

When and Why Understanding Needs *Phantasmata*:

A Moderate Interpretation of Aristotle's *De Memoria* and *De Anima* on the Role of Images in Intellectual Activities

Abstract

I examine the passages where Aristotle maintains that intellectual activity employs φαντάσματα (images) and argue that he requires awareness of the relevant images. This, together with Aristotle's claims about the universality of understanding, gives us reason to reject the interpretation of Michael Wedin and Victor Caston, on which φαντάσματα serve as the material basis for thinking. I develop a new interpretation by unpacking the comparison Aristotle makes to the role of diagrams in doing geometry. In theoretical understanding of mathematical and natural beings, we usually need to employ appropriate φαντάσματα in order to grasp explanatory connections. Aristotle does not, however, commit himself to thinking that images are required for exercising all theoretical understanding. Understanding immaterial things, in particular, may not involve employing φαντάσματα. Thus the connection that Aristotle makes between images and understanding does not rule out the possibility that human intellectual activity could occur apart from the body.

Keywords

Aristotle; Understanding; Soul; Imagination; Images; Representations; Diagrams; Separability

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1. Introduction

“Without an image (φαντάσματος) there is no understanding (νοεῖν).” (*De Memoria* [*Mem*] 1, 449b31-2) Interpreters frequently invoke this claim as decisive evidence that, for Aristotle, exercising understanding requires employing φαντάσματα.¹ Many then appeal to this connection in dismissing or downplaying Aristotle’s claims in *De Anima* (*DA*) III 4-5 about the separability of the intellect.² While the current scholarly consensus takes φαντάσματα to be universally required for exercising understanding, there is little agreement on how and why this connection obtains. In this paper, I call that consensus into question by offering a detailed analysis of why and when Aristotle connects φαντάσματα with understanding.

I employ Aristotle’s discussions of proper practice in mathematics and natural science to unpack the comparison he makes between the use of φαντάσματα in exercising understanding and the role of diagrams in doing geometry. On the Moderate interpretation I advocate, Aristotle thinks that, for natural and mathematical objects, attending to and being aware of the relevant φαντάσματα is usually required for understanding the intelligible forms themselves. Contra Victor Caston and Michael Wedin, Aristotle’s primary basis for connecting φαντάσματα and understanding does not come from taking φαντάσματα to be representations. My interpretation is a moderate one insofar as it maintains that Aristotle’s reasons for connecting φαντάσματα and understanding are varied and contextual. In practical and productive understanding,

¹ E.g. Caston 1998 and 2009; Polansky 2007, 487-489; Wedin 1988; Modrak 1987, 122-123; 130-131

² For an overview of the contemporary debate concerning Aristotle’s views on the intellect in the *DA* see Cohoe 2014.

φαντάσματα are required due to the nature of the goal: a particular action or thing produced. In theoretical understanding of mathematical and natural beings, we usually need to employ appropriate φαντάσματα in order to grasp the explanatory connections between perceptual things.

While Aristotle uses forceful language to distinguish his view from those who think that φαντάσματα are mere prompts or stepladders to understanding, he does not commit himself when it comes to the case of understanding divine and unchanging being. Indeed, there is some suggestion that φαντάσματα are not required for exercising such understanding.³ On the basis of my interpretation, I maintain that φαντάσματα play an ancillary role in understanding: they do not constitute (even partially) the activity of understanding. Their role is not analogous to that played by the affections of sense-organs in perception. Thus the connection between images and understanding does not undermine Aristotle's reasons for thinking that the intellect does not have a bodily organ. It also does not rule out the possibility that intellectual activity could occur apart from the body.

2. Separability Conditions for Understanding and for the Soul

In this section, I discuss what Aristotle says about the requirements for the separability of soul and contrast my overall interpretation of the relationship between images, understanding, and separability with the No Separability interpretation, the predominant view in the contemporary literature.

³ Those who maintain that Aristotle posits a necessary connection between understanding and φαντάσματα need to explain why we should take Aristotle to be committed to such a strong claim. This is a difficult task, particularly once we see that one of the most popular readings, Caston and Wedin's representationalist account of images, has little positive textual support.

At the beginning of the *DA*, Aristotle introduces his Separability Criterion, the condition the soul needs to meet to be able to be separated from the body:

If, therefore, there is something proper [to the soul] among the works or affections of the soul, it is possible that the soul be separated. If, however, nothing is proper to it, it would not be separable...For [the soul] is inseparable, if it is always with some body.⁴

Aristotle seems here to be talking about the conditions required for soul to exist separately from body. In *DA* I 1 he suggests that the only plausible candidate for an activity or affection that is non-bodily is understanding.⁵ Then, in *DA* III 4, he argues that understanding, in contrast to sense-perception, cannot have a bodily organ. He concludes his argument for the immateriality of the intellect by saying that “the power of perception is not without a body (οὐκ ἄνευ σώματος), but the intellect is separate (χωριστός).”⁶ This phrase seems to be picking up on the Separability Criterion from *DA* I 1 and then affirming that the intellect meets it.⁷ The activity of understanding is separate from the body, raising the possibility that the soul can exist without a body.⁸

Most recent interpreters have downplayed the force of this passage by appealing to the connection between images and understanding. When, in *DA* I 1, Aristotle

⁴ εἰ μὲν οὖν ἔστι τι τῶν τῆς ψυχῆς ἔργων ἢ παθημάτων ἴδιον, ἐνδέχοιτ' ἂν αὐτὴν χωριζεσθαι· εἰ δὲ μηθέν ἔστιν ἴδιον αὐτῆς, οὐκ ἂν εἴη χωριστή...ἀχώριστον γάρ, εἴπερ ἄει μετὰ σώματος τινος ἔστιν. (*DA* I 1, 403a10-12, 15-16)

⁵ *DA* I 1, 403a8-9.

⁶ *DA* III 4, 429b4-5. For an interpretation of the force of this argument see Cohoe 2013.

⁷ The passage from *DA* I 1, 403a15-16 asks whether the soul is always “μετὰ σώματος τινος” while the passage from III 4 claims that the perceptive power is “οὐκ ἄνευ σώματος,” but the intellect is “χωριστός.” I think this slight difference in wording should not undermine the strong connection between these passages, as Aristotle often uses “οὐκ ἄνευ σώματος” in discussing his separability condition. In particular, he uses this phrase in asking whether understanding is separable from the body a few lines earlier on in the I 1 passage (*DA* I 1, 403a8-10).

⁸ This possibility remains even if we adopt Phil Corkum’s interpretation of separability in being, on which *A* is separable from *B* if *A*’s ontological status does not depend on that of *B* (Corkum 2008, 2010). The activity of understanding being what it is, independent of and separate from body, might well be enough to ensure the separate existence of the intellect (it will depend on how exactly we interpret III 4-5, but separability in Corkum’s sense sometimes also implies existential separability in the standard sense)

introduced understanding as the most plausible candidate for a separable activity or affection of the soul, he noted that the connection between imagination and understanding might mean that understanding is not separable from the body:

The activity of understanding (τὸ νοεῖν) seems most to be proper (ἰδίῳ) [to soul]. But if this is some sort of imagination or is not without imagination (μὴ ἄνευ φαντασίας), not even this could be without body.⁹

Aristotle lays out two ways in which understanding might fail to be separable in being from body: either understanding might *be* some kind of imagination or understanding might be inseparable in being from imagination. In *DA* III 3 Aristotle rejects the first option, insisting that understanding is not a kind of imagination. However, at several points in *DA* III Aristotle claims that the activity of understanding relies upon φαντάσματα in some way.¹⁰ Most interpreters read these passages as identifying a necessary connection: exercising understanding necessarily *requires* employing φαντάσματα.¹¹ They think that Aristotle endorses the second option, with the result that understanding fails the separability test. Understanding cannot occur without the body, even if it itself is not a bodily activity. This is the No Separability interpretation, the dominant view in the contemporary literature with historical antecedents stretching back to Alexander of Aphrodisias.¹²

Despite its popularity, the No Separability interpretation has some significant weaknesses. First of all, its proponents do not agree about Aristotle's basis for a universal

⁹ *DA* I 1, 403a8-10.

¹⁰ *DA* III 3, 428a16-18 (cf. III 3, 427a17-427b26); III 7 431a14-20, III 8, 432a3-14; cf. *De Memoria* 1, 449b31-2.

¹¹ E.g. Caston 1998 and 2009; Polansky 2007, 487-489; Wedin 1988; Modrak 1987, 122-123; 130-131.

¹² *Ibid.* and Alexander, *De Anima* 12, 19-22; cf. Averroes, *Long Commentary* III 30, 469; and, on the intellect connatural to the soul, Themistius, *On Aristotle's On the Soul*, 113, 18-21.

connection between understanding and images. Some think that Aristotle is committed to a representational theory of understanding on which φαντάσματα serve as the key parts of an internal system of representations that is required for employing our understanding.¹³ Others have suggested that Aristotle may be a precursor of *Gestalt* psychology, holding that the phenomenology of thought requires us to acknowledge the presence of an image in our minds whenever we think of something.¹⁴ The significant divide between these two readings suggest that we may not understand Aristotle's views on φαντάσματα and understanding well enough to be confident of their implications. Secondly, as I will argue below, the passages that posit a connection between understanding and images occur in specific circumstances that implicitly limit their scope, showing up either in the context of practical understanding (as in *DA* III 7, 431a14-17 and 431b2) or where the objects of cognition being considered are all inseparable from perceptible magnitudes (as in *DA* III 8 432a3-14).

Finally, none of the passages in *DA* III or the *Parva Naturalia* that connect understanding and images relate this connection to the separability of the soul. As I mentioned above, the question of separability seems to be directly addressed in *DA* III 4-5.¹⁵ By contrast, Aristotle never brings up the question of separability when discussing the relation between images and understanding in *DA* III 6-8 or *De Memoria (Mem)* 1. This suggests that, for him, their interconnection may not be decisive in determining the

¹³ Caston 1998 and 2009; Wedin 1988; Modrak 1987, 122-123; 130-131. I discuss their views in section 6.

