

Aristotle and Functionalism

It's become popular (if controversial) in contemporary *De Anima* scholarship to portray Aristotle's theory as a precursor to contemporary functionalism¹. Such a strategy, if it works, would have some benefits. Subsuming Aristotle's position under a well-established modern theory would provide a solid framework for interpreting a difficult work, and modern functionalism in turn would get a substantial rhetorical bonus from association with a distinguished precursor.

Such attempts are misguided, however. In what follows, I'll argue that while Aristotle and the modern functionalist share certain *methodological* concerns (concerns which are not unique to them), his theory is at odds with the meaty & important *metaphysical* commitments of functionalism. Section one will be devoted to the role of *Multiple Realizability* in modern functionalist arguments, the claim that the same mental state can be realized in diverse sorts of matter. It's often claimed that Aristotle also held something like this thesis, providing a *prima facie* reason to include him among the functionalists. Section two will dispatch an initially promising attempt to attribute this thesis to Aristotle via his remarks in the metaphysics. In section three, I'll discuss further, less promising attempts to attribute this thesis to him, as well as raising deeper problems for a functionalist reading. Finally, in section four I'll argue that these problems are intractable, and that Aristotle's framework for defining mental states is fundamentally different from that of the modern functionalist.

¹ The claim originated in Putnam 1975. See also Nussbaum 1978, Shields 1990, Cohen 1992, Wilkes 1992, and Nussbaum & Putnam 1992.

I The role of Multiple Realizability

Historically, modern functionalism arose as a reaction to the Identity theory of mental states. The Identity theory held that mental laws and predicates were suitable candidates for theoretical reduction to physical laws and states, much like statements about temperature could be reduced to statements about mean molecular kinetic energy. In a now famous article (Putnam 1975), Hillary Putnam pointed out that a reduction of mental terms was impossible, precisely because mental states seem to be *multiply realizable*. That is, the same mental state—‘being in pain’, say—could potentially be realized by neurons (in Humans), silicon (in Robots), or many other substrates we might imagine².

But if this is the case theoretical reductions of the sort that an Identity theory requires will not be possible in the case of mental states, since the diversity of the possible realizers of mental states precludes any straightforward reduction of mental to physical types. Instead, Putnam argued, we should consider mental states *functionally*, for functional states can be realized in diverse types of matter without difficulty—although this multiple realizability still precludes any straightforward theoretical reduction. One of the original, and still important, examples of a functionally defined system was the computer. Computers, as Putnam points out, are specified in terms only of their abstract causal structure, not their possible realizers (Putnam 292-296). And similarly, Putnam argues, mental states may admit of similar treatment.

The thesis of multiple realizability (hereafter MR) thus plays a crucial role in arguments for functionalism. And, as we should expect, those who argue for a functionalist reading of Aristotle typically begin with an attempt to show that he

². Of course, such an argument doesn't depend on the *actual* existence of wincing Martians; the very conceivability of multiply realizable mental states is argued to be sufficient to establish the falsity of the identity theory.

held some version of MR. Before we get to these attempts, however, we need to make the relevant notions a bit more precise.

First, MR is not *simply* the thesis that mental predicates and states can be instantiated by a diverse group of physical types³. As Kim has pointed out (Kim 1993, 314), a diverse group of different materials can have the same temperature, but this does not preclude theoretical reduction of temperature predicates (and, consequently, no one feels compelled to treat temperature terms functionally). Let us call predicates such as those of temperature *weakly* plastic. Weakly plastic predicates are those such that their potential for instantiation in different types of materials presents no *prima facie* barrier to formulating laws about either the predicate or its underlying realization.

In contrast, the modern functionalist argues that mental predicates are *strongly* plastic—i.e. that the material realizations of these predicates are not only physically diverse, but that these realizations form a nomically heterogeneous class. That is, the laws governing silicon, neurons, Martian physiology, and so forth are too diverse to permit reductions of mental vocabulary to a single set of physical terms. Since there are no simple laws that underlie all of the possible physical realizations of pain, we are therefore barred from holding a version of identity theory for mental states. It is these sorts of strongly plastic predicates and states which MR is concerned with, and it's only these sorts of states that provide an impetus for functionalism. Thus, we need to be sensitive to this distinction when evaluating Aristotle's commitments.

On to point two. I have spoken of MR as an impetus to functionalism, and this is telling. Holding MR is neither necessary nor sufficient for establishing the truth of the functionalist doctrine (though it does play an important *rhetorical* role

³ For purposes of comparison to modern theories, I'll speak of mental predicates and laws, even though such terminology isn't present in the *De Anima*.

in arguments for functionalism). One could consistently hold, for example, that MR is true but that at least some mental states (say, perceptual states) are to be defined solely with reference to their phenomenal feel (a non-functional criterion). MR provides more support for functionalism when combined with a thoroughgoing commitment to physicalist ontology. Functionalism allows one to hold MR, while still maintaining that what does the ultimate pushing and pulling in the world is physical matter—even if mental states aren't strictly reducible to that matter (Kim 1996 112-3).

And conversely, one *could* consistently hold that mental states are to be defined functionally while denying that there is more than one possible physical state that would realize that function. To the best of my knowledge, no one has ever bothered to defend this position, and probably with good reason. It's difficult, within the modern framework, to see what would tempt one to it rather than the straightforward identity theory. Nevertheless, it is at least a potential position, and as such MR neither implies nor is implied by a commitment to functionalism. Again, however, for many moderns, the two go hand in hand.

