οὐ λέγεται τινὸς γραμματικὴ οὐδ' ἡ μουσικὴ τινὸς μουσική, ἀλλ' εἰ ἄρα κατὰ τὸ γένος καὶ αὗται πρός τι λέγεται· οἷον ἡ γραμματικὴ λέγεται τινὸς ἐπιστήμη, οὐ τινὸς γραμματική, καὶ ἡ μουσικὴ τινὸς ἐπιστήμη, οὐ τινὸς μουσική· ὥστε αἱ καθ' ἕκαστα οὐκ εἰσὶ τῶν πρός τι. λεγόμεθα δὲ ποιοί ταῖς καθ' ἕκαστα· ταύτας γὰρ καὶ ἔχομεν—ἐπιστήμονες γὰρ λεγόμεθα τῷ ἔχειν τῶν καθ' ἕκαστα ἐπιστημῶν τινά—ὥστε αὗται ἂν καὶ ποιότητες εἴησαν αἱ καθ' ἕκαστα, καθ' ἃς ποτε καὶ ποιοὶ λεγόμεθα· αὗται δὲ οὐκ εἰσὶ τῶν πρός τι.* (*Cat*. 8, 11[a]23–36)

For in almost all of these cases, the genus is said to be a relative, but none of the specific types is. For understanding, a genus, is called just what it is, of something else (it is called understanding of something); but none of the specific types is called just what it is, of something else. For example, grammar is not said to be grammar of something, nor music, music of something. Thus, the specific types are not relatives. But we are said to be qualified with the specific types, since we have them (it is because we have some particular type of understanding that we are said to understand). Hence these—the specific types, in virtue of which we are on occasion said to be qualified—would indeed be qualities; but these are not relatives.

Aristotle makes a distinction here between the categorial status of specific types of understanding like music and grammar and understanding as a 'genus' (*γένος*), that is, understanding as the kind encompassing all of these specific types of understanding.[95]

[94] *Cat*. 8, 11[a]20–3: *οὐ δεῖ δὲ ταράττεσθαι μή τις ἡμᾶς φήσῃ ὑπὲρ ποιότητος τὴν πρόθεσιν ποιησαμένους πολλὰ τῶν πρός τι συγκαταριθμεῖσθαι· τὰς γὰρ ἕξεις καὶ τὰς διαθέσεις τῶν πρός τι εἶναι.*

[95] Minio-Paluello, *Aristotelis* Categoriae *et liber* De Interpretatione, Praefatio, n. 1, and M. Frede, 'The Title, Unity and Authenticity of Aristotle's *Categories*' ['Title, Unity and Authenticity'], in id., *Essays in Ancient Philosophy* (Minneapolis, 1987), 11–28 at 13, hold lines 11[b]10–16, which immediately precede this passage, to be suspect, and Bodéüs, *Catégories*, 50, transposes these lines to just after 11[a]38. M. Frede, 'Title, Unity and Authenticity', 13–17, argues for extending suspicion to a passage including [11] (specifically, to 11[a]20–38), on grounds of style and content. I will make no attempt to address stylistic issues here. However, the reasons that Frede gives for doubting the authenticity of this passage on the basis of the doctrine it espouses are not convincing. Frede notes that, in a different passage (*Cat*. 7, 8[a]13–8[b]24), Aristotle goes to pains to avoid the conclusion that the same item is a

He points out that the peculiarity of being in two categories does not apply to music, grammar, etc. This is because these are qualities alone, not relatives. To be schooled in (or 'have') grammar or music is not to have grammar or music 'of' or 'than' something else.

We may be tempted to infer from this that Aristotle holds that understanding as a genus is, conversely, not a state. This would then give him a tidy solution to the puzzle: all understanding is either understanding as a genus or one of its species, and the genus is only a relative (not a quality), while the species are only qualities (not relatives).[96] It would be from there a small step to attribute to Aristotle the analogous claim that understanding as a cognitive virtue is a state only (and not a relative), whereas the sense in which understanding is a relative refers only to understanding in the sense of the exercise of our capacity to understand. He would then avoid the claim that understanding *in the very same sense* is both a state and a quality.

The problem for this response is that Aristotle does not deny that understanding as a genus is a quality in [11]. He only affirms that it is a relative and denies that its *species* are relatives. In fact,

relative and a *substance*, and so finds it surprising that Aristotle should be willing to allow the same item to be both a relative and a quality here. There is, however, an independent reason for Aristotle to wish to avoid the conclusion that relatives are substances: relatives are posterior in nature to beings in the other non-substantial categories (*Metaph*. *N*. 1, 1088^{a}24), while substances are prior to them in nature (*NE* 1. 6, 1096^{a}21). Hence, we need not take Aristotle's desire to avoid the conclusion that some substances are relatives as the outcome of a general aversion on his part to assigning the same item to multiple categories. Rather, Aristotle may hold this view so as to avoid violating the antisymmetry of priority in nature. Frede's other reason for taking the content of this passage to be at odds with Aristotelian doctrine relies on the categories being interpreted as highest genera, and as such being mutually exclusive. But as Frede himself notes (13), the categories are only described as highest genera in the *Categories* at 11^{b}15, in a part of the text generally agreed to be suspect. On this, see further Bodéüs, *Catégories*, 141, and Morrison, 'The Taxonomical Interpretation of Aristotle's *Categories*'. My approach here will be to proceed under the assumption that 11^{a}20–38 is authentic and to argue that this passage is consistent with my reading. The passage is not, however, required to establish my claim that Aristotle takes understanding to be both a quality and a relative: this is already claimed at 6^{b}3 and 8^{b}29. Since, however, I suspect the passage is authentic, I will explain how, properly understood, it is consistent with my reading and may be taken to provide further details of Aristotle's position on the categorial status of understanding.

[96] Elias endorses this interpretation very explicitly; see Elias, *In Cat*. 238. 8–10 Busse, with H. Taieb, 'Classifying Knowledge and Cognates: On Aristotle's *Categories*, 8, 11^{a}20–38 and its Early Reception' ['Classifying Knowledge and Cognates'], *Documenti e studi sulla tradizione filosofica medievale*, 27 (2016), 85–106 at 98–9.

his criterion for being a quality requires that he include in this category understanding as a genus. For the criterion that Aristotle uses to argue that the particular types of understanding are qualities is that we qualify people with them (*Cat*. 8, 11[a]32–6): We say someone is 'musical' (*μουσικός*) or 'literate' (*γραμματικός*). We also qualify people with understanding generally; indeed, 'understanding' (*ἐπιστήμη*) is Aristotle's example of something 'in' but not 'said of' a subject (2, 1[b]1).[97] The fact that such an attribution stands in need of semantic supplementation by a correlative does not imply that it is not used to qualify people, and hence does not imply that it is not a quality.

This is one reason to reject the reading that takes Aristotle to be solving the puzzle proposed in [11] by denying that understanding as a genus is a quality. Another reason to reject this reading is that it makes it very difficult to understand what Aristotle says next. He goes on: 'Moreover, if the same thing really is a quality and a relative, there is nothing absurd in its being counted in both the genera'.[98] This makes little sense if Aristotle has just been arguing that nothing is really both a quality and a relative. Why go to the trouble of providing that argument if there is anyway nothing absurd in something occupying both categories?[99] What this remark makes clear is, rather, that Aristotle's purpose in [11] is more modest: he only endeavours to clarify *which* items it is that belong to both categories, not to argue that there aren't any. His point is only that such cases are less pervasive than we might first have thought, since the *species* of understanding are only in the category of

[97] Cf. *Cat*. 8, 10[b]2. Porphyry (*In Cat*. 140. 20 Busse) denies that the term 'understanding' is ever used to qualify someone with a particular type of understanding like grammar or music, but he does not justify his claim. Olympiodorus (*In Cat*. 129. 28 Busse) attempts to defend this claim by asserting that it is impossible for any one person to know everything, but this is clearly beside the point. When we say that someone has 'understanding' without further specification, we are not saying this person knows *everything*. On this, see further Taieb, 'Classifying Knowledge and Cognates', 97.

[98] *ἔτι εἰ τυγχάνει τὸ αὐτὸ ποιὸν καὶ πρός τι ὄν, οὐδὲν ἄτοπον ἐν ἀμφοτέροις τοῖς γένεσιν αὐτὸ καταριθμεῖσθαι* (*Cat*. 8, 11[a]37–8).