¹⁴ Dorothea Frede suggests this possibility but does not firmly commit herself to it (D. Frede 1992, 290-291).

¹⁵ While interpretations of *DA* III 5 are obviously relevant to Aristotle's views on the separability of soul, the meaning of that short passage (and, in particular, the sort of entities it refers to) is so contested that I am going to set it aside. My approach in this article will be to make sense of Aristotle's views on images and understanding without appealing to any particular reading of *DA* III 5.

separability question. The structure of book III of *DA* does not fit well with what one would expect if Aristotle, in fact, affirmed the No Separability view.¹⁶

My reading, the Moderate interpretation, explains the structure of the *DA* and the relevant texts better than its rivals. On my interpretation, Aristotle's views on the connection between images and understanding are significantly stronger than those of many of Aristotle's contemporaries. In contrast to philosophers who take images to be mere prompts to understanding or view them as stepladders that can be discarded once understanding has been achieved, Aristotle thinks that truly *exercising* most kinds of understanding requires employing images. This explains the forcefulness of the relevant texts: Aristotle wants to distinguish his views from those popular in the Academy.¹⁷ It also explains the emphasis on universality in several of these texts, since Aristotle thinks that images are needed even for understanding the objects of mathematics, seen as substances and principles by some (e.g. *Metaphysics* M 1). Practical and productive understanding employs images, as does most theoretical understanding of natural and

¹⁶ A proponent of the No Separability interpretation might respond to this third problem by claiming that Aristotle is leaving his readers to draw the connection between images and lack of separability for themselves (Hendrik Lorenz and Benjamin Morison have suggested such a reading to me). On this view, Aristotle adopts this approach to avoid giving direct offense to those with strong commitments to the immortality of soul. Such a reading may be broadly consistent with the text, but there is little positive evidence in the *DA* that Aristotle is treading carefully for fear of annoying or disturbing his readers. For example, Aristotle's treatment of Platonist views on parts of the soul in *DA* I 5 is far from sympathetic, despite Aristotle's own regular employment of "parts of the soul" language and his qualified endorsement of psychic partition. Throughout the work, there is little sign that Aristotle is trying to be irenic.

¹⁷ Thus my interpretation gives more weight to the connection between imagination and understanding than the sort of reading found in several late ancient Platonic commentators, who often attempt to restrict Aristotle's claims of interconnection to understanding of particulars or to lesser sorts of intellect. These commentators are very sensitive to claims that might impinge on the intellect's immaterial and divine status and sometimes attack Aristotle's views and/or phrasing. For example, Ps.Philoponus, frustrated that Aristotle, in *DA* III 7 431b17-19, seems to question whether an intellect that is not separated from sensible magnitude can understand things that are immaterial, goes so far as to call Aristotle out:

But that [intellect not separated from matter cannot know non-material forms] is false, O Aristotle. For if intellect does not while it is in the animal know things that are in every way non-material, how is it that in your treatise the *Metaphysics* you both enquired after forms that are in every way non-material, and found them, and reported them to us? (563, 27-30, Trans. Charlton)

mathematical being. On my reading, Aristotle does not, however, commit himself on the role of images in first philosophy and theology (e.g. as laid out in *Metaphysics* E 1; A 6-7), leaving open, for reasons that I discuss in section 9, the question of whether he thinks human understanding meets the Separability Criterion.

3. Initial Connections between Images and Understanding

Before examining how these three approaches fit with the relevant texts, it will be helpful to give a brief sketch of Aristotle's conception of images and understanding and lay out two uncontroversial ways in which understanding relies on images. Let us start with Aristotle's conception of φαντάσματα, images, and the power of imagination (φαντασία) responsible for them. Aristotle discusses φαντασία in *DA* III 3 and contrasts it both with sense perception and with intellectual activities such as understanding and opining. He ends up characterizing φαντασία as “motion generated by actual perception.”¹⁸ Perception, for Aristotle, requires contact between the perceptible object and the perceiver. Actual perception produces certain motions that are often preserved. The power of imagination, φαντασία, is responsible for remembering or recollecting things that have previously been perceived and for putting them together in various combinations (*DA* III 3, 428b10-429a2, 427b17-20).¹⁹

¹⁸ κίνησις ὑπὸ τῆς αἰσθήσεως τῆς κατ' ἐνέργειαν γιγνομένη (429a1-2)

¹⁹ It is this function of creative combining that lies behind my use of “imagination” to translate φαντασία. Some prefer the use of “appearance” or “presentation” to translate φαντασία and “appearances” or “presentations” to translate φαντάσματα (E.g. Burnyeat 2008, 47, fn. 15 and J.I. Beare's translation of the *De Memoria*), though Bloch uses imagination in his translation of the *De Memoria* (Bloch 2008). These alternative translations do bring out an important aspect of Aristotle's conception of φαντασία, the idea that φαντασία is a power whose sphere includes that of appearances and that the φαντάσματα it produces do not command assent in the way that perceptions or thoughts, which are about the way things are, do (*DA* III 3, 427b6-428b9). These translations also helpfully connect up to the Platonic background for Aristotle's conception where in a number of related texts from Plato the verb φαίνεσθαι (to which φαντασία and φαντάσματα are closely related) is appropriately translated “to appear” (cf. *Theaetetus* 152b-c. *Sophist*

While the power of imagination belongs to animals, understanding, τὸ νοεῖν, belongs only to rational beings.²⁰ To understand something is to cognize its essence, to comprehend what that thing is as such. Such an intellectual achievement is not simply a matter of repeated experiences or associating a number of things together. It requires truly grasping the form that all the relevant individuals share.²¹ To understand horse or triangle is to recognize what makes something a triangle or horse and distinguishes them from other substantial or accidental beings.

So, why does Aristotle, in both *DA* and *Mem*, connect the exercise of understanding to the use of images? Before discussing the disputed passages, I want to note two important and uncontroversial roles that imagination has in relation to understanding. First of all, commentators generally agree that images are important to Aristotle's account of thought because they allow him to maintain his broadly empiricist

264a-b). However, it is misleading to think of φαντασία as a power of the soul responsible merely for appearances or presentations, as this neglects the vital cognitive role that φαντασία has as the power that preserves and combines perceptions for purposes of cognition and action. The language of images and imagination also brings out the connection with light and the visual sense that Aristotle thinks is present in the etymology of φαντασία (*DA* III 3, 429a2-4). I will regularly use imagination for φαντασία and images for φαντάσματα, but the full range of functions that this power is responsible for should be kept in mind. Victor Caston and Michael Wedin have argued that φαντάσματα should be understood as “representations,” since this is the cognitive role they play. I will discuss their views below in section 6. For more discussion of the different cognitive roles Aristotle assigns to φαντασία see D. Frede 1992; Caston 1996; Caston 1998; and Caston 2009, 323-6.

²⁰ The perceptual power and related activities and abilities are discussed in *DA* II 5-III 3 while the intellectual power and related activities and abilities are discussed in III 4-8. For a discussion of the way in which the imaginative power depends on the perceptual power see Johansen 2012, ch. 10. For Aristotle, animals, by definition, are capable of perception (although the level of development of their perceptual powers differs). He suggests, however, that only some animals, seemingly those with more developed powers of perception and locomotion, are capable of imagination (*DA* III 3, 428a6-11), though he later allows for an indefinite form of φαντασία in lower animals that are also capable of indefinite motion (*DA* III 11, 433b31-434a5). For discussion see Lorenz 2006, 138-47 and Johansen 2012, 217-8. Among perishable living things, only human beings are rational and thus only human beings are capable of understanding.

²¹ While Aristotle thinks that memory, repeated perception, and the unified experience that results play an important role in the process that leads to understanding, as both *Posterior Analytics* II 19 and *Metaphysics* A 1-2 make clear, he strongly differentiates the achievement of intellectual understanding from these activities (cf. *Nicomachean Ethics* VI 6-7).

account of knowledge.²² For Aristotle, the human intellect starts out as a blank slate (*DA* III 4, 429b29-430a2). Human beings first perceive the world around us, then form memories and unified experiences from these sensations, and only after all this do we begin to understand things and grasp what the being of each thing is. Because φαντασία is the cognitive power responsible for producing a unified experience from many different memories, the exercise of imagination is necessary for our initial acquisition of understanding.²³

Secondly, in *Mem* Aristotle argues that both memory (ἡ μνήμη) and the extended process of recollection (ἡ ἀνάμνησις) use images (and the connections between images) to allow us to remember or recollect something. Even when the object of our memory or recollection is an object of understanding, the process of remembering or recollecting still takes place through imagination.²⁴ However, it is also clear that not all exercises of

²² E.g. M. Frede 1996, 106-7, Polansky 2007, 498-9, Caston 2009, 327.

²³ Aristotle's presentations of how this process works, as found in *APo* II 19 and *Metaphysics* A 1-2, are quite concise and give rise to some interpretative difficulties. Nevertheless, Aristotle clearly thinks that φαντασία is the key intermediary between the activities of sense-perception and those of the intellect. Imagination is what allows us to preserve our perceptions of the world around us, forming memories and unified experiences that allow us to begin to form generalizations and universals based on our repeated experience of particulars

Key texts on this include *Posterior Analytics* I 18, 81a38-b9, II 19, 100a10-b3 and *Metaphysics* A 1. For discussion of II 19 see Bronstein 2012. For a general discussion of some relevant topics see Irwin 1988, Charles 2000. For reasons similar to mine, Dorothea Frede maintains that imagination, although not specifically mentioned in *Metaphysics* A 1 or *APo* II 19, is clearly the power required for forming the sort of unified experience of something required for the acquisition of understanding (D. Frede 1992, 291-2).