So, what's the import of all of this for Aristotle? Well, in reading the *De Anima*, it's not enough to establish a functionalist reading simply to pick and chose quotes which show that Aristotle held something like MR—we need also to show that whatever version of MR we find also plays the same *motivational* role for Aristotle's theory as it does for modern functionalism. It's possible that Aristotle may hold MR, but for reasons that wouldn't tempt him to functionalism. Or, since MR isn't a necessary component of functionalism, he might hold some breed of functionalism without a particular concern for MR. Or, of course, he might hold to neither doctrine, at least in a recognizably modern form. With these distinctions in mind, let's turn to the arguments.

2) A flawed attempt to attribute MR

An initially promising attempt to attribute MR to Aristotle has been made by a number of authors⁴, focusing on some broad metaphysical commitments he makes in *Metaphysics VII.XI*. In the course of a discussion about whether the matter of a thing is ever part of its definition, Aristotle points out that this is clearly not the case for something like a circle, which can appear in a multitude of materials (1036a31f). Furthermore, he claims that:

“Of things which are *not* seen to exist apart, there is no reason why the same may not be true, e.g. even if all circles that had ever been seen were of bronze (for none the less the bronze would be no part of the form); but it is hard to effect this severance in thought. E.g. the form of man is always found in flesh and bones and parts of this kind; are these then also parts of the form and the formula? No, they are matter; but because man is not found also in other matters we are unable to effect the severance.” (1036a33-b6).

In other words, just as bronze would not be part of the form of circularity even if all known circles were brazen, so too is the actual matter of man not part of the form of man (however difficult it may be to abstract them). However, this passage alone should be slim comfort for an MR reading. Aristotle clearly takes it to be the case in this passage that man *isn't* ever realized in anything other than flesh and bones—indeed, Code and Moravcsik take this passage to *refute* a reading of MR (Code and Moravcsik 134). Shields defends an MR reading on this passage alone, arguing Aristotle believed that “despite the fact that we always see human

⁴ See, for example, Nussbaum 1978, 70; Shields 22-3; Nussbaum and Putnam 46; and Cohen 59 & 72-3.

beings realized in flesh and blood, ‘nothing hinders’ their being realized in other ways” (Shields 23). However, this relies on an extremely unnatural reading of ‘the same’ at 1036a33 as drawing a comparison between the multiple realizability of circles and of humans. It’s much more natural to read it as I have outlined above—namely, that ‘the same’ thing which is true of both humans and circles is simply that the matter is not part of the form and the formula.

Cohen has given a more detailed defense of a MR reading of this section, however, relying on Aristotle’s further discussion. At 1036b24f, Aristotle criticizes the view of Socrates the Younger, who presumably thought that the case man was *just* like that the circle. But, as Aristotle points out, the case isn’t exactly similar, for an animal cannot be defined without movement, and thus ‘without reference to the parts [of the animal] and to their being in a certain state’ (1036b30).

Now, Cohen argues that we should not read the ‘being in a certain state’ in this passage as requiring a *particular* sort of matter for an animal⁵ (Cohen 72-3). Rather, Aristotle continues, “it is not a hand in *any* state that is part of man, but the hand which can fulfill its work...” (1036b31-2). Thus, Cohen concludes, Aristotle is concerned here with limiting the matter only to that which is functionally appropriate (Cohen 73). And this, presumably, should give us reason to read the preceding discussion of form and matter as evidence that Aristotle held *some* version of MR, even if, as Cohen concedes, he may not have thought that the form of man was likely to supervene on anything other than good old flesh-and-bones (Cohen 59).

⁵ And though Cohen doesn’t make the point, his reading is supported by a further consideration. Aristotle remarks a few lines before that some things are presumably “a particular form in a particular matter, or particular things in a particular state” (1036b23-4). That Aristotle chose the latter of these two possibilities when both were available seems to indicate that he *wasn’t* concerned with attributing a single sort of matter to animals, at least not here. Of course, whether this is true of the rest of the Aristotelian corpus can still be questioned—and the argument that will follow doesn’t depend on a single type of matter for animals in any case.

Perhaps, but we should not be so hasty. Aristotle has a definite goal in this section of the metaphysics, and we should evaluate statements he makes in this context. The overall purpose of this discussion, as Frede points out, is a point about definitions (Frede 115). In the standard sense of ‘definition’, argues Aristotle, the definition of a thing will make reference only to those attributes which are properly speaking, part of the “form and the formula” (1036b4).

Thus, Aristotle’s concern here is with definitions, and what sorts of things will properly be referred to in a definition. And, as MR proponents emphasize, his primary point is that, in the strict sense, a definition of some composite substance will not deal only with the form of the composite, not the matter. This is why, as Frede points out, Aristotle uses the terms ‘form’ and ‘logos’ interchangeably in passages such as the above and DA 403a25--because “in the standard sense of ‘logos’ or ‘definition’, the form just is what gets specified by the definition” (Frede 115-6).

But this is not yet an endorsement of MR. Aristotle’s quarrel with Socrates the Younger is illuminating in this regard. While it is true that the matter shouldn’t, properly speaking, be included in the definition, Aristotle also argues that Socrates the Younger’s position “leads away from the truth, and makes one suppose that a human being can exist without its parts, the way a circle can exist without bronze. But the case is not similar” (1036b26-28). Note here that Aristotle doesn’t say that Socrates the Younger’s position is *wrong*--he clearly agrees with him that our definitions of humans, like those of circles, shouldn’t include the matter (Frede 120). However, a comparison of humans with circles is misleading and ‘leads away from the truth’, because it can lead us to believe that our definitions should *take no account* of the matter of humans.