[99] As Porphyry reads him (*In Cat* 140. 24–141. 5 Busse), Aristotle is offering an alternative, incompatible solution to the puzzle at 11[a]37–8, but it is hard to see a further solution in Aristotle's flat assertion that there is nothing absurd in the same thing being counted in both genera. See further Taieb, 'Classifying Knowledge and Cognates', 96–100 on Porphyry's interpretation and its problems.

quality.[100] Understanding as a genus, however, still occupies the category of relative as well as being a certain kind of quality (a state).

This means that even if we restrict our attention to understanding as a genus, we still face the problem discussed in Section 3.1: since it is a state, understanding in this sense ought to be capable of being lost only with harm to its possessor, but as a relative, this state of understanding ought to be liable to expire on account of its object, without any intrinsic change in its possessor. The same is true of understanding in the sense of an intellectual virtue: as a virtue, it is a state and therefore stable in the way that a state is required to be. It is, however, the type of virtue that relies on an appropriate relation to something external to the knower, and thus also a relative.[101]

There is thus a real and not merely lexical tension between the characterizations of understanding that emerge from *Cat*. 7 and 8 respectively. Both of these are motivated by plausible intuitions about scientific understanding. On the one hand, Aristotle wishes to pay heed to the fact that we regularly take our understanding to be stable in a way that it only could be if we did not have to reckon with our understanding changing on account of factors outside us. On the other hand, Aristotle takes the grammar of *epistēmē* at face value, as reflective of a metaphysical reality in which understanding, even in the *statal* sense, is essentially *of* something. His

[100] Simplicius has a similar view. As he interprets the text, 'Aristotle did not mean that the genera were not qualities' (*οὐκ εἶπεν τὰ γένη μὴ εἶναι ποιότητας*); instead, Aristotle thinks that 'even if [the] state and condition [of understanding] are said to be relative, this is not true of all states and conditions, but only the generic' (*εἰ καὶ εἴρηται πρός τι ἡ ἕξις καὶ ἡ διάθεσις, οὐ πᾶσα ἔχει τοῦτο, ἀλλ' ἡ γενικὴ μόνον*, Simplicius *In Cat*. 293. 22–5 Kalbfleisch, trans. Fleet modified). This interpretation also allows us to address another point that leads Frede to doubt the authenticity of 11[a]20–38. Frede, 'Title, Unity and Authenticity', 13, complains that 11[a]37–8 'contributes nothing to solving the difficulty raised in 11[a]20–22'. I agree with this judgement, but on my reading the sentence nevertheless has a clear function. Aristotle does not accept that there is a problem with certain items falling in both the category of quality and the category of relative; he only addresses the problem that 'many' (*πολλά*, 11[a]21) relatives end up in the category of quality. The function of the sentence at 11[a]37–8 is to remind the reader that nothing about the notion of quality or relative requires the two categories to be fully disjoint. Its function is thus to clarify what has and what has not been shown in the preceding lines.

[101] See also *Phys*. 7. 3, 247[b]2–3. The context there makes it clear that Aristotle means to include *epistēmē* in the sense of an intellectual virtue (see 247[b]9–10, 246[b]20–247[a]2). For some reasons to think the doctrine of this text is not so at odds with Aristotle's discussions elsewhere as some have thought, see Harari, 'The Unity of Aristotle's Category of Relatives'.

metaphysics of relatives requires that the perishing of the object of understanding would bring in its wake the perishing of any understanding of it.

This way of putting things, however, suggests a solution to the dilemma. For—and this is the key observation—nothing about the considerations motivating the dependency principle requires Aristotle to hold that the object of understanding ever does actually perish. His remarks in *Categories* 7 about what is entailed by the object of understanding perishing need not be taken to show that he takes this to be possible; they may be taken to have the character of a *per impossibile* thought experiment designed to illustrate how understanding depends on its object by having us consider the consequences of a scenario that could never actually occur.

Now, if it is not possible for the object of understanding ever to actually perish, then the core claims of *Categories* 7 and 8 regarding understanding will fall short of a contradiction, although the logical space between these claims is narrow indeed. Dependency requires only that, *were it possible* for the object of understanding to perish, understanding would perish with it. It entails no commitment to the object of understanding actually being capable of perishing. If it is not, then the dependency of understanding on its object will be compatible with the claim that scientific understanding is never such as to be lost on account of changes in the world. Thus, if the object of understanding cannot, in fact, perish, then the dependency principle and the durability principle generate no contradiction. Seeing this is key to understanding Aristotle's argument for the necessity of the object of understanding in *Nicomachean Ethics* 6. 3. Let us turn to this now.

5. Aristotle's argument for the necessity of what we understand

Nicomachean Ethics 6 discusses the intellectual virtues, among which Aristotle counts scientific understanding,[102] placing it alongside craft (*technē*), practical wisdom (*phronēsis*), theoretical wisdom (*sophia*), and insight (*nous*). He announces his intention to specify what understanding is, 'if one is to be precise about the matter' (*εἰ δεῖ ἀκριβολογεῖσθαι*, *NE* 6. 3, 1139^{b}18–19). He starts, however, by

[102] See n. 86 above.

discussing the character of 'what we understand' (*ὅ ἐπιστάμεθα*, 1139^{b}20), that is, of the object of understanding. It is here, I claim, that Aristotle gives an argument for the necessity of the object of understanding, drawing on the durability and dependency of understanding as tacit premisses. Here again is the key passage:

[12] (i) *πάντες γὰρ ὑπολαμβάνομεν, ὃ ἐπιστάμεθα, μηδ' ἐνδέχεσθαι ἄλλως ἔχειν·* (ii) *τὰ δ' ἐνδεχόμενα ἄλλως, ὅταν ἔξω τοῦ θεωρεῖν γένηται, λανθάνει εἰ ἔστιν ἢ μή.* (iii) *ἐξ ἀνάγκης ἄρα ἐστὶ τὸ ἐπιστητόν.* (*NE* 6. 3, 1139^{b}19–23)

(i) We all think that what we understand cannot be otherwise. (ii) With what can be otherwise, we are not aware whether it is so or not whenever it goes out of view (*ἔξω τοῦ θεωρεῖν*). (iii) Therefore, the object of understanding is of necessity.[103]

Sentence (i) states the conclusion Aristotle intends to establish in this passage: 'What we understand cannot be otherwise'. As in other passages where he makes this claim, Aristotle notes the widespread acceptance of this claim, but whereas elsewhere he seems content to rely on consensus, here he presents an argument,[104] albeit a highly compressed one. Sentence (ii) gives the only explicit premiss. In sentence (iii) he proceeds without further ado to draw the conclusion stated in sentence (i), rephrasing it as the claim that what we know is 'of necessity' (*ἐξ ἀνάγκης*, 1139^{b}22).

Three other passages parallel the language of *Nicomachean Ethics* 6. 3, 1139^{b}19–23, but none of them is arguing for precisely this claim. The first is *Posterior Analytics* 1. 6, 74^{b}32–6, where Aristotle argues that the middle term of a demonstration that provides *epistēmē* cannot 'perish' (*φθαρείη*), on pain of the demonstration ceasing to impart understanding. I discuss this passage below. The second passage is *Metaphysics Z*. 15, 1040^{a}2–5, where Aristotle argues that there are no definitions of individual perceptible substances or demonstrations of facts about them. He argues that because any purported definition of an individual perceptible substance would not be necessary, no definition of an individual perceptible substance can be an object of understanding. This argument too relies on the claim that what we understand is necessary, using it to establish further conclusions. Finally, there is *Topics* 5. 3, 131^{b}21–3, which presents an argument for the conclusion that

[103] The division into sentences (i), (ii), and (iii) is for ease of exposition.
[104] Note the *ἄρα* at 1139^{b}23.

no object of perception is, in a certain technical sense, 'properly assigned' (*καλῶς κείμενον*) to a subject. This argument draws on similar considerations and will be relevant in analysing the argument here, but it does not aim to establish a conclusion about our knowledge or understanding directly; its conclusion is about the status of a certain type of predication in dialectic.[105]

It will thus pay to analyse [12] closely. The only explicit premiss of the argument states what might seem a queer claim about contingencies: if something is a contingency, then we are not aware whether it is so or not (*λανθάνει εἰ ἔστιν ἢ μή*) whenever it goes out of view (*ἔξω τοῦ θεωρεῖν*).

The first question to be settled concerns the use of *ἔστιν* here. Given that Aristotle's conclusion concerns our knowledge of necessities, and these elsewhere must be taken to be necessary facts or states of affairs, I will take the sense of *ἔστιν* in the premiss to be veridical. This reading is warranted by the context, since Aristotle indicates that he intends to be talking about the same notion of scientific knowledge that he discusses in the *Analytics* (*NE* 6. 3, 1139^{b}32) and, as I argued above, the objects of scientific knowledge at least include states of affairs or propositions there. My central justification for this reading, however, is that it allows us to make good sense of Aristotle's argument, as I will endeavour to show.