²⁴ This is because, for Aristotle, the objects of understanding can only be incidental objects of memory (*Mem* 1 450a11-14). Aristotle holds that for something to be remembered as a proper object it must be in the past (*Mem* 1 449b15-8). Intelligible objects, however, are immaterial and unchanging and thus, for Aristotle, they do not, properly speaking, exist at a time (For a detailed discussion of Aristotle's reasons for denying that the objects of understanding are in time see Coope 2005, c. 9). Since they do not have a time in themselves, they cannot be past. Thus while we can remember when we first understood something or a particular occasion on which we exercised our understanding (cf. 449b18-25), we cannot remember an object of understanding as such.

understanding involve memory or recollection in Aristotle's sense, since we often understand things without understanding them *as remembered* or *as recollected*.²⁵

4. *DA* III 7 on Understanding and Images

Images are necessary for acquiring intelligible forms and remembering and recollecting them. Are they always required for exercising one's understanding? To address this question I will consider texts from *DA* III 7; III 8, and *De Memoria* 1. The connection between images and exercising understanding first occurs in *DA* III 7.²⁶

This chapter discusses, *inter alia*, how cognition relates to action and compares perception and understanding. It is in this context that we get the first remarks about images and understanding:

For the thinking soul (ἡ διανοητικὴ ψυχὴ) images (φαντάσματα) serve like the objects of perception (αἰσθήματα) [do for the perceptive soul] and when it affirms or denies them as good or bad, it avoids or pursues them. That is why the soul never understands without an image. (*DA* III 7, 431a14-17)

As I read this passage, Aristotle is focusing on the role of perception in seeing things as painful or pleasurable and the role of understanding in seeing things as good or bad, and thus as to be pursued or avoided. While some have taken the final claim in this passage to apply to all cases of understanding, in context it seems to be a claim about exercising

²⁵ Aristotle maintains that it is not sufficient for something to be a memory that it be a thought or image that I have retained. I have to cognize it *as a memory*; I need to consciously use this likeness as a likeness of the thing I previously experienced (*Mem* 1, 450b20-451a2). Recurrences of some previous thought or image do not count as memories unless they meet this standard. Recollection, for Aristotle, is an even more involved and distinctive process. Recollection comes into play when I cannot directly recall some previously experienced thing, but need to engage in a process involving chains of connected images in order to reach the object of my recollection (*Mem* 2).

²⁶ While I will take the material in this chapter as a guide to Aristotle's thought, it should be noted that the chapter's role in the overall text is unclear, making some degree of caution about whether the views it contains represent Aristotle's worked out views appropriate. Some scholars think it is merely a collection of Aristotelian fragments, possibly put together by an early editor (Torstrik; Ross; Hamlyn). Myles Burnyeat thinks it may have been "a sort of 'folder' kept by Aristotle himself for storing bits and pieces which might in due course be integrated into the treatise." (Burnyeat 2002, 68).

practical understanding.²⁷ Aristotle is claiming that we cannot understand something as good or bad in a practical or deliberative sense, and hence aim to pursue it or avoid it, without employing an image.²⁸

Just as perceiving the objects of perception (αἰσθήματα) as pleasant or painful leads to pursuit or avoidance of these objects (*DA* III 7, 431a9-14), so understanding images (φαντάσματα) as good or bad leads to pursuit or avoidance of them. This analogy is supposed to ground the claim that understanding requires images, as the introduction of this claim by the conjunction διὸ, “on account of which,” clearly indicates. It is hard to see how facts about cognition of the good and the bad could ground an explanation of why *every* exercise of understanding of *any* object must employ φαντάσματα. Given this, we should take Aristotle’s claim to be restricted.

Similarly, when, later on in the chapter, Aristotle claims that “the power of understanding understands the forms in images,” the context suggests we should again restrict the scope of this claim to practical thought and action.²⁹ Aristotle works to establish this claim by discussing two sorts of cases, one in which understanding something as to be pursued or avoided follows upon sense-perception and one in which

²⁷ E.g. Hicks 1907, 537-8. In support of his interpretation, Hicks notes that Aristotle appears to make a fully general claim in a later passage (*DA* III 8 432a5). However, the fact that Aristotle may make a broader claim in other passages does not force us to interpret his claim here as an unrestricted one. The context strongly suggests that the range of Aristotle’s claim is limited to practical understanding. Aristotle is presenting an analogy between the ways in which perception and understanding give rise to action, to avoiding or pursuing something. Polansky agrees with my more restrictive interpretation (Polansky 2007, 485).

²⁸ Aristotle is here discussing taking something to be good or bad *for oneself*; hence the good at issue is the practical good (as discussed, for instance, in *NE* III 4): it is the apparent good that one must attempt to pursue or the apparent evil that one must attempt to avoid. Aristotle allows for a non-practical understanding of something as good, along the lines of the attributive sense of good Peter Geach lays out (Geach 1972), where we understand or evaluate some *X* as a good *X*, because of its excellence with respect to the nature or the ἔργον of *X*. Such an understanding of good, however, need only be theoretical and thus is not the understanding at issue in this passage.

²⁹ τὰ μὲν οὖν εἶδη τὸ νοητικὸν ἐν τοῖς φαντάσμασι νοεῖ (*DA* III 7, 431b2).

the intellect employs images (431b3-5; 431b8-10). Aristotle starts with an example of the first kind of case: you perceive a fiery beacon being moved and, on the basis of that perception, come to understand that the enemy is approaching. The second kind of case occurs “when, by employing images (φαντάσματα) or notions (νοήματα) within the soul, just as if it were seeing, it calculates and deliberates about things to come based on present things.”³⁰ In this case, your understanding of something as good or bad is based on the particular images or notions you employ in your calculating and deliberative process. Aristotle closes his discussion by coming back to the analogy between pleasure and pain and pursuit and avoidance, as he takes both to involve a kind of affirmation or denial in relation to action (431b9-10).

The general framework of Aristotle’s presentation strongly suggests that his topic is practical understanding, not all possible kinds of understanding. This is borne out when we try to reconstruct Aristotle’s reasoning. As I read these passages, Aristotle is relying on both the particularity of the φάντασμα and one’s awareness of it. A φάντασμα that was disconnected from my particular circumstances might not appear good or bad or prompt action. I may be able to understand whether some object or class of things is the sort of thing that I should, in general, pursue or avoid. When it comes to some individual case, however, I cannot just use my general understanding, since action is concerned with particulars (cf. *NE* VI 7, 1141b14-23). Employing images allows me to consider actions in the appropriate spatiotemporal context. Is eating this pizza right now good or bad for me? Should I go running, biking, or swimming for my exercise today? The intellect cannot answer such questions without bringing in images that capture the particular

³⁰ *DA* III 7, 431b6-8.

characteristics of the options I am envisioning. The effect the φάντασμα has on my beliefs, desires, and actions also requires some level of awareness of the φάντασμα. If my cognitive and desiderative powers do not have access to this φάντασμα, it will not serve its purpose. There are good reasons, then, to take the sort of φάντασμα as issue here to be particular imaginings that I am aware of and that I take to be relevant for determining my action. This is the way in which Aristotle thinks images are employed whenever we exercise our practical thought.³¹

5. *DA* III 8 and *Mem* 1 on Understanding and Images

I have argued that the passages from *DA* III 7 are making claims about the role of φαντάσματα in practical understanding. Texts from *DA* III 8 and *Mem* 1, however, seem to suggest that φαντάσματα are required even for exercising theoretical understanding. I will discuss the import and limitations of these two passages before turning to a more general evaluation of how φαντάσματα aid understanding.

At the end of III 8 Aristotle is summing up his account of perception and understanding. There he makes a broader claim about the relationship between images and understanding:

But, since, as it seems, no thing (πράγμα) exists separately and apart from perceptible magnitudes, the intelligible forms (τὰ νοητά) are in the perceptible forms, both the things spoken of in abstraction and as many as are states and affections of perceptible things. And on account of this, without perception no one can learn or comprehend and when he contemplates, he must at that very time contemplate (θεωρεῖν) with a sort of image (φαντασματά τι). For images are like the objects of perception, except without matter.

³¹ For further discussion of the particularity of φρόνησις, practical wisdom, see *NE* VI 7, 1141b8-23; VI 8, VI 11, 1143a35-1143b17. On this role for images cf. D. Frede 1992, 288-92. Analogous considerations about particularity and awareness would also apply to productive understanding.

Imagination (φαντασία) is different from assertion and denial, for the true and the false involve a combination of notions (νοημάτων). In what way will the first notions (τὰ πρῶτα νοήματα) differ from images? Or [should we say] that these are not images (φαντάσματα), but are not without images?³² (*DA* III 8, 432a3-14)

Here we find the assertion that the intelligible forms are in the perceptible forms, an assertion similar to the one in III 7. Aristotle's argument for connecting perception with understanding might seem to depend on a bold ontological claim about the structure of reality. Hamlyn, for example, translates, "Since there is no actual thing which has separate existence apart from, as it seems, the objects of perception." However, such a position would be strange given Aristotle's insistence elsewhere (particularly in *Metaphysics* Λ) that all of reality depends on a separately existing, non-perceptible divine being that does not have any magnitude.

We can make better sense of the passage by taking Aristotle to only be speaking about objects of cognition that are inseparable in existence from perceptible magnitudes, not about all intelligible realities. The passage claims that no πρᾶγμα exists separately from perceptible things. Aristotle often uses πρᾶγμα to refer to concrete, composite things, as Polansky notes.³³ It is plausible to think that Aristotle is using πρᾶγμα in this

³² At line 13 I follow Jannone, Ross (1961), and Themistius in reading ταῦτα, which is found in H^a, instead of τᾶλλα which is found in the other manuscripts. If one wishes to retain τᾶλλα the sentence could be translated along the lines suggested by J.A. Smith: "neither these [first notions] nor even our other notions are images," which would give a similar meaning to my reading, though it would clearly extend Aristotle's claims to all νοήματα.