And it’s clear here that for some things, Aristotle believes that the theorist should matter into account when formulating his definitions. He continues beyond Cohen’s ellipses to conclude that the hand which can perform its work

“therefore must be alive; if it is not alive it is not a part” (1036b31-2). Why is this? As Aristotle has made clear a few lines previous, it is because “an animal is a perceiver⁶ and it is not possible to define it without reference to change---nor, therefore, without reference to the parts’ being in a certain state” (1036b27-29). In other words, unlike circles, living things necessarily have certain parts enmattered in certain ways. Indeed, they *must* be enmattered in particular ways if they are to carry out the functions characteristic of life. As such, any definition of living things will not include the matter of that thing, but it must be constructed such that it does not obscure this fact. How is this to be done? As Frede points out, it’s precisely by defining humans (for example) as things that are capable of perception, movement, and so forth. Since the ability to do these things necessarily requires some particular matter, it follows that our definitions will not mislead us into thinking that a human, like a circle, could exist without particular matter or without matter altogether (Frede 120).

Therefore, Aristotle’s goal in this section is not, as Cohen claims, to argue that the matter of living things is unrestricted beyond mere functional appropriateness. Indeed, the point of his discussion of Socrates the Younger is precisely to draw our attention to the fact that the matter of life is indeed quite restricted, and that our inquiries must take this into account. And, as he initially stated, “the form of man is always found in flesh and bones and parts of this kind” (1036b3-4); Cohen has offered nothing to indicate that he believes otherwise, or that he is particularly concerned about the possibility that the form of man may be found in *any* functionally appropriate matter⁷.

⁶ Reading *aisthetikon* rather than *aistheton*, after Frede and Patzig.

⁷ All this said, faculties of the soul may be plastic in the weak sense of the term. As Code points out, sight “must be realized in a transparent body, and since both water and air are transparent, it could be realized in either” (Code 109). However, there is a nomologically homogeneous property—transparency—which would underlie both of these manifestations. And, in general, when Aristotle considers the appropriate matter for some faculty, he’s concerned with giving some property which must underlie any such manifestation in order for the faculty to perform its

3 Unsuccessful attempts to show a commitment to MR or functionalism.

The argument discussed above was an attempt to show a broad commitment to MR on Aristotle's part. Apart from this, many authors have marshaled passages where Aristotle seems to show a specific commitment to some version of either MR or functionalism. Most of these arguments fail. The fact *that* they fail, however, is less interesting to look at than *why* they fail. I'll argue that for each, certain assumptions are needed to make Aristotle's remarks consistent with a motivation towards something like modern functionalism, and that these assumptions are unsupported. In each case, either Aristotle's remarks belie a different set of motivations from those of modern functionalists, or else they cast direct doubt on the idea that he held a specific version of functionalism. Altogether, this should cast deep doubts on the idea that Aristotle held something akin to modern functionalism.

3.1

Some authors have pointed to passages where Aristotle seems to claim that certain mental functions are *actually* realized in diverse sorts of matter, supporting the claim that he held something like MR. Many of these attempts are simply misinterpretations. Shields, for example, points to PA 657a10-12 as such a passage (Shields [24]). But the context of this passage is simply a discussion of the *arrangement* of the nostrils in different sorts of animals. It contains no reference to the *matter* of these organs, much less the psychological state of smelling, but only to their relative positions. As such, it in no way gives support

work (see, for example, 418b27-8, 422a16-19, 423b424a3). As we saw above, however, it's only if we believe that the manifestations of a mental state can be realized in nomologically diverse matter—that is, that they are *strongly* plastic--does functionalism gain its appeal.

to Shields' contention (Shields 24) that Aristotle is here concerned with denying type-type identity theories. Similarly, Cohen points to PA 647a21:

“Accordingly, the organ which deals with these varied objects is of all the sense-organs the most corporeal, being either the flesh, or the substance which is in some animals takes the place of flesh” Quoted by Cohen [59]).

This does seem, at least initially, to support Cohen's remark that Aristotle advocates compositional plasticity of the organs of sense (Cohen 59). However, it is clearly not Aristotle's considered opinion. As DA II.6 (esp. 423b18-21) makes clear, flesh is not the *organ* of touch, but only the *medium* through which touch is transmitted to the central organ. Much as sight can work in a medium of both air and water, so too could we expect touch to have different sorts of materials as its medium. But this says nothing about the *organ* of touch, which would be necessary for reading MR into this remark⁸.

Nevertheless, although these passages don't work, others can be found. For example, when Aristotle discusses the central organ, in which “the sensory faculty, the motor faculty, and the nutritive faculty are all lodged” (PA647a25), he claims that:

“...it is the heart which in sanguineous animals constitutes this central part, and in bloodless animals it is that which takes the place of a heart” (PA647a301-31).

In other words, the central organ of sense is the heart in those creatures with blood, but something else in bloodless creatures⁹. This seems to show an *actual*

⁸ Shields (p31 n16) also mentions PA 656a35-7 and DA 421b9-422a6, which shows a similar confusion on his part between the medium and the organ of touch.