Supposing, then, that *ἔστιν* is to be taken veridically, [12] (ii) comes to the following:

If *p* is a contingent state of affairs, then we are not aware whether it is the case that *p* when *p* is out of view (*ἔξω τοῦ θεωρεῖν*)

Equivalently, replacing the internal conditional with its contrapositive:

If *p* is a contingent state of affairs, then: when we are aware whether it is the case that *p*, *p* is not out of view (*ἔξω τοῦ θεωρεῖν*)

We should note an important fact that this paraphrase reveals. Aristotle is not denying knowledge of contingencies outright. He is

[105] *Metaph*. *Δ*. 5, 1015^{b}6–9 does contain an argument for the claim that what we understand is a necessity, but this argument relies on the premiss that what we understand is the conclusion of a demonstration from necessary principles, a claim which Aristotle attempts to establish in turn from the premiss that what we understand is necessary in *Post*. *An*. 1. 6, as we have seen (see the discussion of text [3] in Section 1 above).

only making a claim about the conditions under which such knowledge could occur. His claim in [12] (ii) presupposes that knowledge of contingencies would require conscious awareness of them (the negation of *λανθάνει εἰ ἔστιν ἢ μή*) and that such awareness, in turn, would require them to be in some sense 'theorized' or 'in view'. Below I will argue that Aristotle has reason to think the possession of scientific understanding must be possible even when not 'in view' in the relevant sense, and so scientific understanding cannot be of a contingency. It is, however, open to Aristotle to maintain that some less demanding type of knowledge, or even a type of knowledge that is equally demanding but not in such a way as to rule out these conditions, is of contingencies.

In motto form, then, (ii) of [12] says that contingencies are 'known only when theorized' (KOWT, where 'theorize' is intended as a placeholder transliteration for *θεωρεῖν*, which I have so far rendered prejudicially). What does Aristotle mean by this, and how does this support his conclusion that understanding is of necessities? Let us consider these questions in turn.

5.1. *Why does Aristotle hold that contingencies are KOWT?*

Aristotle sometimes uses *θεωρεῖν* to mean 'observe',[106] and this meaning is intelligible even if the relevant objects are contingent states of affairs. I might, for instance, be said to observe the contingency that Socrates is sitting when I look at Socrates in a seated position and recognize that he is in such a position. One possibility, then, is that Aristotle is talking about what happens when a contingency ceases to be observed. His claim is that when we cease to observe a contingent state of affairs, we cease to be aware of it, and hence cease to know it.

A reading like this is encouraged by many translations.[107] It is also supported by a parallel passage in *Topics* 5. 3, where Aristotle writes:

[106] See the references in H. Bonitz, *Index Aristotelicus* (Berlin, 1870), 328ª4–40.

[107] 'outside our view' (Broadie and Rowe, *Nicomachean Ethics,* trans. Rowe, 178), 'outside our observation' (W. D. Ross (trans.), 'Nicomachean Ethics', in id., *The Complete Works of Aristotle: The Revised Oxford Translation*i (Oxford, 1984), ii. 1798), 'beyond our observation' (R. Crisp, *Aristotle:* Nicomachean Ethics [*Nicomachean Ethics*, trans. Crisp] (Cambridge, 2004), 105), '*cessons de regarder*' (Gauthier and Jolif, *L'éthique à Nicomaque*, ii. 163). T. Irwin (trans.), *Nicomachean Ethics* [*Nicomachean*

[13] *Ἔπειτ' ἀνασκευάζοντα μὲν εἰ τοιοῦτο ἀποδέδωκε τὸ ἴδιον, ὃ φανερὸν μὴ ἔστιν ἄλλως ὑπάρχον ἢ αἰσθήσει· οὐ γὰρ ἔσται καλῶς κείμενον τὸ ἴδιον. ἅπαν γὰρ τὸ αἰσθητὸν ἔξω γινόμενον τῆς αἰσθήσεως ἄδηλον γίνεται· ἀφανὲς γάρ ἐστιν εἰ ἔτι ὑπάρχει, διὰ τὸ τῇ αἰσθήσει μόνον γνωρίζεσθαι.* (*Top.* 5. 3, 131^{b}19–23).

For destructive criticism, see whether the *idion* is of such a sort that it is not evident whether it holds except by perception. For in that case, the *idion* will not be properly assigned. For all objects of perception take on an unclear status when they go outside perception, since it is not evident whether they still hold, on account of their being known only in perception.[108]

Aristotle is discussing what it takes for an *idion*, a counter-predicating but non-essential term (1. 5, 102^{a}18–19), to have a certain favourable status in dialectical which he calls being 'properly assigned' (*καλῶς κείμενον*). The issue of whether the *idion* is 'properly assigned' is distinct, for Aristotle, from the issue of whether the *idion* holds of a given subject at all (5. 4, 132^{a}22–4). In this context, Aristotle assumes that the purpose of assigning an *idion* to the subject is to render that subject 'more comprehensible' (*γνωριμώτερον*).[109] This rules out, on the one hand, predicating the more obscure of the less obscure, as when 'most similar to the soul' (*ὁμοιότατον ψυχῇ*) is predicated of the subject 'fire' (*πυρός*, 5. 2, 129^{b}9–13). The requirement also, however, disqualifies true predications that parties of the debate are in no position to verify, even if true (129^{b}14–17).

In [13], Aristotle claims that an *idion* which needs to be verified by means of perception is dialectically inappropriate in this way. He does not mean that no perceptible property can be a properly assigned *idion*, as he carefully clarifies: he takes the fact that surfaces are coloured to be a perceptible feature of them[110] but not to

Ethics, trans. Irwin], 2nd edn (Indianapolis, 1999), 88, gives a similar translation and adds what is in my view a correct parenthetical gloss: 'whenever what admits of being otherwise escapes observation, we do not notice whether it is or is not, [and hence we do not know about it]'.

[108] Cf. *Metaph. Z.* 10, 1036^{a}5–7. For the text of the *Topics*, I employ the edition of W.D. Ross (ed.), *Aristotelis Topica et Sophistici Elenchi* (Oxford, 1958).

[109] *Top.* 5. 3, 131^{a}17. Cf. 5. 2, 129^{b}1–5, 13–14, 22–3; 5. 3, 131^{a}1.

[110] *αἰσθητόν*, *Top.* 5. 3, 131^{b}31–2. In order to avoid a contradiction, we must interpret *αἰσθητόν* here more broadly than at 131^{b}21. In this line it evidently refers to any perceptible feature of a thing (whether knowledge of that perceptible feature *depends* on its being perceived), while at 131^{b}21 it is used in a narrower sense to refer to properties which can be known to hold only by being perceived.

be dialectically inappropriate, since in this case the predicate 'obviously belongs to its subject of necessity' (*ἐξ ἀνάγκης ὑπάρχον δῆλόν ἐστιν*, 5. 3, 131^{b}32). The example he offers of an improperly assigned perceptible property is 'the brightest star which revolves around the earth [as an] *idion* of the sun'.[111] Even if the sun always in fact goes around the earth and in fact always is the brightest star to do so (let us suppose with Aristotle that these things are both so), 'goes around the earth' (and so the compound property which includes this) is not properly assigned to the sun as an *idion*. This is because it is the type of property that is 'known by perception' (*τῇ αἰσθήσει γνωρίζεται*, 131^{b}27) or 'made clear to perception' (*τῇ αἰσθήσει φανερόν*, 131^{b}31). What Aristotle means, I take it, is that knowing whether the sun has this property at a given time requires perceptual verification: we need to perceive the movement of the sun at *t* in order to know that it is moving at *t*, and so we cannot do this when the sun sets 'on account of our lack of perception at that time' (*διὰ τὸ τὴν αἴσθσιν τότε ἀπολείπειν ἡμᾶς*, 131^{b}29–30).

We might wonder whether this is really so, even in Aristotle's view (shouldn't a sufficiently developed theory of astronomy allow us to know that the sun moves around the earth all the time?). We needn't place too much pressure on the example. Aristotle makes clear that the type of case he is trying to illustrate is one where our knowledge of *p* at *t* depends on perceiving *p* at *t*. Let's call this *perception-dependent knowledge*. His view is that at least some knowledge is like this, and that while we can have such knowledge, we have it only when we are actually perceiving the object of our knowledge.[112] Assuming that, for example, our basis for knowing the sun moves around the earth is just our perception of it doing so, we cease to know this at those times when we are unable to perceive the sun.

