

TN: 1590258
Pages: 19-33 ARIEL COD
Exempt

UBY/UTBG ILL - Lending

Call #: BD 161 .H537 1990

Location: 5TH

Journal Title: Historical foundations of cognitive science /
ISSN:

Volume: Issue:

Month/Year: Pages: 19-33 ARIEL

Article Author:

Article Title: shields; The First Functionalist

ILL Number: 84090005



Lending String:

*UBY,SOI,HUH,HUH,LDL

Patron: Pageler, Ben

Borrower: COD

ILL- Univ of Colorado Libraries

1720 Pleasant St. 184 UCB

Boulder, CO 80309-0184

Fax: 303 492- 2185

Ariel: 128.138.154.145

Odyssey: 128.138.154.194

Email: cu-ill@colorado.edu

11/10/2011 4:13 PM

BYU

BRIGHAM YOUNG UNIVERSITY

Harold B. Lee Library

Interlibrary Loan
Copy Center

For Odyssey Receipt Problems:

Phone: 801-422-4155

Fax: 801-422-0471

Email: ill-byu@byu.edu

Odyssey Problem Report

If you have experienced a problem in the delivery of the requested item, please contact us within

Five Business Days with the following information:

ILL#: _____

Your OCLC Symbol: _____

Date of Receipt: _____

Please specify if:

____ Pages were missing pp. ____ to ____

____ Edges were cut off pp. ____ to ____

____ Illegible copy, resend entire item

____ Wrong article sent

____ Other (explain): _____

NOTICE:

This material may be
protected by copyright
law **Title 17 U.S. Code**

THE FIRST FUNCTIONALIST

Aristotle sternly rejects Platonic dualism, but nevertheless resists an ancient version of the identity theory of mind and body.¹ Equally dissatisfied with each of these alternatives, he endeavors to analyze the relationship between soul and body by employing the notions of form and matter introduced in the *Physics* and articulated and expanded in the *Metaphysics* (Meta.). Thus, in the *De Anima* (DA) we find the familiar claim that "the soul is a substance as form of a natural body having life in potentiality" (DS 412a19-22),² which Aristotle proceeds to illustrate by suggesting that the soul bears the same relation to the body as the shape of a candle does to its wax (DA 412b6-7). Both the claim and its illustration are in some ways obscure. But it is reasonably clear that these remarks represent Aristotle's attempt to provide a workable alternative to both Platonism and an austere form of the identity theory. Aristotle is perhaps the first philosopher to seek an account of mind-body relations which captures the insights of these theories while avoiding their individual shortcomings. Indeed, Aristotle self-consciously views his position in the philosophy of mind in much the same way contemporary functionalists view their own. Like the contemporary functionalist, Aristotle seeks a theory of the mental which avoids what he regards as the excesses of his predecessors: his preferred account would capture the supervenience of the mental on the physical without identifying mental state types with physical state types. Moreover, beyond having analogous historical vantage points, Aristotle and contemporary functionalists share deep theoretical commitments. So deep are these commitments that it is fair to regard Aristotle as the first functionalist.

1. Contemporary Functionalism

It is not at all fantastic that Aristotle should be a functionalist in the philosophy of mind, since functionalism as such need not be regarded as peculiarly contemporary.³ This can be appreciated by considering a plausible textbook version of the history of the philosophy of mind in the latter twentieth century. In *Matter and Consciousness*, Paul Churchland

reasonably treats functionalism as a descendant of logical behaviorism which is sensitive to the failures of both behaviorism and the identity theory.⁴ Recognizing that any identification of mental state types with neural state types is parochial in the extreme, the functionalist embraces a central behaviorist strategy: mental states are to be defined relationally, but with reference to other mental states as well as to causal inputs and behavioral outputs. Mental state types are to be identified with functional state types, which in turn are best thought of in humans as properties of neural states: neural state *n* has the property of being a belief just because it has a certain functional role.⁵ States of non-human systems—computers, Martians, angels, or whatever—can in principle have that same functional role, and so, strictly speaking, can equally be belief states. On the functionalist analysis, then, whatever can be in a state that has the functional role associated with, e.g., pain, will be in pain. Thus, functionalism is neutral in terms of its ontological commitments: as far as functionalism *per se* is concerned, any system whatsoever can realize a given mental state type—so long as it can be in a state which has the functional role associated with that type.⁶ Even so, nearly all modern functionalists, as a matter of fact, are materialists,⁷ and expect the neurological sciences to specify which physiological states in humans realize the functional roles characteristic of pains, beliefs, and so on. Unlike identity theorists, however, their definitions of mental states do not by themselves require that mental states be physical states.