⁹ Even this creates some problems, however. Aristotle also thinks that the proper matter for the central organ is constrained to that which has certain properties. For example, it must be the ‘most corporeal’ & earthy (PA647a19-21) and neither hot nor cold (DA424a10). It's thus questionable

commitment to MR, at least for a large range of functions, and thus good *prima facie* evidence for Aristotle's commitment to functionalism.

But is this enough? Not quite. Central to modern versions of functionalism is a particular view about the nature of mental types, and it's an important part of the argument linking MR and Functionalism proper. Let's call this the Generalization Thesis. The Generalization Thesis is the claim that mental types admit of interesting generalizations (typically in terms of their causal structure). Pain perception, for example, must be the sort of thing which obeys certain patterns of laws—that is, when some organism perceives pain, that mental state is reliably caused by certain types of things (things harmful to it, say) and which causes other sorts of mental states and behaviors (wincing, avoidance, beliefs about the nature of the pain's cause, and so on). In other words, the Generalization Thesis is that all pains are just pains—there's no wild variations between different types of perceiving pain. Furthermore, these generalizations must be interesting enough to be worth incorporating in our philosophy of mind—they can't be too broad or too trivial.

Holding some version of the Generalization Thesis is necessary for the move from MR to Functionalism; the functionalist needs to be able to say that wildly differing organisms are in *the very same mental state*, and that this mental state is non-trivial. This can be challenged, even within the modern framework. Kim, for example, has argued that when confronted by an organism (real or imagined) with vastly different physiology, we have no reason to assume that its mental types will admit of the same general descriptions as ours, at least in any interesting sense (Kim 324). If this is the case, then we must admit of the possibility that

whether this shows a commitment to strong plasticity (required for functionalism) or to weak plasticity. For the sake of argument, I'll consider the stronger possible position in what follows.

“...there will be theories about human pains (instances of N_h), reptilian pains (instances of N_r), and so on; but there will be no unified, integrated theory encompassing pains in all pain-capable organisms, only a conjunctions of pain theories for appropriately individuated biological species...” (Kim 325).

So, instead of one theory of pain encompassing all organisms (which is what the functionalist needs), we may need to rest with a theory of pain for each particular type of organism—and, similarly so, for all interesting mental types. Instead of giving an account of perception in general, we may only be able to speak of human-perception, dog-perception, lizard-perception, and so on.

Whether this is sound within a modern framework is an open question. However, *Aristotle* certainly seems sympathetic to this sort of view. He argues that the ‘common definition’ of souls and *psuche*-functions is by itself useless, as it pertains to no particular organism. So, in investigating soul-functions, we must look to particular organisms and how each function works *within that species* (DA 414b25-9). Aristotle thus believes that while we may give general (relatively uninteresting) definition of soul and *psuche*-functions, the interesting task will require investigation of their particular forms in particular species (as, for example, in DA III.11). But this means that the move from a *prima facie* statement of MR to functionalist reading of Aristotle would be blocked. If Aristotle believes that there are many different species of each generic *psuche*-function, then he denies the Generalization Thesis, and his version of MR cannot motivate as the modern account’s does.

3.2) Another problem for a functionalist reading.

Shields [24] makes much of Aristotle’s claim that while human thinking requires *phantasia* (DA 432a8-9, for example), God’s apparently does not (Meta.

XII 9). Shields takes this to support MR. It's difficult to see why, however, beyond Shields' weak claim that, for Aristotle, "thought can be betokened in different entities in different ways"¹⁰. Perhaps so, but a closer look reveals that this presents serious problems for a functionalist reading.

First, it's difficult to see how this supports MR, Perhaps so—but the differences between the thought of God and Humans have nothing to do with their *matter*. If anything, such considerations should *hurt* a functionalist reading. In particular, God doesn't *do* anything. He is 'impassive and unalterable' (Met. 1073a12), neither affected by nor affecting the world with any sort of *kinesis*. In other words, unlike humans, God's thought isn't affected by perception, and doesn't result in any behavior¹¹.

Nevertheless, both Humans and God have thought. And, this should be an impossibility on a modern functionalist account. The modern functionalist wants his analysis of mental states in terms of functions to do two things. First, to define something in terms of its function is to describe it in terms of its *abstract causal structure* (Putnam 296). That is, to define some mental state (pain, for example) in terms of its function is to describe the sorts of things that cause it (bodily damage) and the sorts of things it causes (wincing, beliefs about injury, and so on).

In general, the modern functionalist believes that all mental states can be so defined, in terms of what physical inputs or other mental states causes them, and what behavior and further mental states they cause (Block 179-81). These

¹⁰ It's worth pointing out in passing that contemplative thought is the only *psuche*-capacity that Aristotle believes does *not* need instantiation in matter (DA III.4). As such, it's difficult to see how this passage supports any thesis about realization. Shields is aware of this in his discussion of the passage, but doesn't offer a clear answer to this obvious problem.

¹¹ There are further differences between God and Man's thought which I won't treat here, but which should present further problems. For example, unlike material thinkers, the thought of God is *identical* to the object of thought (Met. 1075a3-5).

states can then in turn be decomposed into further, simpler functions of a different sort, ones that contribute to the overall function of the mental state (Cummins 189). Since the functionalist is committed to the claim that there is nothing to being a certain mental state M beyond M's causal structure, the goal of a functional analysis is to so analyze *every* mental state into an abstract causal function, giving an explanation which makes reference only to an abstract causal structure (realizable in any suitable matter), not to mental terms (Block 172).