One way to read [12] is to assume that Aristotle thinks knowledge of any contingency is perception-dependent. Contingencies, according to this reading, are like 'objects of perception' (*αἰσθητά*, in the sense that *αἰσθητόν* is used at *Top.* 5. 3, 131^{b}21) in that knowledge of a contingent state of affairs requires that contingent state of affairs to be perceptually present to the knower. While I think that this reading cannot be decisively ruled out, it has the unwelcome

[111] *Top.* 5. 3, 131^{b}25–6: *ἡλίου ἴδιον ἄστρον φερόμενον ὑπερ γῆς τὸ λαμπρότατον.*
[112] Cf. *Pr. An.* 2. 21, 67^{a}39–^{b}3.

consequence of committing Aristotle to the view that all contingencies can be perceived, or else that non-perceptible contingencies cannot in any sense be known. Aristotle never makes any claim of this sort so far as I am aware, and it is unfortunate if this assumption should be required to make sense of his views about the necessity of understanding. After all, some contingencies—for example, facts about what someone is thinking at some time and place—are not in any obvious sense things we know perceptually. Yet it is hard to see why Aristotle would want to deny that we can know them, at least in some mundane sense.

An alternative is offered by C. D. C Reeve, who holds that we should resist assimilating Aristotle's point in [12] to his point in [13]. He proposes a different way of understanding the phrase ἔξω τοῦ θεωρεῖν, and a very different way of taking Aristotle's point in [12].

As Reeve reads him, Aristotle is not making a statement about contingency *per se* in this passage, but rather about the epistemic status of theorems of natural science which hold only for the most part. He uses the expression ἔξω τοῦ θεωρεῖν to describe theorems of natural sciences as opposed to those of 'rigorous theoretical sciences'. As he puts it, Aristotle's 'thought' in [12] (ii) 'is that because theorems of natural science hold for the most part and so do not constitute strictly theoretical scientific knowledge, we cannot know whether they hold of unobserved cases'.[113] Reeve consequently recommends translating ἔξω τοῦ θεωρεῖν as 'whenever they fall outside theoretical knowledge' (129). Aristotle's point, on Reeve's reading, is that whereas a demonstration in a rigorous science like mathematics allows us to know that all triangles everywhere, for example, have their characteristic angle sum, a demonstration in a natural science can at best allow us to know that something holds of those cases observed so far.

Leaving aside whether Aristotle holds that demonstrations in natural science apply only to observed cases,[114] there are two problems

[113] C. D. C. Reeve, *Aristotle on Practical Wisdom: Nicomachean Ethics VI* [*Aristotle on Practical Wisdom*] (Cambridge, Mass., 2013), 129.

[114] See *Post. An.* 1. 1, $71^{a}34$–$^{b}3$, where Aristotle places weight on the claim that we do know unobserved instances of a fact we have demonstrated. Reeve might reply that Aristotle means to restrict his claim to demonstrations in rigorous sciences, but Aristotle does not say as much. In any case, the evidence Reeve adduces (*Post. An.* 1. 8, $75^{b}24$–30) does not show that Aristotle is committed to this claim.

with this reading: Aristotle's argument turns, on Reeve's reading, on the difference between demonstrations in different sciences, but Aristotle does not mention demonstration or rigorous as opposed to non-rigorous sciences in [12]. In order to find this point in [12], Reeve needs to take Aristotle to be using a number of terms in restricted or unusual ways.[115] The more serious problem for this reading, however, is Aristotle's use of *γένηται* with *ὅταν* in [12] (ii). On Reeve's reading, Aristotle's point is that theorems of natural science *always* fall outside theoretical sciences, for which reason they are always restricted to observed cases. They do not sometimes fall within theoretical science on his view, and certainly they do not *come to be* (*γένηται*) outside theoretical science. Reeve's reading would require Aristotle to say that theorems of natural science are restricted in this way because they (always) fall *ἔξω τοῦ θεωρεῖν*, but [12] (ii) cannot be translated in this way.

For these reasons, I think that a reading closer to the original interpretation is preferable. We can, however, develop a reading along these lines without committing Aristotle to the questionable view that knowledge of contingencies depends on occurrent sensory perception.

We noted that Aristotle has good grounds for taking not just scientific understanding but any type of knowledge that has an object to be a relative, and thus to depend on that object as a correlative (even where the object does not reciprocally depend upon it). Consider, then, the consequences for knowledge that has a contingent proposition *p* as its object. If at some point I know *p*, then, at least at that time, *p* must be true on Aristotle's view.[116] Aristotle holds, however, that a contingent state of affairs is capable of ceasing to be, in particular when the predicate ceases to be 'combined'

[115] *τὸ ἐπιστητόν* (and *ὃ ἐπιστάμεθα*) needs to be understood to refer specifically to the object of knowledge in rigorous natural sciences, while *τὰ δ' ἐνδεχόμενα ἄλλως* are taken to refer specifically to the type of contingency proven in natural sciences. Aristotle gives no indication of intending the latter restriction, and, while he makes clear that he is speaking about scientific knowledge in a precise way in this passage, he says nothing about any restriction to theoretical sciences. Likewise, Reeve wants to get out of the words *λανθάνει εἰ ἔστιν ἢ μή* ('we don't know whether it is so or not') the thought that something cannot be known to hold of a case of a given generalization not yet observed. This would, to say the least, be a very opaque way for Aristotle to make that claim.

[116] See *Post. An.* 1. 2, 71^{b}25. Aristotle's statement is about understanding there, but I take it that all forms of knowledge for Aristotle are at least factive. See further Fine, 'Aristotle on Knowledge', 228.

(*συγκεῖσθαι*, *Metaph*. *Θ*. 10, 1051^{b}12) with the subject. This has the consequence, he notes, that 'the same account and the same belief about contingent things come to be at one time true and at another time false, and it is possible for it to sometimes indicate the truth (*ἀληθεύειν*) and sometimes represent things falsely (*ψεύδεσθαι*)'.[117]

Given our analysis of *Cat*. 7, we can understand why. If a known fact or state of affairs ceases to exist, then there will no longer be anything for my knowledge to be 'of'.[118] Given that contingent states of affairs can perish, then, my beliefs regarding contingencies are liable to fall out of sync with the object of my knowledge, even if (or precisely because) I don't change my mind about anything.[119] In the terminology developed above, knowledge of contingencies is liable to secondary loss.

Now, this does not imply that knowledge of contingencies is impossible. What it does imply, however, is that the security of this type of knowledge will depend on the vigilance of the knower. Someone who has this knowledge and wishes to keep it will need to be poised to immediately update her cognitive state so as to match the changes in this contingent state of affairs, coming to hold *p* to be false, should the object of her knowledge that *p* perish, coming to hold it to be true, should the relevant state of affairs once again come into being.

This is what I take Aristotle's point to be in [12] (ii). He is not attempting to exclude all knowledge of contingencies, but rather only to articulate the conditions under which this type of knowledge is retained. In order to be guaranteed to remain knowledge, knowledge of contingencies requires constant attention to the thing known, specifically a type of attention that makes us *notice* when the relevant fact changes and thus change our beliefs. Visual observation will fit the bill, at least in cases where the state of affairs is visually perceptible. If, for instance, I am closely observing Socrates, then I will inevitably notice and thus come to know if it ceases to

[117] *περὶ μὲν οὖν τὰ ἐνδεχόμενα ἡ αὐτὴ γίγνεται ψευδὴς καὶ ἀληθὴς δόξα καὶ ὁ λόγος ὁ αὐτός, καὶ ἐνδέχεται ὁτὲ μὲν ἀληθεύειν ὁτὲ δὲ ψεύδεσθαι* (*Metaph*. *Θ*. 10, 1051^{b}13–15). This does not imply that the state of affairs itself is a bearer of truth: see D. Charles and M. Peramatzis, 'Aristotle on Truth-Bearers', *Oxford Studies in Ancient Philosophy*, 50 (2016), 101–41. In other respects my interpretation of this sentence agrees with that of Crivelli, *Aristotle on Truth*, 60–1.

[118] *Cat*. 7, 7^{b}29–30.

[119] Cf. *DA* 3. 3, 428^{b}8–9.

be the case that Socrates is sitting. (I take 'observe' here to be a success term, so that observing Socrates entails knowing how things genuinely stand with Socrates' visually perceptible features. Riders like 'so long as I am not hallucinating, or a brain in a vat, etc'. are, therefore, unnecessary.)