³³ Polansky 2007 495, fn. 3. This usage also fits with the etymological sense of πρᾶγμα as something that is done or happens. For example, in *DA* I 5 Aristotle criticizes theories that compose the soul out of elements, tacitly assuming that like is known by like, by pointing out that this position requires putting the πράγματα in the soul (ὥσπερ ἂν εἰ τὴν ψυχὴν τὰ πράγματα τιθέντες). (409b27-8) This, Aristotle argues, is ridiculous because the full range of material or composite things cannot, as such, be present in the soul. He does not however think the presence of forms or immaterial things in the soul is ridiculous, since this is in fact central to his own views on cognition (e.g. III 4, 430a4-5). Thus there is a good case for

way in *DA* III 8, particularly since his comments at 432a5-6 refer to the cases of perceptible things and abstractions from perceptible things (such as mathematical objects), but make no mention of other realities that might be included in the scope of πράγματα.³⁴ Since Aristotle thinks that, in fact, there are entities that exist separately from magnitude and matter, he may think we can exercise our understanding of such entities without using images.³⁵ Further, while this passage indicates why perception would be required for learning (since the objects initially comprehended are either perceptible things or abstractions from them), it does not clearly explain how and why some sort of image (φάντασμα τι) would be required for contemplating. Thus the III 8 passage is not decisive for determining the scope or overall nature of Aristotle's claim that images are required for understanding.

The current passage ends with a discussion of the relationship between notions (νοήματα) and images. Aristotle argues that the two are not the same, but that notions depend in some way on images. As I interpret him, his first step is to deny that images are the same as judgments or complex notions, because judging and putting notions together involves affirming or denying, whereas the use of images does not, as he has argued earlier. (*DA* III 3, 428a16-b9) He then claims that the first notions are not images but are

thinking that Aristotle is using πράγματα in I 5 to refer not to all beings, but just to material or composite things, the sorts of things that could not, as such, be present in the soul.

Admittedly, Aristotle does sometimes use πᾶν to refer to all things (c.f. *DA* III 4, 429b22; III 5, 430a20/III 7, 431a2). That fact does not rule out this second interpretation, as there are a number of cases in which Aristotle sometimes uses a term with a broader reference and sometimes with a stricter. For example, Aristotle sometimes includes the imagination under the heading of νοῦς (cf. *DA* III 3, 427b-428a5, III 7 431b2-9, III 10, 433a9-14, *De Motu Animalium* 6, 700b17-22), but usually restricts the scope of νοῦς to properly intellectual activity.

³⁴ Further, Aristotle has made a similar distinction in *DA* II 5 between understanding perceptible and non-perceptible realities. There he claimed that exercising understanding of non-perceptibles is up to us to a greater extent than exercising understanding of perceptibles, since understanding perceptibles requires a certain connection to the perceptible objects being cognized (417b22-28).

³⁵ Cf. Johansen 2012, 236-7.

not without images. I take the first notions (τὰ πρῶτα νοήματα) that he discusses to be the indivisible and simple conceptions of things that are discussed in III 4-5 and taken as the basis for combined thought in III 6.³⁶ On my reading, we require images for our first, simple notions of perceptual things (and thus for complex perceptual notions that employ these simple concepts) but these notions are not to be identified with the images we employ in understanding them.³⁷ This suggests that, on Aristotle's view, exercises of understanding concerning perceptual things (and abstractions from them) require the use of images.

The last important passage on images and understanding comes from Aristotle's *De Memoria*. Here he presents the connection between images and understanding and offers some account of this connection:

Since we spoke earlier about imagination (φαντασία) in our discussions *On the Soul* and since without an image there is no understanding (νοεῖν)—for the same affection occurs in understanding as in drawing diagrams. For there, though we make no use of the determinate quantity that the triangle has, we nevertheless draw it as determinate in quantity. So likewise when one understands, although what one understands may not be quantitative, one envisages it as quantitative, though one does not understand it as quantitative; while, on the other hand, if by nature it is quantitative, but indeterminate, one envisages it as if it had determinate quantity, but understands it only as a quantity—the reason why it is not possible to understand anything without the continuous, or the things that are not in time without time, is for another discussion. (*Mem* 1, 449b30-450a9)

³⁶ Others, drawing in particular on *Posterior Analytics* II 19, have taken this phrase to refer to a special class of notions, either those first in our experience and thus most closely related to perceptible things or those first in the order of things and thus most universal and generic. However, this sort of distinction is not explicitly brought up anywhere in the *DA* and the context seems to best support a contrast between first, simple notions and second, complex notions that occur due to the combination and separation of first notions. See Hicks 547-8 for a discussion of various views on this question. Hicks himself agrees with the interpretation I am presenting.

³⁷ If, instead, Aristotle is speaking of universal notions he would be claiming that even the notions furthest from sensation require images, but are not the same as these images, a strong claim that does not have many obvious parallels elsewhere. If, however, Aristotle is speaking of notions that are first in our experience and order of knowing, then he might be claiming only that these sorts of less universal notions require images.

In this passage, Aristotle seems to make a general connection between images and understanding, comparing the use of φαντάσματα in understanding to the use of diagrams in geometry. To understand the force and scope of Aristotle's claims, we need to unpack the analogy. I will summarize and critique the internal representation account of φαντάσματα, lay out some other interpretive options, and then present my own views on the role of φαντάσματα in exercising theoretical understanding.

6. Why the Internal Representation Account of Images is Wrong

Why does *Mem* claim that understanding needs to employ a spatiotemporally individuated image? Victor Caston and Michael Wedin have both proposed accounts of images that offer a straightforward answer to this question.³⁸ On the accounts they offer, φαντασία is “a system of internal representation that subserves the other faculties.”³⁹ Φαντάσματα are “physical states of the body, which possess their content in virtue of their similarity to an object, together with their role in the cognitive system as a whole.”⁴⁰ To understand something, I need to use my representation of that thing. This requires employing the relevant φάντασμα, which is both a representation and a physical state of the body (but not necessarily an object of awareness). Φαντάσματα are analogous to diagrams insofar as both are physical representations that are required for the relevant cognitive processes to function. The internal representation account offers a universal explanation for why exercising understanding requires φαντάσματα.

³⁸ Wedin and Caston have published their views separately, but their accounts and objects are clearly similar and compatible (Caston refers approvingly to Wedin's account in Caston 2009, 325).

³⁹ Caston 2009, 325. Since Caston does not approve of translating φαντασία as “imagination” or φαντάσματα as “images,” I will mostly leave these terms untranslated when discussing his views.

⁴⁰ Caston 2009, 325. Caston is here summarizing Wedin's position, which he also endorses.

The relevant texts, however, give us indications that this is not how Aristotle conceives of the relationship between understanding and φαντάσματα. To begin with, Aristotle does not think that all understanding requires representations (and hence φαντάσματα), since the divine understanding does not use φαντάσματα or any sort of representation that is distinct from the object understood, as *Metaphysics* Λ 9 makes clear. There are also reasons to doubt that Aristotle conceives of φαντάσματα as internal representations of understanding in the human case. I shall start by critiquing Wedin's specific account of how φαντάσματα and understanding relate and then identify the problems with Caston's version.

Michael Wedin's account of φαντάσματα and understanding relies on blurring the distinction between φαντάσματα and the objects of understanding. He claims that:

A thought is like an image in the sense that the properties in virtue of which the image exemplifies the thought are those that tell us what it is to be, say, a triangle. So we may say that the image exemplifies its form. Or, with 431b2, we may say that the mind thinks the forms in the images...Thus, while [the image] cannot exemplify independently of something like a material aspect, what it exemplifies can be something immaterial. As universals, precisely this is required for exemplification of objects of thought. It would be a mistake to suppose that images merely prompt the mind to entertain an independently existing object of thought. Aristotle's point is much deeper and much more anti-Platonist. *There simply is no such thought to be intuited, grasped, or touched apart from the image.* Thus, images really are essential for thought. (Wedin, 140-1; emphasis added)

Wedin's view seems to be that, strictly speaking, there are no universal objects of understanding that the soul acquires and exercises in its understanding. Instead, different human beings have different images as a result of the impressions made on them through perception. These images exemplify certain features, which can then become objects of thought. The different images of different human beings resemble each other because

they were produced in a similar way and this is what allows human thought (and words) to be intersubjective and publicly available.

Although Wedin's account would certainly explain the strong connection between images and thought, it falls short as an interpretation of Aristotle. Wedin acknowledges that, according to Aristotle, "the mind's proper objects are universals."⁴¹ On his own interpretation, however, the objects of our thought are always particular structures or representations. On Wedin's account, when I understand a triangle, the object of my understanding is some particular triangle, with a particular shape and structure. What makes my understanding universal is that it does not matter which triangle I happen to be using: any instance of triangle will do.⁴²

This account of universality does not fit well with Aristotle's own contrast between the particularity of perception and the universality of understanding:

For even if perception is of what is such and such, and not of individuals, still one necessarily perceives an individual, and one at a definite place and time. But it is impossible to perceive what is universal and holds in every case; for that is not an individual nor is it at a time; for then it would not be universal—for it is what is always and everywhere that we call universal.⁴³ (*APo* I 31, 87b29-33)

Here Aristotle maintains that for something to be universal it cannot be spatiotemporally individuated: it must be always and everywhere. Wedin's account of universality, by contrast, seems to match Aristotle's characterization of perception: it is of a certain kind (of "what is such and such," not just of one thing), even though any instance of it will be particular. For me to perceive red or hear middle C, I just need some red thing to see or

⁴¹ Wedin, 203. Cf. *DA* II 5, 417b22-28; *APo* 1.31, 87b29-33. See Cohoe 2013, 372-375 for further discussion of this passage and the contrast between universal understanding and spatiotemporally limited perception.