This history rightly regards the functionalist as reacting to two distinct pressures. First, the functionalist has recognized the need to structure an account of the mental compatible with a commitment to ontological materialism in such a way that its theoretical underpinnings will dovetail with the advances in the physical sciences. At the same time, the functionalist has sought to avoid the overly constricted view of the manner in which mental states are realized which sometimes accompanies these advances: mental states must be regarded as multiply realizable. It is important to recognize that these pressures are conceptual as opposed to empirical, in the sense that they are theoretical considerations not immediately informed by any ongoing empirical research. Although compatibility with the results attained in the physical sciences is a *desideratum*, the emergence of functionalism has not depended essentially upon advances in the neurological sciences. Indeed, as I will argue, there were analogous pressures and theoretical constraints already in place in antiquity, and these gave rise to an Aristotelian theory with striking parallels to the variety of functionalism espoused today.⁸ In particular, we find in Aristotle the suggestions that: (1) mental states are multiply realizable; i.e., that entities which realize mental states are compositionally

plastic; and more importantly, (2) mental states are definable in terms of their causal relations to inputs, outputs, and other mental states. (2) constitutes a minimal functionalist theory and so establishes that Aristotle accepts functionalism in the philosophy of mind. (1) is a consequence of (2), taken together with some plausible assumptions, and has been one of the governing insights of functionalism. That Aristotle embraces (1) further demonstrates his acceptance of the implications of this theory.

2. Functional Determination and Compositional Plasticity

Aristotle argues in many passages that in order to determine whether a given thing x belongs to a class or kind F , one must determine the function (*ergon*) of that class or kind, and then determine whether x has the capacity to fulfill that function. For example, in the *Meteorologica* Aristotle claims:

All things are defined by their function: for [in those cases where]⁹ things are able to perform their function, each thing truly is [F], e.g., an eye, when it can see. But when something cannot [perform that function] it is homonymously [F], like a dead eye or one made of stone, just as a wooden saw is no more a saw than one in a picture. The same, then, [holds true] of flesh....(*Meteorologica*, 390a10-15)¹⁰

Here Aristotle directly asserts a thesis of Functional Determination:

(FD) An individual x will belong to a kind or class F iff x can perform the function of that kind or class.¹¹

According to FD, if the function of a knife is to cut, x will be a knife just in case x can cut. Aristotle sometimes makes this point by claiming that after a living organism has died, its parts retain their names only by courtesy, "only homonymously" in his words.¹² The import would seem to be, for example, that whatever—and only whatever—has the functional role of seeing will be an eye.

Not surprisingly, then, Aristotle suggests that "if an old man were to receive an eye of the right sort, he would see just as a young man" (DA 408b21-23), and then goes on to observe that the afflictions of old age result solely from the decrepitude of the body. The suggestion is an interesting one for Aristotle to make: he allows in principle that one could gradually replace bodily parts at will with others of the right sort, viz. ones capable of performing the functional role assigned to those parts, and still end up with a functioning human being.

Now, Aristotle does not specify what "the right sort" (*toiondi*) of material for an eye will be. But he thinks that the suitability of matter for realizing an *F* is determined by its ability to perform the functional role characteristic of *F*'s.¹³ Hence, what matters for Aristotle in determining whether something belongs to a class of kind *F* will depend, as a general principle, not so much on its specific material composition as on whether it has the functional role assigned to *F*'s. This allows him to hold that certain types of things are, within certain specifiable limits, multiply realizable. That is, a commitment to compositional plasticity allows Aristotle to hold that entities or states can be realized in distinct types of materials, so long as those materials are functionally suitable. It is striking that Aristotle accepts this consequence not only for relatively innocuous cases, like tables and chairs, but, as I will argue, extends it to include human beings and mental states.