We needn't, however, commit Aristotle to the view that perception is the only way that we can keep our beliefs regarding the contingent up to date. Aristotle uses *θεωρεῖν* to refer to a variety of different intellectual and perceptual activities.[120] Here, it is likely that it functions as a catch-all for the various activities we engage in that would ensure we notice changes in contingent states of affairs. *θεωρεῖν* might, in particular, be intended to include various sorts of purely or partially non-perceptual forms of attention that can serve to keep our beliefs in sync with non-perceptual contingencies, such as the introspection required to track whether I am currently thinking or whether I am currently sleepy, etc. Regardless of whether that is so, Aristotle's claim in [12] (ii) will be that we are guaranteed to keep knowledge concerning the contingent only if we engage in a certain kind of active attending to that contingency, so as to neutralize the risk of secondary loss.

Here it is important to bear in mind that scientific understanding, *epistēmē*, is only one type of knowledge, and so even if Aristotle allows knowledge of contingencies of some kind, it does not follow that he allows *epistēmē* of contingencies. In fact, Aristotle intends to leverage this conclusion to show that *epistēmē* differs from other kinds of knowledge in not permitting contingencies as its objects. Let us turn to this issue now.

5.2. *How does the claim that contingencies are KOWT establish that understanding is of necessities?*

On one reading, proposed by Jaakko Hintikka, Aristotle's reasoning in [12] relies on the assumption that knowledge must always remain knowledge, since '"false knowledge"—even merely *sometimes* false knowledge—struck the Greeks, as it is likely to strike us

[120] See Bonitz, *Index Aristotelicus*, $328^{a}4$–$^{b}56$, esp. the references attached to $328^{a}54$–5, where Bonitz takes it to function to distinguish an activity from a capacity associated with *epistēmē*.

today, as a misnomer'.[121] Knowledge of contingencies, however, is bound at some point to cease to be knowledge on Hintikka's view, since there must come some time when the contingency fails to hold, and we inevitably will (in my terminology) suffer a secondary loss of knowledge at that time. There can, consequently, be no knowledge of contingencies. Since understanding is a kind of knowledge,[122] understanding cannot be of contingencies.

This reading has a number of problems. First, as noted above, Aristotle's formulation in [12] (ii) strongly suggests, although it does not imply, that we *can* have knowledge of contingencies, albeit only with appropriate vigilance. If Aristotle's conclusion is that we, after all, cannot have any type of knowledge of contingencies, then his conclusion contradicts a strong suggestion of his premisses, which is an awkward result. Second, if the considerations of Section 5.1 are sound, then Aristotle does not think that known contingencies will inevitably cease to hold and hence cease to be known, only that such knowledge *can* be subject to secondary loss. There is no reason to think that one's knowledge will, therefore, sometimes be false.[123] Third, Hintikka provides scant evidence that Aristotle holds the view that all knowledge must remain knowledge at all times, and this view is not very plausible. As we have seen, Aristotle seems to think that our knowledge lasts at most as long as we do, and in cases of cognitive decline he allows that it might not even last that long.

As far as I can see, Aristotle does not think that the fact that knowledge of contingencies would require constant attention rules it out as genuine knowledge. Aristotle's warrant for drawing this conclusion derives rather from the distinctive feature he takes scientific understanding to have as compared with other kinds of knowledge. In particular, whereas Aristotle holds that some other

[121] Hintikka, 'Time, Truth and Knowledge in Aristotle and Other Greek Philosophers', 75.

[122] See n. 15 above.

[123] Hintikka is no doubt assuming what has become known as the 'principle of plenitude', the principle that truth at all times implies and is implied by necessary truth: see J. Hintikka, 'Necessity, Universality, and Time in Aristotle', in J. Barnes, M. Schofield, and R. Sorabji (eds.), *Articles on Aristotle*, vol. iii: Metaphysics (London, 1979), 108–24 at 111, for a classical formulation. See J. Barnes, 'The Principle of Plenitude', *Journal of Hellenic Studies* (1997), 183–6; and, especially, L. Judson, 'Eternity and Necessity in *De caelo* 1. 12: A Discussion of Sarah Waterlow, *Passage and Possibility: A Study of Aristotle's Modal Concepts*' ['Eternity and Necessity'], *Oxford Studies in Ancient Philosophy*, 1 (1983), 217–55 for powerful arguments that Aristotle did not accept the thesis, at least in full generality.

types of knowledge are sustained only by certain mental or perceptual acts, scientific understanding cannot be like this:

> If we have understanding of *p*, then it is *not* the case that we understand *p* only when we actively attend to *p*.

It should at this point be no surprise why I take Aristotle to be committed to this. The durability principle says that understanding is a type of knowledge we retain so long as we undergo no cognitive harm or decline. But failing, for example, to keep an eye on Socrates to see whether he has risen from his seat is certainly not a disqualifier of this sort. Ceasing to watch Socrates is typically a harmless procedure. In general, *no* type of active attending ought to be required in order to keep understanding if simply coming to no harm is sufficient to keep it. So, scientific understanding cannot be such that we only understand what we understand when we actively attend to or 'theorize' it.[124]

It will be noted that this is precisely the premiss Aristotle requires to render his argument in [12] valid. Aristotle's argument may thus be represented as follows (writing, again, KOWT for 'Known Only When Theorized'):

(1) Everything that can be otherwise is such that it is KOWT [explicit premiss]
(2) (but no object of scientific understanding is such that it is KOWT). [suppressed premiss]
(3) Therefore, no object of scientific understanding can be otherwise. [conclusion]

As we have seen, Aristotle endorses (1) on the basis of the dependency principle. (2) is a paraphrase of the claim just discussed, and I have argued it follows from Aristotle's durability principle. Both the idea that understanding is stable from *Categories* 8 and the idea that it is dependent from *Categories* 7 are thus needed to secure Aristotle's conclusion. Because scientific understanding is a relative, it depends on its correlative, the object of scientific understanding,

[124] If this is Aristotle's idea, then Hintikka, 'Time, Truth and Knowledge in Ancient Greek Philosophy' is exactly wrong to claim that Aristotle is assuming that 'the highest forms of knowledge [are] somehow analogous to immediate observation'. It is not clear what role this premiss plays in Hintikka's own reconstruction, but as I am reading him, Aristotle's point is that the highest kinds of (theoretical) knowledge do *not* depend on immediate observation as other types of knowledge might.

holding.[125] The status of scientific understanding as a relative thus explains why, if the object of understanding were a state of affairs that may cease to hold, we would be liable to lose this understanding when what we understand goes 'out of view' (ἔξω τοῦ θεωρεῖν). It does not, however, explain why this result is unacceptable, and hence it also does not explain why Aristotle takes himself to be warranted in rejecting the possibility of a contingent object of understanding. This is provided by the durability principle, which supplies (2).

6. Objections

At this point an objection to Aristotle's argument might be raised. Suppose that there is some state of affairs that is true from the time that it is learned by some knower *S* to the end of *S*'s life, but which is not true at all times *simpliciter* (it is false either before it is learned by *S* or after *S* dies, or both). In this case, *S*'s knowledge will satisfy the dependency condition, since, by stipulation, *p* is true whenever *S* knows it. It will apparently also satisfy the durability condition, since there is no time during her life when *S* ceases to understand *p*, and therefore, *a fortiori*, *S* continues to know *p* for as long as her cognitive machinery remains intact. Apparently, then, knowledge of this type of contingency *would* satisfy the durability and the dependency principles. If that is right, then the fact that understanding is durable and dependent does not rule out its having contingent objects, and something is wrong with Aristotle's argument (at least as I have interpreted it).

Another closely related objection is as follows. Let us grant, leaving aside these objections, that Aristotle establishes that whatever we know in the sense of *epistēmē haplōs* is true at all times. We might still worry here that Aristotle is playing fast and loose with temporal and modal notions, for the conclusion that he wishes to draw is not merely that the object of understanding is *always* true, but that it is *necessarily* true.

[125] Kiefer, *Aristotle's Theory of Knowledge*, 12–40 likewise highlights the importance of the fact that *epistēmē* (which he translates as 'knowledge') is both a relative and a *hexis*, but he does not emphasize the tension between these claims, and he does not discuss the role they play in Aristotle's argument that scientific understanding is of necessities.

I think Aristotle could respond to these objections. Seeing how will highlight the source of the properly *modal* status of understanding's objects, about which I have so far had fairly little to say.