⁴² Wedin, 208

⁴³ Modification of Jonathan Barnes's translation in the Revised Oxford edition (Barnes 1984).

some middle C to hear. I will always perceive a particular sight or sound, but the particular spatiotemporal identity of the red thing or the middle C does not make a difference with respect to my perception of red or middle C.

Aristotle is, however, here denying that such cases count as cognizing a universal. The objects of understanding are not particular things that seem similar when looked at fuzzily. Aristotle is very clear that my understanding of a triangle is the same as your understanding of a triangle (in species: our understandings are not numerically identical)—provided of course we both do really understand what a triangle is. Understanding and its object are the same, not vaguely similar, and neither the activity nor its object are intrinsically spatiotemporally individuated. This is why my understanding (once achieved) will be the same as yours (*DA* III 4, 430a2-3).⁴⁴

While Caston recognizes more of a distinction between understanding and images than Wedin does, his account, on which φαντασία “is a form of internal representation that underlies mental states” does not fit well with the passages in which Aristotle connects understanding and images.⁴⁵ Caston claims that a φάντασμα is “that *by which* our mental states are directed at objects” but is not itself “an object of a mental state at all.”⁴⁶ Whether or not Aristotle thinks that in some cases φαντάσματα serve as internal mental representations without being the objects of mental states, this does not seem to be

⁴⁴ The difficulties for Wedin are even more pronounced when we consider the full range of intelligible forms Aristotle countenances, including forms that are not separated from matter. Things such as unity, evil, and wisdom are not, as such, perceptible. *DA* II 6 makes it clear that such things can only be incidental objects of perception: our perceptual faculties (including our faculty of imagination) cannot cognize them directly. It is unclear how Wedin thinks that such intelligible objects could be exemplified, strictly speaking, by perceptual φαντάσματα.

⁴⁵ Caston 2009, 235

⁴⁶ *Ibid.*

their role in the case of practical understanding or theoretical understanding of mathematical and natural objects.⁴⁷

As we saw earlier, the examples Aristotle offers in III 7 concerning practical thought all require that I be aware of the φάντασμα my soul is employing.⁴⁸ When trying to understand what I should eat for lunch, I need to be aware of the competing φαντάσματα of a pizza slice and a salad that I am employing to aid my deliberation. Particular φαντάσματα are only helpful for deliberation and practical thought when they are actually held in mind and used. Similarly, the mathematical analogy in *Mem* 1 suggests awareness. The mathematical diagram is not employed mechanically at a sub-conscious level: instead, as I will discuss in section 8, it is by *attending* to the diagram that one comes to understand the proof for which it is employed. Aristotle's examples and his reasoning strongly suggest that it is the *awareness* of φαντάσματα that is crucial to exercising understanding, not the mere occurrence of certain sub-conscious physical states. This tells against Caston's interpretation on which φαντάσματα are not the objects of mental states.⁴⁹

⁴⁷ Caston 1996 and Caston 1998 argue generally for this interpretation of φαντασία. I am not here evaluating the merits of Caston's thesis as a general claim about φαντασία. I am simply denying that this is the role φαντάσματα play in the particular case of exercising understanding.

⁴⁸ I am not claiming that second order awareness (being aware that I am employing a φάντασμα) is required, just that a first order awareness of the φάντασμα itself is necessary, as opposed to Caston's account on which my employment of a φάντασμα requires the occurrence of certain physical processes, but no awareness of these processes or the φάντασμα.

⁴⁹ Even if Caston's interpretation can allow for the logical possibility that we are sometimes aware of φαντάσματα, this awareness does no explanatory work on his account.

7. Other Possible Factors

a. The Triggering Theory

If the representationalist account is not the best explanation of the relevant passages, it becomes less clear why Aristotle thinks there is a general connection between understanding and images. What should we take Aristotle's motivation for connecting understanding to images to be? A position akin to that of Wedin and Caston, but less extreme, holds that images are necessary to trigger someone's understanding. This position concedes that once I have achieved an understanding of some intelligible object such as horse or triangle, this object of understanding will, in an appropriate sense, remain in my soul, even when I am not exercising my understanding. The triggering position acknowledges that the objects of understanding are distinct from images, but holds that we need some sort of image to prompt our thought, to get us to exercise the understanding we have achieved. Polansky seems to put forward a position along these lines.⁵⁰ If I am to think about a triangle, or a horse, or goodness I need some perceptible image to prompt me to start thinking about it.

This sort of Triggering Theory, on which any actual occurrence of understanding is explained by some prior occurrence of perception or imagination, does not fit with Aristotle's psychology. Aristotle holds in *DA* II 5 and III 4 that, once achieved, understanding can be exercised whenever I please.⁵¹ This is one of the features that distinguish understanding from perception. As Aristotle puts it in *DA* II 5:

⁵⁰ Polansky 2007 says "We think the forms in the *phantasmata* just because of some intermediary connection that stimulates us to think, as when picturing a lyre we think of a person" (491). He also speaks of *phantasmata* as giving rise to thought, leading us to think, and getting us to think (493). For his discussion see Polansky 2007, 489-493, 498-500

⁵¹ *DA* II 5, 417b16-28, III 4, 429b5-9 cf. II 5, 417a27-417b2.

Actual [perception] corresponds to contemplating. There is this difference, however, that in the one case the things that bring about the activity—the object of sight, the object of hearing and likewise for the other senses—are external. The explanation is that actual perception is of particulars, while knowledge is of universals. These universals are, in a way, in the soul itself. Hence it is up to someone to understand whenever he wants, but perception is not up to him; for the presence of the perceptible object is necessary. (*DA* II 5, 417b18-25)

I can only perceive when there are perceptible things present to act on me. In contrast, once I have achieved understanding, I can exercise this understanding whenever I want. I can start thinking, with full understanding, about triangle or human being or gold without needing some image to trigger my thought.⁵²

b. The Phenomenological Theory

Another suggested motivation for Aristotle's connection between images and understanding is a phenomenological one. It is hard to exercise one's understanding and think about triangles and their properties without bringing to mind some sort of image of a triangle. It is even harder to understand vivid perceptible objects such as colors (e.g. the clear blue of a lake, or the green of growing grass) or smells and tastes (e.g. the bite of balsamic vinegar or the zest of an orange peel) or physical objects that possess strikingly perceptible properties (e.g. lions or rubies) without mentally employing images of some kind. This sort of experience may suggest that our thoughts are always accompanied by images. Sometimes, as in these cases, the images may be vivid, but maybe they are

⁵² Assuming, of course, that I have already achieved understanding of these objects. Note that Aristotle's claim allows for there to be some limits on exercising my understanding. If someone is drunk or really angry or in some other inhibiting condition his ability to exercise his understanding can be impaired (cf. *NE* VII 1147a10-23). The point is just that there are no external causes needed for exercising understanding of something one has previously understood. There may be internal conditions that would prevent someone from exercising her understanding, but this is a case of disruption from performing what would normally be in her power to do, not a case of lacking a necessary external cause, as it is in the case of perception. For further discussion of how the activity of understanding is triggered see Corcilius 2009. His interpretation is compatible with the role that images play in my own account.

present even in more abstract cases of thought, perhaps by imagining some perceptible thing to which the object of thought is connected (e.g. when thinking about strength, I may imagine someone lifting heavy weights).⁵³

While Aristotle could presumably make some use of this sort of empirical experience in defending the importance of images, the structure of his claims suggest that they do not rest on the phenomenology of understanding. As we have seen, Aristotle holds that exercising understanding about any object of thought that is perceptible or abstracted from the perceptible requires employing images. The occurrence of mental imagery is not equally obvious in all these cases, however. For instance, “incommensurable” is not clearly associated with a certain image in the way that “peacock” is. This is particularly true once we recognize that simply picturing or hearing the word used for the object of thought does not seem to sufficient for employing an image, in Aristotle’s sense. Aristotle’s account seems to require that the image employed actually make an important cognitive contribution. The mathematical diagram is crucial to understanding the proof it illustrates, not just something that my mind happens to associate with the proof. Aristotle presents our use of images as helpful aids in exercising our cognitive accomplishments, not as necessary limitations of the human mind, à la Kant (cf. *Critique of Pure Reason*, B 154).⁵⁴

⁵³ Cf. D. Frede 1995, 291-2.

⁵⁴ D. Frede compares Aristotle to Kant in this regard, claiming that for Aristotle “whenever we think of the form of something we have something like a *Gestalt* of it in mind.” (D. Frede 1992, 290) Although Frede goes on to caution that she “does not want to turn Aristotle into a *Gestalt* psychologist” (D. Frede 1992, 291), I think the differences between Aristotle’s views and those of Kant and later German philosophers are greater than Frede does.

c. Explaining Error and Variation in Understanding

Several later Aristotelians appealed to the necessary role of φαντάσματα in exercising understanding in order to explain why intellectual activities can be affected by the condition of the body.⁵⁵ While Aristotle does seem to concede that one's age and condition can affect one's ability to exercise understanding, he never explicitly connects this to the use of φαντάσματα.⁵⁶ Further, most of these remarks occur either in dialectical contexts (e.g. *DA* I 4 408b18-28) or as reputable opinions that Aristotle is citing without definitive commitment (e.g. *Politics* II 9, 1270b36-9). While the employment of φαντάσματα could help to explain variation and deterioration in understanding, the lack of explicit textual support suggests we should not take such motivations as the *basis* for Aristotle's views.

⁵⁵ E.g. Thomas Aquinas insists that all human activities of understanding must employ φαντάσματα on the basis of 1) experience, 2) the need to explain why injuries to the organ of imagination (i.e. the brain) disrupt intellectual activity, and 3) the need to distinguish human understanding from the understanding of more spiritual creatures (*Sentencia Libri De Memoria*, lectio 2, 314-17; cf. *Sentencia Libri De Anima* lectio 13, 792). Along similar lines Averroes insists that “universal intelligibles are gathered with images and corrupted with their corruption.” (Averroes, *In DA* III 30, 469, Trans. Taylor) Not all later thinkers in the Aristotelian tradition held such a position. For example, Avicenna seems to have held that φαντάσματα were only necessary for acquiring intelligible forms and understanding could be exercised without them (Davidson 97; cf. *Shifâ': De Anima* 223, 248 [Avicenna, 1959; Avicenna, 2005]; *Najât*, 183 [Avicenna, 1952, 56]).