This is most readily appreciated by considering one important but often neglected feature of Aristotle's hylemorphic analysis of body and soul. Since, according to Aristotle, the soul is the form of the body, and the body its matter, one would expect the relationship between soul and body to be nothing more than a special case of the relationship between form and matter, and so to be explicable in terms of this more general relationship. And indeed it is, but, unfortunately, it is rather difficult to specify with any precision the relationship between form and matter. Aristotle's own reticence in addressing this question is surely part of the cause of the difficulty here. But there are passages where Aristotle endeavors to address this issue.

Especially relevant in this regard are *Meta.* VII 10 and 11, where Aristotle sets himself the problem of determining "Whether it is necessary that the account (*logos*) of the parts be present in the *logos* of the whole" (*Meta.* 1034b22-24). This may seem an oblique way of attempting to assess the relationship between matter and form, but it is made clear in the course of these chapters that among Aristotle's concerns is the question of whether forms must be regarded as *essentially* material. While investigating this topic, Aristotle draws a striking analogy between humans and circles:

In those cases where things appear realized in [materials] differing in kind, e.g., a circle in bronze or stone or wood, it seems to be clear that none of these, the bronze or the stone, belongs to the essence of the circle, because it is separated from them; but in those cases which are not seen separated, nothing hinders them from being similar to these, [viz. circles]; just as if circles were always seen to be brazen, nonetheless bronze would not belong to the form [of circle], but it would be difficult to abstract this in thought. For example, the form of man always appears in flesh and bones and these sorts of parts; are these, therefore, parts of the form and account [of man]? No, they are but matter, but

because [man is not seen] coming to be in other [materials], we are not able to separate them.¹⁴ (1036a-31-b7)

In this passage Aristotle argues that despite the fact that we always see human beings realized in flesh and blood, "nothing hinders" their being realized in other ways. The comparison with brazen circles is particularly helpful. It would be a completely contingent fact if all circles happened to be composed of bronze; it is similarly contingent that all human beings have been composed of flesh and bones. Human beings are compositionally plastic. Anything which is able to realize the states and activities characteristic of the human *ergon* will suffice: if an appropriate configuration of silicon chips could be in the complex state with the functional roles of beliefs, desires, and other thoughts, it would qualify as a human being. Thus, the only restriction Aristotle (sensibly) places on matter is that it be functionally suitable (DA 414a25-27). That Aristotle should have this insight is not surprising, given his acceptance of FD, the principle that a given *x* will be an *F* so long as it has the characteristic function associated with *F*'s. His view that the states and activities of human beings are functional states follows plausibly from his commitment to FD.¹⁵

3. The Multiple Realizability of the Mental

In a general way, then, Aristotle suggests that human beings can be realized in any functionally suitable matter. This is already sufficient to show that Aristotle has functionalist inclinations in the philosophy of mind. But his commitment is more precise and runs deeper than just this vague orientation would seem to indicate: Aristotle, not surprisingly, endorses the multiple realizability of the mental. This endorsement is not surprising since FD entails that whatever plays the functional role of a given mental state type will count as an instance of that state. Together with the plausible assumption that entities with physiological structures different from humans can have states with the same functional roles as the states of humans, this entails a rejection of any type-type identification of the mental with the physiological. But it is nevertheless noteworthy that Aristotle demonstrates his recognition of this consequence in two ways, by suggesting that both sensory and intellectual psychic states are multiply realizable.

In his biological writings, Aristotle repeatedly notes that a given sensory based mental state can be realized in different physical systems. Different species of animals have radically different physiological systems, but can nevertheless equally be in the state of smelling a strong odor. For

example, in *De Partibus Animalium*, after describing differences in the sense organs of different animals, Aristotle plausibly remarks that "in animals other [than man] these sense organs are well [arranged] in accordance with the peculiar nature of each" (657a10-12).¹⁶ Dogs and humans will realize the property of smelling orchids differently. Consequently, for Aristotle, two tokens of the same mental type, such as smelling an orchid, will have different physiological realizations. Therefore, he rejects any straightforward (type-type) identification of such psychic states and (non-disjunctive) physiological properties and is committed to the multiple realizability of mental states that are sensory based.