But, as we've noted, it's impossible for the thought of God and the thought of Humans to have the same causal structure, precisely because God doesn't do squat. Indeed, Aristotle doesn't seem to have a general concern with giving a full (efficient-) causal account of any of the *psuche*-faculties. As Sorabji notes:

“He does not try to reduce perception to things at a *different* level, such as physiological states, or behaviour, or the performance of functions. Rather, he relates it to capacities at the *same* level, such as belief, reason, appearance, memory, experience, and concept formation” (Sorabji 1992 208; see Sorabji 1993 186 for a similar point).

But if this is the case, if Aristotle gives us a much different picture of the relationships between different capacities of *psuche* than modern functionalism does, then a functionalist reading is in trouble. It could be argued that Aristotle was just sloppy, a *proto*-functionalist after all, and one who didn't get around to giving a full causal account. Such an evaluation would be over-hasty. Instead, I think the weight of both this and the other problems detailed above should give us reason to seriously question any functionalist reading. With that in mind, I turn to one further passage used by functionalist commentators, a close examination of which will allow a clearer picture to emerge.

4) Functions versus Capacities.

4.1

A crucial passage for those who attribute functionalism to Aristotle come in the *Meteorologica*. This isn't properly an argument for MR¹², but an examination of it reveals deep problems with a functionalist reading of Aristotle, as well as a way to make sense of some of the smaller problems outlined above. In the course of discussing the natures of the homeomerous and anhomeomerous bodies, Aristotle makes the point that:

All of these things, in fact, are determined by their function, and the true being of each consists in its ability to perform its particular function, of the eye, for instance, in its ability to see; while if it cannot perform its function it is that thing in name only, like a dead man, or a stone figure of a man. Nor is a wooden saw, properly speaking, a saw but merely a representation of one. This is all equally true of flesh, but its function is less obvious than that of, *e.g.* the tongue; it is true of fire, but its natural function is even less obvious than that of flesh. It is equally true of plants and inorganic bodies like bronze and silver, for they are all what they are because of their ability to perform some active or passive function..." (Met. 390a10-20).

Now, this certainly seems like straightforward support for functionalism. Indeed, it would appear to include functionalism about mental capacities as part of an egalitarian sort of functionalism in which *everything* is to be defined functionally. Cohen, for example, argues this way, claiming that this passage shows Aristotle's

¹² The *Meteorologica* passage (Met. 390a10-15) and similar passages which are also used to show Aristotle as a functionalist are also commonly used to show that Aristotle held something like MR (see Shields 24 for an explicit example). It's worth pointing out that their use in showing a commitment to MR is faulty. Aristotle, even if he is concerned with functional identifications of mental states, doesn't necessarily support MR—as we saw above, MR neither implies nor is implied by functionalism. Thus, even if we do concede that he's concerned with functional definitions of mental predicates, we can't necessarily give this a modern reading. Aristotle's commitment to MR must be shown *independently* of any supposed commitment to functionalism. In other words, we need to be sensitive to the rhetorical arrow of arguments for functionalism. If MR is to be established in a way which supports a functionalist interpretation of the *De Anima*, it must be adduced independently of such considerations—just as it is in the modern debate. To use passages supposedly about functional definability to argue that Aristotle held MR, and then in turn to use MR to support a functionalist reading, is to rob MR of its proper role in an argument.

commitment to functionalism extends all the way down to inorganic compounds and the elements from which they are composed¹³ (Cohen 71).

Is this solid support for a functionalist reading, then? No. In fact, one would rather hope it wasn't, since if Aristotle in the above passage is using 'function' in anything like our sense of the word, his theory of substance is *incredibly* strange¹⁴. What would it mean to define 'fire' functionally, anyway? Fortunately, Aristotle's theory is not so weird; this appearance comes about only through an oddity of translation. The word translated as 'function' above, *ergon*, has the straightforward meaning of 'work', in the sense of 'doing something'. In the above passage, it might be best translated as 'characteristic activity', which would make Aristotle's claim relatively clear¹⁵. The characteristic activity of fire, as he claims in numerous other passages, is simply to rise to its natural place; fire then would be defined in terms of this tendency. Similarly, bronze has a (passive) characteristic activity of being shaped in certain ways, muscle an (active) characteristic activity of contracting with a certain amount of force, and so on.

This is not merely a terminological quibble. When we look at the *De Anima*, it's clear that Aristotle wants to define the different aspects of the soul in terms of their *dunamis*, their capacity to do certain sorts of things. Indeed, the technical term for an aspect of the soul exercising a particular capacity (*energia*), is related to '*ergon*', and carries a meaning like 'coming-to-do one's characteristic activity'. It is this notion of capacity which is crucial to understanding Aristotle's remarks on soul, and which casts strong doubt on a functionalist reading.

¹³ Shields similarly claims that Aristotle here shows a commitment to functional definability of mental predicates (Shields 21).

¹⁴ Code makes a similar point at (Code 109).

¹⁵ In the context of psychological inquiry, there's a case for translating *ergon* as function, which I'll discuss below. While in one sense this would be legitimate, however, it would come fraught with the potential for misunderstanding. As such, I'll use either the original term or 'characteristic activity' when discussing this aspect of Aristotle's position.