6.1. *Objection 1: Durability without eternal truth*

There are a few ways that the type of scenario sketched in the first objection might be envisioned, and for the purposes of responding to this objection it will help to separate them. First, what is known might be something which is true at all times when known by *S* because it refers in some way to *S*'s cognitive state. For instance, *S* might know the proposition 'I am alive', 'I understand geometry', or even 'my cognitive faculties are intact'.[126] These propositions, if true, are clearly contingent truths (*S* might not have been alive; *S* might not have known geometry, etc.), but we can easily imagine a case where they are known all the time during a person's life, once learned. Let's call this the 'problem of introspective truth'.

Second, we might consider cases where the thing known has nothing to do with *S*'s own cognitive state, but nevertheless turns out to be true at all the times when *S* knows it. We might imagine, for instance, that Socrates, either due to a temporary disability or as some sort of long joke, remains seated from the moment that *S* learns he is sitting and gets up only after *S* dies. Let's call this the problem of luckily persisting knowledge, not to be confused with problems of epistemic luck discussed by contemporary epistemologists.[127]

Finally, we can imagine a rather different case of this sort. Suppose there is some proposition which becomes true at some point in the world's history and remains true ever after, for instance, that the world is established as an ordered *kosmos* by a divine craftsman at some point in time. In this case too, if someone learns this fact once

[126] Readers concerned about the indexical content introduced by personal pronouns may replace them with their own name, here and throughout, to see that nothing hangs on this.

[127] When post-Gettier epistemologists discuss epistemic luck, they are typically concerned with the possibility that a belief is acquired in a lucky way, not, as we are, with the possibility that a belief in a contingent state of affairs happens to remain true. M. Fricker, 'The Value of Knowledge and the Test of Time', *Philosophical Aesthetics and the Sciences of Art: Royal Institute of Philosophy Supplement*, 64 (2009), 121–38, esp. 128–9, however, argues that epistemologists ought to be more concerned with the diachronic stability of knowledge, an issue she traces back to the *Meno*.

it has become true, they will never lose it on account of a change in its truth, since (by stipulation) it always remains true after becoming true. Yet the proposition is not an eternal truth; there is a time at which it was false. Call this the 'problem of Timaean possibilities'.[128]

Consider first the problem of luckily persisting knowledge. While these cases clearly satisfy the dependency principle, they do not satisfy the durability principle on the most plausible way of understanding it. Aristotle's durability principle, as I formulated it above, says:

> If *S* understands *O*, then *S* continues to understand *O* so long as she experiences no detrimental changes to the constitution of her cognitive faculties.

There is, however, an ambiguity in this formulation as it stands, since the modal force of 'continues' is not specified. On a narrow reading, we might take this to mean simply:

> If *S* understands *p* at *t*, then, for every *t′* after *t*, *S* understands *p* at *t′* (so long as she experiences no detrimental changes to the constitution of her cognitive faculties between *t* and *t′*).

However, this is not the only way to understand this principle. We might also take the condition to be modally robust, as follows:

> If *S* understands *p* at *t*, then *necessarily*, for every *t′* after *t*, *S* understands *p* at *t* (so long as she experiences no detrimental changes to the constitution of her cognitive faculties between *t* and *t′*).[129]

On the first formulation, which I will call the 'non-modal durability principle', the cases of luckily persisting belief stand. On the second, they do not. Even if Socrates *in fact* remains seated until *S*'s death, the fact that he *could* have ceased to sit without injuring *S*'s psyche means that the object of her knowledge *could* have perished without any detrimental change to her. Given the dependency

[128] I draw the moniker 'Timaean' from Judson, 'Eternity and Necessity', 285. As we will see, it is no coincidence that we must reach for a non-Aristotelian example.

[129] To avoid any ambiguity of scope, we can write this condition formally as $(\forall t)(Uspt \rightarrow (\forall t' > t)\ \Box\ [\neg Dstt' \rightarrow Uspt'])$, where *Uxyz* means *x* understands *y* at time *z*, and *Dxyz* means *x* experiences a relevant detrimental change between time *y* and time *z*. The necessity, that is, takes narrow scope and governs the internal conditional.

principle, this means that *S* might have ceased to know it—and not on account of any change in her, but rather just because Socrates got up. Hence *S*'s knowledge is not, in this case, in fact durable on the modal reading of the durability principle, since it is subject to a possible secondary loss (even if no actual one occurs), whereas the modal durability principle requires scientific understanding to be counterfactually and not just actually stable.

The same response will not, in general, work for cases of introspective truth. Suppose the proposition I know is that my cognitive faculties are functioning well, and that as a matter of fact I continue to know this throughout my life. In this case, if the proposition I know ceases to be true, I *ipso facto* incur a detrimental change to my cognitive condition, since for that known proposition to cease to be true just is for it to cease to be the case that my cognitive faculties are functioning well. It follows that a secondary loss, that is, a loss where the thing known changes without any change in me, cannot possibly occur.

This is admittedly a more difficult case. I think Aristotle's best response would be to claim that we cannot rule out a primary loss of this type of belief. Whereas a belief in a fundamental scientific fact might come to be so deeply ingrained in my belief system that nothing could persuade me to renounce it, it is difficult to see how the same could be true in the case of some fact about the contingent condition of my own psyche. I might, for instance, be misled by a particularly cunning and manipulative sophist who convinces me that I am in cognitive decline when in fact I am not. Such a scenario, far-fetched as it is, does seem a genuine possibility, and there seems no reason to assume that I must actually be cognitively injured in any such scenario. The same is plausible, *mutatis mutandis*, for other cases where the proposition I know is implied by the condition that the I undergo no cognitive detriment. Given these possibilities, this type of contingency also *could* cease to be known even in cases where the knower comes to no harm. If that is so, the modal durability principle rules out understanding of contingent introspective truths.

If Aristotle holds the modal durability principle, then, he is not vulnerable to the first class of counter-examples, and at least has a serviceable reply to the second. The first piece of evidence in favour of a modal understanding of the durability principle is the language Aristotle uses to describe the durability of understanding. He says that understanding is 'steady' (*δυσκίνητος*) and 'abiding'

(παραμόνιμος). This language indicates more than just an actual persistence. As we saw, the reference is to *Meno*,[130] where these terms are used to describe the reliability of knowledge compared with true belief, on the model of an abiding slave. Now, an abiding slave is not one who just *in fact* sticks around, perhaps because the costs of running away turn out by chance to be too great. An abiding slave is one who *would not* run away in some appropriate range of counterfactual circumstances. Similarly, for understanding to be steady and abiding means that it not only actually remains understanding, but that it *would* do so at least in those circumstances that do not include a destructive change in the soul, whose condition is the source of this guarantee.

Further evidence that Aristotle intends the principle to be understood in this way may be garnered from an argument Aristotle gives in *Posterior Analytics* 1. 6:

[14] ἔτι εἴ τις μὴ οἶδε νῦν ἔχων τὸν λόγον καὶ σῳζόμενος, σῳζομένου τοῦ πράγματος, μὴ ἐπιλελησμένος, οὐδὲ πρότερον ᾔδει. φθαρείη δ' ἂν τὸ μέσον, εἰ μὴ ἀναγκαῖον, ὥστε ἕξει μὲν τὸν λόγον σῳζόμενος σῳζομένου τοῦ πράγματος, οὐκ οἶδε δέ. (*Post. An.* 1. 6, 74^{b}32–6)

> (i) Again, if someone does not know something now, although he possesses the account and is preserved, and the object is preserved, and he has not forgotten, then he did not know it earlier either. (ii) But the middle term might perish if it is not necessary, so that he will retain the account and the object will be preserved, but he will not have knowledge.[131]

Here Aristotle gives an argument that is structurally similar to the argument of [12], but for a different conclusion. In this chapter, Aristotle is assuming that scientific understanding of *p* requires grasping a demonstration whose conclusion is *p*.[132] Taking as a premiss that what we understand is a necessary truth, Aristotle argues for a thesis concerning the character of the demonstration by which we have scientific understanding. Not only must the thing we understand by means of demonstration (its conclusion) be

[130] See n. 77 above.

[131] The division into (i) and (ii) is my own, for ease of exposition.

[132] Given that [12] is embedded within a summary of the theory of understanding in the *Posterior Analytics*, Aristotle probably takes this for granted when he formulates [12] as well, but his argument there as I have reconstructed it does not depend on any particular assumption about the connection between understanding and demonstration.

necessary; the 'middle term' (*μέσον*) of the demonstration must also be necessary.