⁵⁶ *DA* I 4 408b18-28, *NE* VII 1147a10-23, *Politics* II 9, 1270b36-9. In *De Ins.* 3, 460b3-16 Aristotle claims that affections such as anger or erotic desire can influence and distort one's perception, with an effect proportional to their strength. The resultant φαντάσματα, he claims, interfere with making appropriate judgement about what is happening and what one should do. Aristotle does not, however, seem to be suggesting that they affects the nature of one's understanding as such. He claims that the angry are more likely to mistake someone for an enemy and the amorous for a lover, but he is not suggesting that they are misunderstanding what it is to be an enemy or lover. They are just making mistaken judgments about their particular circumstances. The φαντάσματα may prevent one from exercising the proper understanding but they do not distort the content of understanding. (cf. Gallop 1990, 147-148)

8. The Anchoring Account: Using Images to Grasp Explanatory Connections in Mathematical and Natural Understanding

I will now develop my own interpretation by returning to Aristotle's geometrical analogy, since this provides his most in-depth and suggestive remarks on how φαντάσματα are employed in exercising understanding. After carefully examining the role of diagrams in mathematical understanding, I then consider how φαντάσματα could play a similar role for natural science. Given our limited textual evidence about the precise role of φαντάσματα in understanding, my account employs Aristotle's more general views on proper mathematical and scientific practice to develop a proposal for when and why φαντάσματα are needed. In mathematics and natural science, they are required to appropriately anchor our understanding to the perceptible world and to grasp the explanatory connections that true scientific knowledge demands.

To see what kind of role an image can play in the process of activating understanding, we can start with Aristotle's analogy: how does the geometer use the diagram of the triangle? The diagram is clearly necessary for the initial acquisition of geometrical knowledge. I learn, for instance, that triangles have interior angles adding up to two right angles by seeing a proof conducted by means of a diagram. What happens when, having mastered the proof, I want to exercise my knowledge? To exercise knowledge I need to grasp why something is the case. If I am just remembering the theorem that triangles have interior angles adding up to two right angles, I may affirm it as true and believe it, but I am not, for Aristotle, exercising understanding.

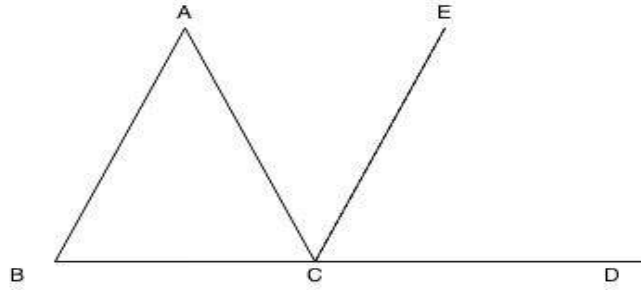
To do that, I need to employ a diagram. As Aristotle puts it in *Metaphysics* Θ,

Why are the angles of the triangle equal to two right angles? Because the angles about one point are equal to two right angles. If, then, the parallel to the side had

been drawn up (ἀνήκτο), the reason why (διὰ τί) would have been clear to any one as soon as he saw the figure.” (1051a24-27, Trans. Heath, altered)

Aristotle thinks that drawing in the diagram, making it actual, is what enables understanding.⁵⁷

Diagram 1:



In diagram 1, it is by means of drawing in line CE parallel to side AB so as to produce two angles, ACE and ECD, each equal to one of the opposite interior angles, BAC and ABC, that one sees the truth of the theorem, why it holds.⁵⁸ The diagram supplies the crucial middle term that gives the explanatory connection between the conclusion (triangles have interior angles adding up to two right angles) and its grounds (the interior angles of the triangle—ACB, BAC, and ABC—are equal to the angle ACB plus the exterior angles formed by the parallel, ACE and ECD, which three angles are, taken together, equal to two rights). I cannot understand the theorem unless I understand why it

⁵⁷ While most of the Greek mathematical texts we have come from after Aristotle, the practices they describe go back to Aristotle’s time and before. In this case and others like it, Aristotle’s descriptions of the figures involved in various mathematical proofs allows us to determine whether the proof he is thinking of is the same as or different than the one found in texts such as Euclid’s *Elements*. Greek mathematics did not develop abstract notation for mathematical proofs; instead, schematic letters referring to points and figures on accompanying diagrams are used for all the propositions to be proved, both by Aristotle and by mathematical practitioners (cf. Netz 1998, Manders 2008, Macbeth 2010, Mumma 2010). This is true in arithmetic and astronomy as well as geometry.

⁵⁸ This diagram is taken from Euclid, *Elements* I 32. I agree with Heath (vol. 1, 321) that Aristotle’s use of ἀνήκτο indicates that the procedure and diagram he employs is the same as Euclid’s, not the Pythagorean proof handed down by Eudemus and reported by Proclus.

holds. The way to see why it holds is by picturing an appropriate diagram with the parallel to the side drawn in (as CE is drawn parallel to AB in diagram 1).

The picturing required for exercising understanding is not just the phenomenological presence of a vague impression of lines and letters. Instead, I need to know that the line I am mentally drawing in is parallel to the opposite side, forming two angles, one (ECD in diagram 1) equal to the interior and opposite angle (ABC in diagram 1), and one (ACE in diagram 1) equal to its alternate angle (BAC in diagram 1). I can mentally draw in the triangle and the parallel in a variety of ways and label the picture differently, but whichever sort of diagram I employ must have the relevant specificity. Exercising understanding requires picking up on what K. Manders calls the co-exact properties of the diagram, the “conditions which are unaffected by some range of every continuous variation of a specified diagram.”⁵⁹ In this case, the relevant co-exact properties are the relationships between the angles formed by the parallel and the opposite and interior angles. These are equal regardless of changes made to the exact conditions of the diagram (e.g. changing the lengths of the triangle’s sides or making one of the triangle’s angles larger or smaller or relabelling points).⁶⁰

While the exact properties of the diagram are not vital for exercising understanding, I need to employ a fully determinate diagram because I cannot grasp the relevant co-exact properties without it. Although we can state the theorem without

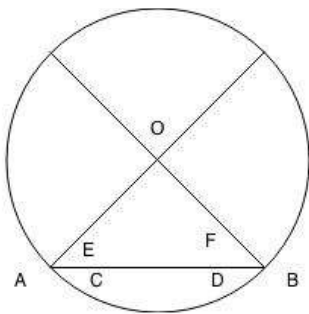
⁵⁹ Manders 2008. I think Manders’ interpretation of how Euclidean proofs work is closer to Aristotle’s philosophy of mathematics than the stronger position advocated by Reviel Netz, on which, in ancient geometry, “part of the content is supplied by the diagram, and not solely by the text. The diagram is not just a pedagogic aid, it is a necessary, logical component.” (Netz 1998, 34) While I think that Aristotle would agree with Netz in maintaining that the diagram is a necessary component of understanding, not just a pedagogical device, Aristotle would deny that the diagram supplies the content. The diagram helps one to grasp universal explanatory connections but is not itself the object of understanding.

⁶⁰ If we are understanding, as opposed to just memorizing without comprehension, we should be able to reproduce the diagram ourselves and follow the proof with the schematic letters changed.

explicitly referring to a diagram, exercising understanding requires making contact with reality. I am only actually understanding when I am grasping the reason why. I need to grasp that drawing in a parallel to the opposite side will produce two angles, each of which is equal to one of the two opposite interior angles. This requires employing a fairly determinate mental image of the triangle and its angles in order to make my potential understanding actual.

I also need to realize that the determinate diagram is a means to grasping universal truths, not the object of the proof itself. This comes out clearly in *Prior Analytics* I 24, where Aristotle is discussing the need for universal propositions in order to have demonstrative proofs. He thinks that the clearest case of the need for universal propositions comes from geometrical practice (41b13-15). He illustrates this claim with reference to a proof that the angles at the base of an isosceles triangle (E and F in Diagram 2) are equal.

Diagram 2:



Here we must recognize at each stage that the propositions in question are universal: to have a demonstrative proof, we must know that *all* the angles made by the intersection of the diameter with the circumference (the angles of the semicircle—in Diagram 2, at A and B) are equal, that *all* the angles of an equal segment are equal (C and D in Diagram

2), and that, *in every case*, equals subtracted from equals give us equals (41b15-22).⁶¹

Otherwise, the proof will not necessarily refer to the subject in question (the things that are equal may not be all angles of this kind, but only the one in the diagram) or will assume what is to be proved (if we just assume that the angle in the diagram happens to be equal). If we do not grasp the universality of the relevant propositions, we do not grasp the proof as a proof. We need to use a particular diagram, but we also need to understand that we are not using its determinateness as such: in Manders' terms, we are using its co-exact properties not its exact properties. Again, however, there is no way to grasp the reason why the angles of the base of an isosceles are equal without employing a fairly determinate mental image of the triangle and its angles. We cannot get access to the relevant explanatory connections without mental images.