First, an important distinction. There are two related but distinguishable versions of functionalism, both of which are at work in modern functionalism proper (Block 171-2). Let's call them the Methodological and the Metaphysical strands for functionalism. Methodological functionalism is simply a commitment to investigating particular entities in terms of how they contribute to a larger whole. So, for example, we may investigate the workings of an assembly line in terms of how each portion of the line contributes to the final product made (Cummins 186-7). This is an important, but fairly weak methodological commitment—in particular, it makes no *metaphysical* claims about the nature of entities so investigated, beyond the expectation that they will have some important contribution to the total system.

In this sense, Aristotle is *certainly* functionalist. He's quite clear that an investigation of particular *psuche*-capacities will have to make reference to their final cause—that is, to their overall contribution to the functioning of the soul (DA 415b17-22). Indeed, much of the De Anima proceeds by investigating broad types of *psuche*-capacity and showing how their exercise contributes to the well-being of the organism that possesses them. This is why, in his famous preliminary schema for defining soul capacities, he's quite clear that the final cause—the end for which a particular thing operates—must be included in the definition of particular soul capacities (DA403a26-b1).

Methodological functionalism carries no particular metaphysical weight, and is neutral as to what sorts of entities the objects of analysis might be. On the other hand, Metaphysical functionalism is a much stronger sort of commitment. The metaphysical functionalist about mental states claims that to be in a mental state F just is to be in some state with a particular function, where 'function' is cashed out in terms of causal input-output relationships. Remember, the virtue of functionalism is supposed to lie in its ability to characterize mental states in terms of their *abstract causal structure*, rather than the specifics of these structure's

realizations (Putnam 296, Block 179-80). This characterization of mental states is crucial to modern functionalism, and every version of modern functionalism rests upon some version of this principle. Of particular relevance to the preceding discussion, this characterization of mental states allows the functionalist to deal with multiple realizability. Different bits of widely differing matter can have the same causal relationships with each other. And since under metaphysical functionalism this is all it takes to be a particular mental state, this view can allow mental states to be multiply realized. This sense of ‘function’, therefore, is an important technical term in modern functionalism, and in what follows I’ll use it in that sense.

Aristotle isn’t a functionalist in this sense, because Aristotle’s capacities aren’t functions of this sort. Capacity, indeed, is a much broader notion than that of function, and has some interesting properties. In general, to have some capacity is to affect (or be affected by) a certain set of objects in a particular manner M under the proper circumstances. So, consider a simple substance with a set of capacities. Consider the old standby of toolboxes, 3-in-1 oil, which has the capacity to lubricate metal parts, eliminate rust, and protect metal from further oxidation. We can define these capacities via the schema above: to have the capacity to lubricate metal, say, is to be able to affect certain objects (the metal ones) in a certain manner (making them slippery) under the proper circumstances (a particular range of normal temperature, pressure, and so on). And, indeed, this is exactly how Aristotle thinks we should investigate *psuche*-capacities. In giving his outline of how one grasps what a particular faculty of soul, Aristotle states that

"one must again first explain what thinking and perceiving are; for logically the exercise of their functions (*energeiai*) comes before the faculties themselves. And if this is so, and if one should have examined, even before these functions, the objects corresponding to them, then for the same reason one must first of all determine the facts about those objects..." (DA 415a19-23).

So, Aristotle seems to agree with the schema above: to investigate a particular capacity, we must investigate the objects that this capacity acts upon, and then what the exercise of this capacity amounts to. The conditions under which the capacity is exercised also play an important role, though Aristotle doesn't mention them here. For example, the medium of vision must be transparent for vision to take place (DA II.7), taste requires the presence of liquid (DA422b17-20), and so on.

Now, if we accept that Aristotle is using this notion of Capacity, then the functionalist account is in trouble. First, as a general point, functions are not equivalent to capacities. With suitable tinkering, we can make functions into a subset of capacities, of course—we can set the conditions as the causal inputs, the effects as the form of the causal output, and the objects to whatever is affected by the output. But doing so with *all* capacities doesn't seem possible, and misses the flavor of capacity-talk. For example, we aren't typically interested in giving an efficient-causal story about lubricants—it misses the point to couch the actions of lubricants to give a story about the input being squirting and the output being a slippery piece of metal.

Along the same lines, stories about capacities are typically non-reductive, relating effects on the *same* level of analysis. For most purposes, we needn't give the full story of a lubricant's action on the level of atomic causes and effects. Though one could certainly be given, it would miss the higher-level features of the situation that we find interesting¹⁶. And, in general, when we talk about

¹⁶ Indeed, I think many of the standard examples in functionalist literature miss this point, and move too quickly to the sorts of causal input-output functions they are looking for. Consider the (now-dated) functionalist example, the carburetor. What makes something a carburetor is its general capacity to oxygenate gasoline to the proper mixture for combustion, along with the proper physical links to air and gas on one end, and the engine on another. These are all things on the *same* level of description, and for good reasons. Actual Carburetors are complicated beasts, and it would be quite difficult to give a set of efficient causes and effects sufficient to encompass

capacities, we're not interested in reducing their action to a single, well-defined set of physical causes and effects. What's more, capacities like lubrication *don't* seem to be multiply realizable in any interesting sense. Whatever property a lubricant has in virtue of which it does its work is probably only weakly plastic—we care concerned, after all, with actual physical effects on a set level of description.