By the middle term of a demonstration being 'necessary' (*ἀναγκαῖον*), Aristotle seems to mean that it constitutes a necessary 'link' between the subject and predicate that makes the premisses of the demonstration true. Aristotle argues in [14] that if the middle term could 'perish' (*φθαρείη*), causing one or both of the premisses to go from being true to being false, it would be possible for someone to continue to remember a demonstration without coming to any harm, and without the object of scientific understanding changing in the manner countenanced in [12], and yet for what they remember to cease to be a sound argument for what they know.[133]

Aristotle holds that this cannot occur and that, consequently, the premisses of a demonstration must be necessary truths. What he is assuming is that demonstrations are reliably sufficient for retaining understanding, modulo certain disqualifying conditions that he specifies. He states this condition in [14] (i), in contrapositive form. Where D is a demonstration for p, Aristotle says that:

> If, between t and t', S possesses D, p does not perish, S does not forget [D or p], and S experiences no detrimental change and yet S does not understand p at t', then S also did not understand p at t.

It is easy to see that this is equivalent to the following:

> If D is a demonstration for p, then, if S understands p by possessing D, S continues to understand p so long as S experiences no cognitively detrimental change, and does not forget [D or p], and it does not cease to be the case that p.

In other words, remembering a demonstration is supposed to suffice for the continued possession of demonstrative scientific knowledge, given certain additional provisos made explicit in [14].[134] Since a demonstration only imparts knowledge of its conclusion if,

[133] Cf. Barnes, *Posterior Analytics*, 2nd edn, 128.

[134] In light of the foregoing, we can see that the conditions that S does not forget and that p does not cease to be true are unnecessary on Aristotle's view, since he thinks that if S has understanding of p, she is guaranteed not to forget it and it is guaranteed not to change. In sentence (i) of [14], Aristotle is presumably stating the principle in its most general form, even though he takes some of these conditions always to be satisfied. His theory of knowledge as relatives still entails that one *would* cease to have knowledge if p were to cease to be true, and that S *would* cease to know if she were to forget.

at a minimum, its premisses are true (*Post. An.* 1. 2, 71^{b}25), it follows that one will cease to grasp a demonstration that *p* if the premisses of the demonstration become false. The person still 'will possess the account' (*ἕξει . . . τὸν λόγον*), but the account will cease to constitute a demonstration; consequently, given the assumption that understanding *p* requires demonstration that *p*, *S* will cease to understand *p*. Hence, the premisses of a demonstration must also, like the fact understood, not change their truth values.[135]

What is of greatest relevance here is the remark that Aristotle goes on to make next. He says:

[15] *εἰ δὲ μὴ ἔφθαρται, ἐνδέχεται δὲ φθαρῆναι, τὸ συμβαῖνον ἂν εἴη δυνατὸν καὶ ἐνδεχόμενον. ἀλλ' ἔστιν ἀδύνατον οὕτως ἔχοντα εἰδέναι.* (*Post. An.* 1. 6, 74^{b}36–9)

> And if, although the middle term has not perished, it is possible for it to perish, the result *can* occur and is possible; but it is impossible to have knowledge under such conditions.

Aristotle is considering an objection parallel to the one under consideration, but about the middle term of a demonstration rather than the fact thereby understood (which corresponds to its conclusion). What if the middle term *could* perish, so that the premisses could cease to be true, but it never actually does perish, and so the premisses never actually cease to be true? Can a person in such a case be said to have scientific understanding on the basis of a proof from contingent premisses?

Aristotle answers in the negative. The reason he gives is that it would still be *possible* for the scenario envisaged to occur (*viz.* for one or both premisses to become false without any of the other defeaters to knowledge occurring). It is, however, 'impossible to have knowledge under such conditions' (*ἀδύνατον οὕτως ἔχοντα εἰδέναι*, 74^{b}38–9) in Aristotle's view. In other words, the very *possibility* of the premisses switching truth value, and not just the actual occurrence of this at some time, is incompatible with the guarantee of continued understanding that the grasp of a demonstration is meant to provide. Demonstrations must be such as to *necessarily* guarantee knowledge, modulo the disqualifiers he lists in [14] (i).

If we translate this reply to the case of the object of scientific understanding, the response would go like this: suppose someone understands a contingency, and suppose that this contingency

[135] Cf. *Metaph. Z.* 15, 1039^{b}32–1040^{a}2.

never *actually* ceases to obtain. If the fact is contingent, then it is still the case that it *could* cease to obtain. Further, there is no reason to suppose that this counterfactual occurrence would need to entail any harm to the knower or a corresponding change in the knower's mental state. The mere possibility that it *could* switch in truth value without any harm to the person who understands it is incompatible with the condition that *epistēmē* is *guaranteed* to abide so long as the knower comes to no harm. Hence, the object of scientific knowledge must not only, as a matter of fact, remain true for as long as *S* is in the appropriate condition; it must necessarily remain so during this time.

Admittedly, Aristotle does not actually consider this objection to the argument in [12], and his language there emphasizes temporal continuity rather than counterfactual possibility.[136] Nevertheless, given that Aristotle offers [15] as a supplement to the argument in [14], it seems not unlikely that he would be willing to provide a supplement to the argument in [12] along the same lines. If that is so, then there is good reason to suppose that Aristotle would endorse the modal durability principle. Not only does scientific understanding require knowledge to be *actually* retained where the knower is uninjured; he takes it to be incompatible with any circumstance which *could* result in its loss where the knower is uninjured.[137]

There remains the problem of Timaean possibilities. The reply given to the other cases is not applicable here, since the problem in this case is not that the state of affairs known could cease to hold (even if it never does). The problem is that this type of knowable object is not eternal (because it comes to be only after some particular time *t*), and this holds even if we suppose it can never *possibly* cease to be true after someone comes to know it. In *De caelo* 1, the prospect of such possibilities is at issue, since Aristotle is concerned with whether the *kosmos* has a beginning, and the fact that the *kosmos* is imperishable seems to him directly relevant to this

[136] Note *ὅταν* at 1139^{b}21. Cf. *ὁτέ* in *Metaph. Z.* 15, 1039^{b}33.

[137] Notice that if Aristotle would endorse this argument, then it warrants attributing the modal durability principle with scope as formalized in n. 129 above. The parallel claim is that it would disqualify *S's knowing p now if at some future time she could* cease to know it without undergoing any disqualifying changes; in other words, if she knows it now, then at all future times, it is necessary that she knows it if she doesn't undergo such changes.

question. Aristotle argues against the view that the *kosmos* has a beginning on the very abstract grounds that:

[16] *τὸ δὲ φάναι μηδὲν κωλύειν γινόμενόν τι ἄφθαρτον εἶναι καὶ ἀγένητον ὃν φθαρῆναι, ἅπαξ ὑπαρχούσης τῷ μὲν τῆς γενέσεως τῷ δὲ τῆς φθορᾶς, ἀναιρεῖν ἐστι τῶν δεδομένων τι.* (*De caelo* 1. 12, 283[a]4–7)

> to say that nothing prevents something subject to generation from being imperishable, and something that is not subject to generation from perishing, so long as the coming-to-be, in the one case, and the perishing, on the other, happen only once, is to remove one of the givens.[138]

Aristotle is denying two things here: (1) that something could come to be once, and subsequently be imperishable, and (2) that something which is not subject to generation could perish. He holds that there can only be things whose duration of existence is unlimited in both directions or whose duration is limited on both sides; there cannot, he claims, be things whose duration of existence is limited in one direction only. I will not consider his argument here. What concerns us is that Aristotle denies (1). The context suggests that Aristotle means to include predicative beings like states of affairs among things which come to be and perish.[139] Supposing, as elsewhere, that for a state of affairs to 'come to be' is for it to come to be *so*, and for it to be 'imperishable' at least implies that it could not cease to be so, this amounts to a denial of Timaean possibilities. While I will not attempt to treat this case fully here, [16] shows that Aristotle may have independent reasons for ruling out contingencies with this temporal profile.[140]

6.2. *Objection 2: Eternal truth without necessity*

I have argued so far that the object of understanding must be an eternal truth. The second objection is that Aristotle's argument,

[138] The text here follows P. Moraux (ed.), *Aristote:* Du ciel [*Du ciel*] (Paris, 1965). Translation modified from S. Legatt, *Aristotle:* On the Heavens*: Books I & II* [*On the Heavens*] (Oxford, 1995).

[139] See *De caelo* 1. 12, esp. 281[a]30–3, 281[b]15–17.