To properly exercise knowledge we also need to recognize the level of universality that the proof operates at. In *APo* I 4 and I 5 Aristotle insists that one would not have true understanding of the theorem that triangles have interior angles adding up to two right angles if one thought it held just of isosceles triangles (73b38-74a3) or even if one proved it individually for equilateral, isosceles, and scalene triangles, but not for triangle as such (74a25-32). The proof you employ must be commensurately universal and this restricts the sort of diagrams one can employ. If the diagram you employ uses

⁶¹ In diagram 2, the angles of the semicircle are the "mixed angles" (as Proclus will later call them) formed by the intersection of the diameters ending at A and B with the circle circumscribed about them (angles E+C and F+D in the diagram). The angles of the equal segment AB are angle C, formed by the intersection of the segment with the circle at A, and angle D, formed by the intersection of the segment with the circle at B. In the geometry Aristotle alludes to it seems that some of the earliest propositions, presumably proved by superposition, were that all the angles of a semicircle and all the angles of a segment and a circle were equal (Heath, vol. 1, 252-253). Euclid's *Elements* I 5 does not rely on this method and may be Euclid's own invention (Ibid. 253-254). Later Greek geometry, from Euclid onwards, would not be reliant on this sort of mixed angles formed by the intersection of rectilinear and curved lines, though reference to them still appears in Euclid (e.g. definitions 7-9 of book III and the horn angle of proposition III.16 which illustrates some of the difficulties implicit in employing mixed angles).

features of an isosceles triangle as such to prove that it has interior angles equal to two rights, then you are not understanding the theorem as such, because you are not grasping the right explanatory connections. Thus employing the wrong φαντάσματα will prevent you from exercising understanding.

I have used Aristotle's analysis of mathematical practice to show the way in which Aristotle thinks diagrams, usually the relevant kind of φαντάσματα for mathematical understanding, are required for exercising knowledge. On my interpretation, Aristotle recognizes two sorts of errors that one can make in attempting to exercise understanding. First of all, one might fail to employ φαντάσματα at all or employ φαντάσματα that are too vague and impressionistic to make clear the explanatory middle terms. In such a case, one cannot successfully exercise understanding because one is not in a position to grasp the reason why the claim in question is true. Secondly, one might employ relevant φαντάσματα but confuse them with the universal object one is trying to understand. Aristotle's *Mem 1* distinction between the image and the intelligible object cognized through it is strongly reminiscent of Plato's discussion of mathematics in the *Republic* and obviously draws on it.⁶² In understanding perceptible things some people might err by confusing the image with the intelligible object, as Socrates accuses many mathematicians of doing (*Republic* VII 525d-527c). In such cases, we might think that attributes of a particular triangle or a particular human being belong to triangle or human being as such, leading to error and confusion. Further, by treating an image or diagram as if it were the intelligible object we fail to appreciate the universality of the object of

⁶² *Republic* VI 510b-511a, VII 525d-527c. For a helpful discussion of Plato's views on mathematics and the distinction between the visible and the intelligible see Burnyeat 2000.

understanding or, as in the case of using an isosceles triangle to prove that the interior angles are equal to two rights, we fail to recognize the commensurate level of universality.⁶³

These two sorts of errors could also occur in understanding of natural objects. Aristotle's texts offer little explicit discussion of the role of φαντάσματα in understanding changeable being. However, his remarks on the role of experience in natural science suggest how φαντάσματα might play a role here as well. As Sean Kelsey points out, in his natural philosophy, Aristotle repeatedly draws attention to the dangers of reasoning that is unconnected to actual experience.⁶⁴ Those who speak about natural philosophy without having the experience to truly grasp the subject matter cannot grasp the relevant explanatory connections.⁶⁵ Further, in his biological works, Aristotle discusses a number of cases where mistakes are made because theorists generalize inappropriately from their limited experience. For example, in *PA* III 4 Aristotle criticizes Democritus's view that all animals, sanguineous and non-sanguineous, have viscera, suggesting that observation of sanguineous embryos would show that when the animal has viscera, they are present and visible from a very early stage. Similarly, in *GA* III 5 Aristotle criticizes those who, on the basis of the fact that externally oviparous fish produce vast numbers of eggs and do not copulate with one another, think that they are not sexually differentiated.⁶⁶

While Aristotle raises these issues to point out why the thinkers he criticizes fail to acquire knowledge, similar issues arise for those who have, in fact, previously

⁶³ There is also the danger Aristotle highlights in *Sophistical Refutations* 1, 165a7-19 of the inexperienced person being misled in reasoning due to differences in the use of words and meanings.

⁶⁴ Kelsey 2015; cf. *Physics* I 2.

⁶⁵ E.g. *EN* VII 3, 1147a21-2

⁶⁶ Cf. Kelsey's discussion of these cases (Kelsey 2015).

achieved understanding of natural science and are now trying to exercise it. Aristotle's claims—that one cannot acquire natural science without sufficient experience and that generalizing from incomplete experience is dangerous—suggest that, for similar reasons, one cannot exercise understanding of natural science without being anchored to the relevant empirical phenomena. Those who do not appropriately connect up their current thought with the experience which grounds it cannot exercise understanding.⁶⁷ They would be failing to regulate their thought appropriately, since

[the τέλος] of natural science is what appears to the senses always and decisively (τὸ φαινόμενον αἰεὶ κυρίως κατὰ τὴν αἴσθησιν). (*Caelo* III 7, 306a15-17, Trans. Kelsey)

How do we make sure our exercises of understanding are regulated by the perceptible world? It is plausible to think that this is where φαντάσματα are needed. They store and unify our previous perceptions and allow us to see if our thought matches up with empirical reality. If we do not anchor our thought through the relevant φαντάσματα then we cannot succeed in actually grasping the phenomena. Both failing to employ φαντάσματα and employing them in vague and impressionistic ways could prevent one from grasping the relevant explanatory connections.

Consider a case from Charles Dickens' *Hard Times*. Thomas Gradgrind, a schoolmaster who values only "facts," pushes his pupil Sissy Jupe, whose father cares for horses, to define horse. When she does not respond, he turns to a favored pupil:

'Bitzer,' said Thomas Gradgrind. 'Your definition of a horse.'

⁶⁷ I am grateful to Sean Kelsey for his helpful discussion on the role of φαντάσματα in exercising natural science.

‘Quadruped. Graminivorous. Forty teeth, namely twenty-four grinders, four eye-teeth, and twelve incisive. Sheds coat in the spring; in marshy countries, sheds hoofs, too. Hoofs hard, but requiring to be shod with iron. Age known by marks in mouth.’ Thus (and much more) Bitzer.

‘Now girl number twenty,’ said Mr. Gradgrind. ‘You know what a horse is.’

There are a number of reasons why Bitzer’s attempted definition cannot give someone knowledge of what a horse is. The relevant one for our case is the way that words need to be connected to the phenomena. Even if Bitzer’s definition were perfectly accurate and properly divided horse from other animals, hearing and repeating what he said would not give knowledge. The words of a proper definition, although true, need to be anchored to the relevant experience in order for someone to actually exercise understanding. Bitzer or Sissy would need to see how their experience of horses (remembered and accessed through φαντάσματα) connects up with the definition they are recalling in order for them to actually make contact with reality, as opposed to mouthing empty words.

Thus, on my reading, Aristotle’s insistence on the need for φαντάσματα can apply to both mathematical and natural philosophy. Aristotle uses a geometrical analogy because it is the one sort of understanding he can be reasonably confident that much of his audience has achieved and allows him to appeal to a familiar distinction between the object of understanding and the diagram employed. Aristotle also goes on to distinguish the mathematical case, where the objects of understanding are quantitative but indeterminate and the φάντασμα employed is quantitative but indeterminate, from the case where the object of understanding is non-spatiotemporal but the φάντασμα employed is spatiotemporal. The use of diagrams is a clear instance of the first case, while the second case would cover φαντάσματα of natural things. For example, when

recalling whether all animals have viscera, images of insect dissection might be employed, while images of the milt organs of fish might be used when recalling whether fish are sexually differentiated. These images will be spatiotemporally individuated but will, unlike diagrams, be indeterminate in quantity.⁶⁸

The anchoring account I have put forward would also allow Aristotle to account for the challenge of acquiring and exercising understanding. Different people might also be more or less acute at finding and using appropriate images, both at the level of acquisition and exercise. Some might be skilled at picturing the rotation of the spheres so as to develop their astronomical understanding or proficient at recalling and comparing auditory images to enable them to understand the ratios between different musical tones. Others, in contrast, might have difficulty swiftly finding appropriate and helpful images to call to mind the geometrical properties of a square, or the characteristic behavior of ants, or the different kinds of unity that beings exhibit. Images help us anchor our universal and non-spatiotemporal understanding of things to the spatiotemporal perceptible world.

9. Images Are Not Partially Constitutive of Understanding

Despite the importance of images for understanding, they are not properly part of the activity of understanding. Indeed, Aristotle does not think that the images that we use

⁶⁸ Proponents of a necessary connection read the end of the *Mem* 1 passages as making a completely universal claim: *all* understanding of *all* objects involves envisaging the object as temporal and quantitative. Again, I think a qualified reading is the more plausible one. On the qualified reading, Aristotle is making a claim similar to those found in the passages from *DA* III 7 and 8: all perceptible forms and forms abstracted from perceptibles (such as mathematical forms) are understood by employing temporal and quantitative images. Even perceptible forms are, for Aristotle, immaterial and unchanging and thus do not, properly speaking, exist at a time, as Coope makes clear (Coope 2005, c. 9). Thus, on my reading, they are the things that are not at a time (and, in some cases, are not themselves quantitative, as in the case of, say, hunger or honor). This qualified reading avoids attributing a bold and unsupported claim—that even divine beings are envisaged as quantitative and temporal—to Aristotle.

in our understanding determine what we understand. First of all, our power of imagination is often active when we are not thinking. Indeed, it is primarily used in memory and for a variety of other cognitive functions at the perceptual level. In contrast, if our sense-organs are affected by appropriate perceptibles, we sense.⁶⁹ If my eyes or ears are affected in a certain way I will see red or hear middle C. Having an image of a triangle does not, however, mean that I am understanding what a triangle is. I could just be remembering a triangle I previously considered or I could be using this image to understand a number of other things, such as figure, mathematical object, incommensurability, area, or line.