4.2

With this in mind, we can make sense of many of the worries above that a modern functionalist reader should have about Aristotle. In general, we shouldn't hastily assume that Aristotle means his capacities to be functions. First, as per section 3.1, he's not simply being sloppy by failing to give complete accounts of causal relationships between, say, perception and the other capacities of the soul. If we use the capacity model, Aristotle gives us quite a detailed account of what the capacity of perception amounts to in DA (in DAII.5-7 & III.2)—precisely by going through the objects of perception, what effect they have on the soul, and the (intrinsic and extrinsic) conditions under which perception can take place.

Indeed, the device of capacities gives Aristotle precisely the framework he needs to talk generally about *psuche*. What's contained under the umbrella of *psuche*, remember, is far broader than our term 'mind'. When we consider things like the faculty of nutrition, it's difficult to see how this could be reasonably couched in terms of efficient causation, of the 'inputs' and 'outputs' to the nutritive soul. But the framework of capacities allows Aristotle to deal with the nutritive soul with ease, by explaining what different exercises of nutrition

all instances of carburetors (the reader is invited to look at the tangle of hoses under the hood of a pre-fuel-injection car for a concrete example). Instead, what we are interested in when we give a capacity-description of a carburetor is the general sorts of effects it has within a system. In general, the sort of input-output functionalism discussed here only seems clean when applied to those systems (like computers) which can be described in fully abstract terms. Of course, as I noted above, consideration of systems like computers was one of the primary motivations for considering input-output functionalism in the first place.

amount to. By appealing to capacities instead of functions, Aristotle is able to give a unified account of the faculties of soul.

Indeed, Aristotle's strategy—most obviously in the case of nutrition—differs significantly from that of the modern functionalist strategy of decomposition into subsidiary functions¹⁷. As he states clearly at DA415a25-7, his goal in analyzing the faculty of nutrition is not to decompose nutrition into subsidiary functions, which work together to create an overall effect of 'nutrition'. Instead, he's interested in analyzing the faculty of nutrition in terms of *what its different exercises amount to*; in this case, the analysis focuses on growth and reproduction, and each of these in turn are treated as capacities.

This also fits well with Sorabji's observation above that Aristotle's interest is in giving explanations of capacities in terms of features on the *same* level of description, rather than in terms of efficient-causal links on the level of material realization (Sorabji 1992 208). As we saw above, this is a common feature of capacity specifications, and fits well with Aristotle's general forms of explanation. Again, as Sorabji points out, when Aristotle wants to explain a certain aspect of mental life, he "tries to clarify the formal aspect of a mental state by relating it to other mental states and capacities at the *same* level, not by reducing it to...functions at a *different* level" (Sorabji 1993 186).

What's more, it fits generally with the non-reductive strain of Aristotle's philosophy. It's not as if Aristotle thought that a description in terms of material causes *wouldn't* go some way to explaining the activity of a particular organism. However, such a reductive account would miss many of the important features of an organism's action that an explanation that includes formal and final causes would get right. Again, from the start, he thinks that a full account of any faculty of *psuche* will include an account of the formal and final causes; discussion in

¹⁷ See (Cummins 186) for a discussion of this overall strategy, and (Wilkes 123) for a specific application to Aristotle.

terms of the matter, or even causal links among bits of matter, will be insufficient (DA 403a26-b1).

Finally, though less obviously, understanding Aristotle's explanatory schema in terms of capacities allows us to understand his insistence on investigating *particular* cases of *pusche*-capacities (DA414b25-9). For many capacities, we can give a general description of what the capacity amounts to, but such a story will be uninteresting. Lubricants, for example, have the capacity to make something or other slippery—but this gives us little information about particular aspects of particular lubricants. Indeed, there are a wide range of lubricants available, each with specific and quite different capacities—chainsaw oil, for example, cannot be readily substituted for spark plug anti-seize compound. The serious student of lubricants will have to pay close attention to these differing capacities, including their differing objects, matter of instantiation, and effects they have.

And, similarly, Aristotle seems committed to giving detailed accounts of the different aspects of soul as they are instantiated in different organisms. While humans and grubs, say, may share certain capacities defined in broad outlines, the specifics of these capacity's exercises will be quite different. The notion of capacity allows Aristotle to deal with this without worrying about the fact that differently constructed organisms may have different causal structures.

Ultimately, Aristotle's notion of capacity is deeply opposed to the modern, technical notion of 'function'. This notion 'function', with its attendant metaphysics, plays a crucial and central role in modern functionalism. As such, it's impossible for Aristotle to have been a functionalist in any recognizably modern sense.

5 Conclusion

I've suggested that Aristotle was not particularly concerned with MR, either on its own or in a way that would make functionalism attractive for him. This doesn't immediately sink a functionalist reading, of course—as we pointed out above, it's not necessary to hold MR to be a functionalist. A functionalist reading could also proceed by arguing that while MR wasn't much of a concern for Aristotle, he did have further independent reasons for giving functional definitions for mental properties. Fair enough, but this alone should give us pause.

However, I've also shown that there's independent reason to rule out any modern functionalist reading of Aristotle. Of course, Aristotle's methodology bears some comparison to that of the functionalists; both have some interest in investigating particular mental states partially in terms of their contribution to the functioning of the whole. But Aristotle shares few if any of the metaphysical commitments of the modern, technical incarnation of functionalism.