Aristotle's commitment to the multiple realizability of the mental includes mental states beyond these, however. In *DA* III 4, he argues that intellective states narrowly construed cannot be realized in material systems at all; and in the *Meta.* XII 9 he describes the activity of an immaterial God as a rarefied sort of thinking. Just as we can think, so God can think; but, according to Aristotle, our thinking necessarily involves the use and manipulations of images, while God's evidently does not (*DA* 432a8-9; cf. *De Memoria* 450b30-451a3). Consequently, our thinking, for example, that Socrates is mortal will differ in its realization from God's thinking this same thought. More precisely, the state in us which has the property of being the thought that Socrates is mortal will differ in salient ways from the corresponding state in God, since in one case it will involve the use of images and in the other it will not. That this thought can be betokened in different entities in different ways reinforces the suggestion that Aristotle recognizes and accepts the thesis that mental states are multiply realizable. Hence, Aristotle rightly rejects one central tenet of a type-type identity theory and accepts an intuition which motivated functionalism, viz. the multiple realizability of the mental.

4. Functional Definability

Aristotle promotes the Functional Determination thesis and recognizes as a consequence of that thesis that mental states are multiply realizable. It follows directly from FD that a certain physiological state in humans will count as a token of the mental state type "being a pain" just in case it can perform the function associated with that type; i.e., just in case it realizes the functional role of that type. Aristotle embraces this consequence in an important and striking passage from an early portion of the *De Anima*. There Aristotle suggests that anger is best defined as "a certain sort of motion of such and such a body—or part or faculty [of a

body]—by this on account of that" (DA 403a26-27). In other words, anger is best defined as a movement of a certain sort of body with a particular cause and for the sake of a certain end.¹⁷ He not only specifies that mental states are to be defined relationally in terms of their inputs and outputs but is also willing to allow that such states may be construed as second-order properties, viz. properties of physical properties of the agent. Thus, Coriscus is angry when the blood around his heart boils *and* this state has an appropriate set of causal relations.¹⁸ In so speaking, Aristotle explicitly advocates the use of functional definitions. Consequently, this passage is particularly important. It represents one of Aristotle's few explicit remarks about the appropriate form an adequate definition of a mental state must take: a token of a physical state type will count as a pain when that token has the functional role definitive of being a pain. There is evidently nothing peculiar about *anger* in this regard; rather, anger simply serves as an example of one sort of mental state. Consequently, Aristotle's point is really quite general. Mental states are to be defined relationally, with reference to causal inputs, outputs, and other mental states. By advancing this view, Aristotle satisfies the conditions for a minimal functionalist theory.

Aristotle's acceptance of FD, together with his acknowledgment of the multiple realizability of the mental, entails a rejection of any identification of physical state types with mental state types; it further entails that a token of a physical state type will count as a token of a mental state type when and only when that token has the functional role associated with that mental state type. Aristotle embraces these consequences and explicitly avows that mental states should be *defined* in terms of their functional roles. To this extent Aristotle has a clear appreciation of the motivations and consequences of functionalism in the philosophy of mind and self-consciously commits himself to that view.

5. Constrained Realizability

Although some Aristotelian commentators have been amenable to the suggestion that Aristotle is best represented as a functionalist in philosophy of mind,¹⁹ some have resisted this interpretation, and one author has been positively hostile toward it.²⁰ Doubtful commentators have reasonably expressed two main concerns: (1) Aristotle seems to think that certain psychic states are *essentially* material states, so he cannot be a functionalist since this sort of materialism is incompatible with functionalism; and (2) Aristotle often invokes one mental state when defining another and so may not accept the commitment to topic

neutrality required by functionalism; i.e., Aristotle may not suppose that every mental state is in principle definable in functional terms wholly devoid of mentalistic vocabulary.²¹ Neither of these objections is defeating to my thesis, but an assessment of each in turn will serve to buttress the points I have made.