[140] Judson, 'Eternity and Necessity', 235–41, argues that Aristotle's claim makes most sense if understood to apply only to 'natural' possibilities, but Aristotle does not qualify his claim in this way. C. J. F. Williams, 'Aristotle and Corruptibility', *Religious Studies*, 1 (1965), 95–107 at 212 n. 8, stresses that the claim should be understood as a very general one.

even if it does establish that the objects of scientific understanding are eternally true, does not establish them as *necessary* truths. A possible response to this objection is to claim that Aristotle has in mind a notion of necessity for which eternal truth is sufficient, or even which just means 'true at all times', when he claims that the object of scientific understanding is 'of necessity' (*ἐξ ἀνάγκης*) at *NE* 6. 3, 1139^{b}22. A proponent of this response need not maintain that this is Aristotle's only sense of necessity.[141] Rather, one need only maintain that this is *one* sense in which Aristotle uses 'necessarily', and in fact the sense he employs in [12]. The clearest support for such a view is a passage in *De generatione et corruptione* 2.11:[142]

[17] *τὸ γὰρ ἐξ ἀνάγκης καὶ ἀεὶ ἅμα· ὃ γὰρ εἶναι ἀνάγκη οὐχ οἷόν τε μὴ εἶναι· ὥστ' εἰ ἔστιν ἐξ ἀνάγκης, ἀίδιόν ἐστι, καὶ εἰ ἀίδιον, ἐξ ἀνάγκης.* (*GC* 2. 11, 337^{b}35–338^{a}2)

For 'necessarily' and 'always' go together (since what necessarily is cannot not be), so that if it is necessarily, it is eternal, and if it is eternal, it is necessarily.[143]

Aside from the controversies over whether Aristotle recognizes this as even one sense of necessity,[144] a downside of this reading is that Aristotle would not be establishing his conclusion in a way that supports the type of necessity he takes the object of understanding to have in the *Posterior Analytics*. For there, as we have seen, Aristotle takes the necessity of knowledge to be of a specifically essentialist kind. This objection is not fatal: perhaps Aristotle has independent reasons for thinking that the objects of understanding are essentialist

[141] Hintikka, 'Necessity, Universality, and Time in Aristotle', and S. Waterlow, *Passage and Possibility: A Study of Aristotle's Modal Concepts* (Oxford, 1982), both take Aristotle to operate always with a conception of necessity for which truth at all times is sufficient.

[142] That Aristotle goes on immediately to infer that the object of understanding is 'eternal' (*ἀίδια*, *NE* 6. 3, 1139^{b}24) and 'subject neither to generation nor corruption' (*ἀγένητα καὶ ἄφθαρτα*, 1139^{b}24) does suggest that he associates the relevant notion of necessity with eternality, but he only commits himself to eternality being a necessary condition here, not a sufficient one. Aristotle's inference, therefore, neither strongly supports nor strongly weighs against the proposal that eternal truth is sufficient for being necessary in the sense at issue in [12].

[143] The text here follows C. Mugler (ed.), *Aristote:* De la génération et de la corruption [*De la génération et de la corruption*] (Paris, 1966), and the translation C. J. F. Williams, *Aristotle's* De generatione et corruptione (Oxford, 1982).

[144] See the references in n. 123 above.

necessities specifically, and perhaps his arguments there require only the premiss that understanding is necessary in this broad sense of omnitemporality. Such a reading would need, of course, to be substantiated by a close reading of the *Posterior Analytics*.

Fortunately, the foregoing discussion gives us the resources to mount a reply on Aristotle's behalf which does not depend on any such assumption. For, as we have seen, the modal durability principle implies that the object of understanding is such that it necessarily remains true. Now, that a fact necessarily remains true is, of course, not the same as for it to be necessarily true. Yet it is not easy to come up with examples of contingencies that necessarily remain true, and Aristotle at any rate seems to take his notion of contingency to rule out any such examples at *Metaphysics Θ*. 10, where he claims statements of contingencies can come to be true and can come to be false.[145]

One possibility is that Aristotle simply does not distinguish being necessary from necessarily remaining true.[146] Alternatively, Aristotle might be working from the assumption that being necessarily true is the only reason a fact could necessarily remain true. In that case, he could justify his conclusion by a sort of inference to the best explanation: he might say that nothing could explain the necessary permanence of a known truth other than that fact's necessity, and so infer the necessity of the object of understanding from its necessarily permanent truth. Admittedly, this is a speculative interpretation, but it seems to me the strongest defence available to Aristotle.

7. Concluding remarks

I have argued that *Nicomachean Ethics* 6. 3 gives an argument for the claim that scientific understanding is of a necessity, and that we

[145] *περὶ μὲν οὖν τὰ ἐνδεχόμενα ἡ αὐτὴ γίγνεται ψευδὴς καὶ ἀληθὴς δόξα καὶ ὁ λόγος ὁ αὐτός, καὶ ἐνδέχεται ὁτὲ μὲν ἀληθεύειν ὁτὲ δὲ ψεύδεσθαι* (*Metaph*. *Θ*. 10, 1051^{b}13–15). Contemporary philosophers might consider propositions about the past, like the fact that there was a battle on the Nile under Ramses III, to be examples of contingent propositions that necessarily remain true. While Aristotle's views about this kind of case cannot be settled fully here, it is at least not clear that Aristotle would agree, and there is some suggestion that he treats such past occurrences simply as necessities (at least from the perspective of the present): See *De caelo* 1. 12, 283^{b}12–14; *NE* 6. 2, 1139^{b}7–9; *Rhet*. 3. 17, 1418^{a}1–5; and the notoriously difficult statement at *De int*. 9, 19^{a}2–4.

[146] For a view with this consequence, see Crivelli, *Aristotle on Truth*, 21.

should read the argument in [12] as tacitly drawing on premisses spelled out more fully in *Categories* 7–8. The durability and dependency principles of these chapters generate a tension, but not a contradiction. What is, in fact, contradictory is not the combination of durability and dependency, but the triad that (1) some object of understanding may cease to hold, (2) understanding depends on its object's continuing to hold, and (3) understanding is retained so long as the person with understanding comes to no harm. Aristotle does not wish to relinquish either (2) or (3), since he wishes to maintain that understanding has a place both in the category of relatives and in the subcategory of qualities he calls states. Instead, he rejects (1), the assumption that we ever have understanding of something that may cease to hold, and infers that it is a necessity. I do not claim to have defended Aristotle's argument against all possible objections in this paper, but I do hope to have shown that Aristotle has replies available to the most pressing ones and that his argument is more subtle and has greater staying power than it may seem.

Like Bolton, I have emphasized the importance of the idea that scientific understanding is diachronically reliable. Aristotle's reasoning in [12] is bound to seem questionable if we take Aristotle to be defending his claim solely on the basis of its reliability, however, as Bolton in effect does when he takes Aristotle to defend his conclusion 'on the ground that *epistēmē* is something you should be able to reliably count on even apart from continued observation of the state of affairs in question'.[147] This presentation of Aristotle's argument raises the question: why should we think that such continued observation is required for *any* type of knowledge, scientific or otherwise? To understand this, we need to take account of the character of knowledge as a relative. Conversely, while Hintikka is correct to emphasize the importance of the view that the truth may change in such a way as to undermine our knowledge,[148] this also cannot explain Aristotle's thesis about understanding on its own, since Aristotle does not take this to be a problem for all types of knowledge, but only for knowledge with the special type of stability understanding is supposed to have. It is Aristotle's desire to combine these ideas which generates his view.

[147] Bolton, 'Science and Scientific Inquiry', 53.
[148] Hintikka, 'Time, Truth and Knowledge in Ancient Greek Philosophy', 7.

Both the idea that understanding is of something and the idea that a certain notion of understanding is distinctively stable are plausibly things that a wide variety of speakers might assent to, even if they do not understand them precisely in the way that Aristotle does in the *Categories*. If that is right, then Aristotle's statement that the necessity of what we understand is something we all presume might be intended to say that this is something many people *in effect* presume, or are *committed* to, given certain features of their pre-theoretic conception of understanding in the context of science. We needn't take him to mean that ordinary speakers, or even his philosophical peers, would have actually drawn the inference.

I have not attempted to ascertain whether, in Aristotle's overall picture, he intends for explanatory or essential connections to ground the necessities that we understand. What we can say is that he does not argue that we understand essential or explanatory connections and *therefore* necessities; if he argues in either direction, it is the reverse. While I have also not traced the lineage of these ideas to past thinkers, these results cast doubt on any interpretation which sees Aristotle's view simply as an inheritance from the tradition. For even if the ideas underlying his argument have currency in the tradition, Aristotle elaborates and precisifies them using his own philosophical machinery, particularly the theory of relatives and states in *Categories* 7–8. In this respect, at least, he presents an argument for his position that his predecessors could not have given.

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