This shouldn't surprise us. Modern functionalism is, in a way, an effort to *ignore* the material realization of mental states¹⁸--such considerations may lie in the realm of the neuroscientist or the biologist, not the philosopher. But it's clear that this isn't what Aristotle wants to do. At 403a31f, he famously gives his preliminary definition of anger, claiming that some will focus on the matter (i.e. the boiling of blood about the heart) while others will focus on the form (i.e. the desire for retaliation). But shortly afterwards, he asks which of these people is 'really the natural philosopher'—the one who focuses on the matter or on the form? (403b7-8). The answer, clearly, is that it is the one who manages to incorporate *both* in his studies (403b8). And indeed, when he gives the general

¹⁸ What this amounts to depends on the type of functionalist you are. Apriori or Folk functionalism may be able to ignore material realization altogether, while Psycho-functionalism would prefer to investigate the matter of the body to find the right functional definitions (Rey Ch. 7). But even the latter would claim that once one has found the proper functional analysis of mental states, the matter ceases to be an issue.

form that a definition of a *psuche*-capacity should take, he says that they should be defined “as a movement of a body, or of a part or faculty of a body, in a particular state roused by such a cause, with such an end in view” (403a25-28). In short, the *particular* matter that underlies *psuche*-capacities is just as much a concern of Aristotle’s as is the formal or final causes of such capacities.

In part, this is because he is responding to a fundamentally different set of predecessors than the modern functionalist. In DA I.3 (and again at 414a23f), he shows us that he’s at least partially concerned with refuting various forms of substantial dualism (such as the doctrine of the Pythagoreans). And in these passages, his criticism is quite clear—such theories fail because they don’t take into account the particular sorts of matter that a soul needs. And, correspondingly, much of the *De Anima* is devoted to uncovering the properties of the matter that must underlie the particular forms of the soul. This is a far cry indeed from a functionalist attitude, which is only concerned with matter insofar as it can perform the required function. Ultimately, then, Aristotle *wants* to talk about the material realization of the soul, even if the properties of the matter alone won’t be enough to account for everything there is to say about the various capacities of a living organism.

Indeed, this too shouldn’t surprise us. Whereas the functionalist starts with a concern for abstract representation of mental states—the sorts of things that could be embodied in robots, say—Aristotle starts with a concern for explaining *life ref*. Living organisms are not abstractions, but flesh-and-blood things that have definite concerns and activities in the world. To fail to take this into account, Aristotle rightly claims, is to miss something important about them. This is why Aristotle isn’t particularly concerned with either in strong forms of MR or in cashing out the *psuche* in terms of abstract causal structure. What’s more, this is why he uses his broad notion of *capacity* to capture the full range of experience in living organisms. Ultimately, then, we should be reject a functionalist

interpretation at this point. It seems that Aristotle's concerns about the matter of living things are quite different than the concerns of the modern-day functionalist.

Works Cited

- Block, Ned. "Introduction: What is Functionalism?". In Readings in Philosophy of Psychology v1. ed. Ned Block. pp 171-184.
- Caston, Victor. "Epiphenomenalisms, Ancient and Modern". *The Philosophical Review* 106(3), 1997, 309-363.
- Code, Alan. "Aristotle, Searle, and the Mind-Body Problem". in John Searle and his Critics. ed. Ernest Lepore and Robert van Gulick. Cambridge: Basil Blackwell, 1991. pp 105-113.
- Code, Alan and Moravcsik, Julius. "Explaining Various Forms of Living". In Nussbaum and Rorty 1992.
- Cohen, S. Marc. "Hylomorphism and Functionalism". In Nussbaum and Rorty 1992.
- Cummins, Richard. "Functional Analysis". in In Readings in Philosophy of Psychology v1. ed. Ned Block. pp 185-191.
- Frede, Michael. "The Definition of Sensible Substances in Metaphysics in Met. Z". in Biologie, Logique, et Métaphysique chez Aristotle. Paris : Editions du Centre national de la recherche scientifique, 1990. pp 113-129.
- Kim, Jaegwon "Multiple Realization and the Metaphysics of Reduction". in Supervenience and Mind. New Yoek: Cambridge University Press, 1993. pp309-335.
- Kim, Jaegwon, Philosophy of Mind. Boulder: Westview Press, 1996.
- Nussbaum, Martha C. Aristotle's De Motu Animalium. Princeton: Princeton University Press, 1978.
- Nussbaum, Martha C. and Putnam, Hillary. "Changing Aristotle's Mind." In Nussbaum and Rorty 1992.

Nussbaum, Martha C. and Rorty, Amelie O., eds. Essays on Aristotle's De Anima. Oxford, Clarendon Press, 1992.

Putnam, Hillary "Philosophy and Our Mental Life". Mind, Language, and Reality. New York : Cambridge University Press, 1979. pp291-303

Rey, Georges. Contemporary Philosophy of Mind. Cambridge: Blackwell Publishers, 1997.

Shields, Christopher "The First Functionalist" in Historical Foundations of Cognitive Science. ed. J-C. Smith. Boston: Kluwer Academic Publishers, 1990. pp19-34.

Sorabji, Richard "Intentionality and Physiological Processes: Aristotle's Theory of Sense-Perception". In Nussbaum and Rorty 1992.

Sorabji, Richard. "Body and Soul in Aristotle". in Aristotle's De Anima in Focus. ed. Michael Durrant. New York: Routledge, 1993. pp 162-196.

Wilkes, K.V. "*Psyche* versus the Mind". in Nussbaum and Rorty 1992.