The difference between the role of images in understanding and the role of the affections of sense-organs in perceiving can be brought out further by considering the differing importance of origin for the two activities. Perception, for Aristotle, is a response to a perceptual object in one's environment. If we somehow received a perceptible form without employing our sense-organs this would not be an activity of perceiving. It might be an activity of remembering or imagining, but it would not be perceiving, since there would be no direct contact with the object through the sense-organ. In contrast, if we were to receive intelligible forms without some activity of imagining we would still have understood the forms in question. For Aristotle, understanding requires sameness between the understanding and the object it

⁶⁹ This holds true whichever view one takes of the role of sense-organ and material changes in perception. The point is obvious on a literalist or intermediate view, where material changes in the organ play an explanatory role in perception, but it holds even on the spiritualist view, where the sense-organ is just an unaffected medium for the perceptible object. Even on this view, I will perceive precisely those perceptibles that pass through the relevant sense-organ. For further discussion of this see Cohoe 2013, sections 2 and 3.5-6.

understands.⁷⁰ There needs to be an appropriate cause for our acquisition of knowledge to ensure sameness between understanding and its object, but since the object of understanding is universal, there is no connection to any given particular thing.

This is the opposite of perception, which for Aristotle is of particulars, and must be governed by these particulars and the sense-organs through which we perceive them.⁷¹

While there is a determinate relation between the sense-organ and sense-power, a one-to-one relationship between what is happening to the sense-organ and what I perceive, the relationship between images and understanding is much more fluid.⁷² The indeterminate contribution that images make to understanding further supports Aristotle's insistence that the intellect does not have a bodily organ or component, properly speaking.⁷³

This leaves open the possibility that the intellect, once it has acquired intelligible forms, could operate apart from the body. According to my Moderate interpretation,

⁷⁰ *DA* III 4, 429a15-18; 429b29-430a9; III 5, 430a19-20; III 7, 431a1-1; III 8, 431b20-432a3.

⁷¹ *DA* II 5, 417b22-28; *APo* 1.31, 87b29-33. For further discussion see Cohoe 2013, sections 2 and 3.5-6.

⁷² Again, this holds true whichever view one takes of the role of sense-organ and material changes in perception. See fn. 69 above.

Aristotle also gives no indication that there is one and only one determinate image for each thing that we understand. In coming to understand and grasp what a lion is I might make use of the lion's roar or of a visual image of a lion attacking its prey. It is also important to note that Aristotle leaves the precise character of the images one employs quite indeterminate. Although Aristotle uses a word for imagination that he takes to be derived for light and thus associated with sight, this is because sight is the principal sense-power and hence the principal source of images, not because Aristotle thinks that all images are visual (*DA* III 3, 429a2-9). Visual images are some of the most common and striking ones, but images can also be auditory, tactile, olfactory, gustatory or any combination of these.

⁷³ This interpretation is supported by the fact that Aristotle does not mention images (*φαντάσματα*) at all in III 4-6 when he gives his account of what understanding is and how it is brought about, suggesting that he does not think that images are constitutive of understanding. This contrasts with Aristotle's treatment of cognitive activities that involve a bodily organ, such as perception. In his discussion of perception in *DA* II 5-III 2 he focuses on the objects of perception and the powers of perception, but he also discusses the sorts of bodily organs required for perception and the way in which these organs are affected in perceiving (e.g. *DA* II 7, 418b4-17, 419a11-b2; II 8, 420a3-19, 420b13-421a5; II 9, 421b13-422a7; II 10, 400a17-19, 422b2-10; II 11). In *DA* III 4-8, where Aristotle discusses intellectual activities, bodily organs and processes are not mentioned at all in connection with these activities (except, by implication, in the passages from III 7 and 8 discussed above, where he maintains that certain sorts of understanding require images). Aristotle does not seem to think that any discussion of bodily processes is needed for us to grasp what understanding is.

Aristotle has reasons for maintaining that, for the most part, human understanding requires images. However, as I discussed in sections 4 and 5, when read in context, Aristotle's claims about the need for images apply only to the understanding of enmattered things and abstractions from them, not to immaterial and divine forms. On my interpretation, Aristotle avoids discussion of the theological case because he is writing a treatise on natural philosophy that is concerned with soul insofar as it plays a role in nature (*DA* I 1, 403a29-b16; cf. *PA* I 1, 641a17-b10; *Metaphysics* E 1, 1026a5-6).⁷⁴ While some discussion of intellect is needed because of its role in producing movement according to place and as the principle of practical and productive activities (e.g. *DA* III 10, 433a9-23), Aristotle seeks to avoid extended discussion of aspects of soul that go beyond its role in natural philosophy in ways that would leave no room for first philosophy as a further and higher science.⁷⁵ This comes out both in Aristotle's introduction to the *DA* and in III 7, 431b17-19 where he postpones discussing whether enmattered minds can understand immaterial things, suggesting that he is seeking to avoid inflating the inquiry into soul into a full-blown inquiry into being itself.

While the *DA* points to the possibility of human understanding of the immaterial and first principles of things, it does not offer a full characterization of what such

⁷⁴ His reticence may also be because his own views concerning the relevance of images to doing first philosophy were not fully developed at the time of composition, but my interpretation will not put much weight on this claim, given the problems of providing strong evidence for such developmental hypotheses.

⁷⁵ In *PA* I 1, 641a35-b4 Aristotle worries that if natural philosophy deals with all soul, including intellect and its objects, it will deal with all of being, since our intellects can understand all things (cf. *DA* III 4 429a17-20). For further discussion of *nous* in the biological works see Charlton, 410-414.

While this article will not engage in the interpretive debate concerning *DA* III 5, I think any interpretation on which III 5 plays no essential role in Aristotle's psychology has a serious mark against it, given the methodological commitments Aristotle repeatedly expresses.

understanding would consist in or how it would operate.⁷⁶ When Aristotle claims that “in the case of intelligibles (τὰ νοητά) without matter that which is understanding (τὸ νοοῦν) and that which is understood (τὸ νοούμενον) are the same.” (III 4, 430a4-5), he seems to be describing a sort of understanding that need not be mediated. This understanding would be even closer to the divine understanding and might not require images.⁷⁷ The perceptible images that help us to understand perceptible things may not be of use when we seek to understand the divine. Aristotle’s lack of clarity about understanding eternal and immobile substances is fully compatible with my Moderate reading. The No Separability interpretation, by contrast, faces the burden of explaining what sort of universal and necessary role images play in understanding immaterial entities.

10. Conclusion

On my reading of Aristotle, images contribute to understanding in several different ways. To begin with, images play a crucial role in forming the experiences needed for the initial acquisition of understanding. They are also necessary for remembering and recollecting objects of understanding and for applying our practical

⁷⁶ In this way it would be analogous to Aristotle’s approach in the *Physics*. A study of changeable being and its principles points to the need for a first being that does not bring about change by being changed, a being that is the proper object of first philosophy, not natural philosophy (*Physics* VIII 10, 266a10-12; 267a21-b26). Similarly, study of intellectual soul as the place of forms and as capable of understanding all things (*DA* III 4; III 8) points to an understanding of immaterial principles that is not a proper object of natural philosophy.

⁷⁷ Indeed, Aristotle’s characterization of understanding, in its avoidance of any (positive) reference to the body and in its insistence on sameness of form between the intellect and its object, seems to be emphasizing the similarity between human theoretical understanding and the divine understanding. Both divine and human understanding involve becoming the same as the thing understood. This, for Aristotle, is what is essential to understanding: we understand something by grasping it with the power of our understanding, by taking on its form and, in a way, becoming it. This need not involve the body at all, as the understanding that belongs to the divine intellect, Aristotle’s God, is entirely immaterial (*Metaphysics* Λ 9). On my reading, *DA* III 4-6 presents the psychological and metaphysical foundation for Aristotle’s claim in the *Nicomachean Ethics* (*NE*) that the activity of understanding is the most divine one, the human activity in which we most resemble and imitate the divine (*NE*, X 7, 1177b34-1178a5; X 8, 1178b7-32; cf. *NE*, IX 4, 1166a14-23, *Metaphysics* Λ 7, 1077b13-29).

understanding to a particular situation. However, images should not be thought of as a form of internal representation that underlies mental states, contra Wedin and Caston. For Aristotle, images play a role in thought not because they are the material basis for thinking, but because active awareness of relevant images is required for truly exercising certain kinds of understanding.

On my interpretation, images are required for exercising understanding in two different ways. In practical and productive understanding, the goal of that understanding—a particular action or thing produced—requires employing images in order to successfully direct one’s general understanding. In natural philosophy and mathematics, the nature of the objects one understands need to be anchored in the perceptible world to which they belong. Grasping the relevant explanatory connections often requires employing the relevant images (e.g. geometrical diagrams, sketches and records of animal behavior etc.). Images help to connect our universal and non-spatiotemporal understanding of things to the spatiotemporal, perceptible world we inhabit.

I have also argued that understanding is not partially constituted by images. Aristotle thinks we can give a full account of what understanding is, as such, without bringing in images. The role they play in understanding is not analogous to the role played in perception by the affections of the sense-organs. Further, human understanding of immaterial objects may not require images at all. Thus there is reason to doubt that the connection between understanding and images proves that human understanding cannot take place without the body. Those who maintain such a view on the basis of Aristotle’s claims about φαντάσματα and understanding need to show why they think Aristotle is

positing a necessary connection and, in particular, explain why φαντάσματα are required for thinking of divine, immaterial objects.⁷⁸

⁷⁸ I would like to thank Hendrik Lorenz, Samuel Baker, and John Cooper for their comments on earlier drafts of this material, Benjamin Morison for pushing me during my dissertation defense to articulate why I do not think φαντάσματα are always needed for exercising understanding, Sean Kelsey for helpful discussion of the role of φαντάσματα in natural science, and the anonymous referees for their useful comments that aided me in clarifying the approach and limits of my argument.

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