Deborah Modrak, for example, articulates the first of these concerns and concludes that "the differences between Aristotelian hyломorphism and modern functionalism tell against the assimilation of the one to the other,"²² though she concedes that "Aristotle might be a functionalist in a broad sense."²³ The problem with any such assimilation, according to Modrak, is that functionalism identifies mental state types with functional state types, and this allows that anything which can be in a state which has the functional role associated with a given mental state will be in that mental state. Aristotle, however, "includes a physiological description in the full definition of a psychological state."²⁴ The suggestion is that the contemporary functionalist, Aristotle restricts the range of potential subjects for mental states.

Now the problem here cannot simply be, as Modrak suggests in one place, that "psychological states are regarded as functional states of certain bodily organs."²⁵ Clearly the contemporary functionalist believes this as well: *S* is in pain whenever she is in a neural state which has the functional role (together with the requisite beliefs and desires) of causing *S* to grimace in discomfort, pursue avoidance behavior, etc. So the concern cannot be just that Aristotle *in fact* thinks that being in this or that physiological state (e.g., being in the state of having the blood boil around one's heart) can realize a pain.

Perhaps the worry is deeper. The concern may be that Aristotle is himself guilty of precisely the sort of parochialism functionalism seeks to overcome. That is, functionalism is supposed to supercede the identity theory by allowing the possibility that mental states can be realized in physical systems radically unlike human beings and, as a matter of metaphysical or logical possibility, even in non-material systems. If this is the sort of concern Modrak means to express, the argument will be:

- (1) given its commitment to multiple realizability, functionalism presupposes an ontological neutrality as regards the sorts of systems which can in principle realize mental states;
- (2) if Aristotle incorporates physiological descriptions into his definitions of mental states, he tacitly rejects this presupposition;

(3) Aristotle does frequently incorporate physiological descriptions into his definitions of mental states; and

(4) therefore, Aristotle rejects a central tenet of functionalism and consequently cannot be characterized as a functionalist in the philosophy of mind.

Perhaps (3) is true; indeed in the canonical definition of anger adduced as evidence of his functionalism, Aristotle holds that there must be some bodily movement involved.²⁶ But this by itself provides no reason to suppose that (2) is true. Aristotle, like the contemporary functionalist, can maintain that mental states are *in fact* realized in humans in certain specifiable ways without regarding this as a consequence of his functionalism *per se*.²⁷ It is perfectly compatible to hold: (a) mental state types are identifiable with functional state types; (b) it is logically possible for any sort of system whatsoever to be in a particular state with the functional role determinative of a given mental state; and even so, (c) in fact only physical systems of specifiable sorts do come to be in states with such functional roles. Indeed, this would seem to be precisely Aristotle's position as regards all non-intellective psychic states. To this extent, Aristotle seems all the closer to the contemporary functionalist.²⁸ In any case, Aristotle's references to physiological states do not entail a rejection of functionalism.

Still, there is an important conceptual connection between a thing's function and its matter for Aristotle. Though many functional states are multiply realizable, the range of materials appropriate for realizing a given function is constrained or circumscribed by that function. Even when articulating FD in the *Meteorologica*, Aristotle notes that not just any matter can realize the functional property of being able to cut wood: "a wooden saw is no more a saw than one in a picture" (*Meteorologica* 390a14-15). Similarly, if being an eye involves seeing, and seeing involves receiving light waves, then only something so constituted as to be able to receive light waves, can be an eye. But these sorts of constraints do not entail a rejection of functionalism. Rather, they represent the plausible independent judgment that only structures of suitably sophisticated sorts can realize mental states.²⁹

6. Reductionism and Aristotle's Functionalism

It may seem implausible to suppose, even given the parallels we have seen, that Aristotle has a fully articulated functionalist theory. There may be concern that the textual evidence underdetermines the issue and that

consequently Aristotle is made to conform to a functionalist theory, even though he is non-committal about some crucial issues. One such crucial issue concerns whether Aristotle's functionalism is appropriately regarded as reductive. The concern, perhaps, is that Aristotle is not sufficiently self-conscious about the aims of his theory and so has not systematically considered all relevant alternatives. Although in some ways unfair to Aristotle, this sort of concern is not entirely unwarranted. Indeed, it should be noted that the minimal conditions for a functionalist theory specified above are conditions for what has been called "weak functionalism."³⁰ Weak functionalism is simply the view that mental states are definable in terms of their causal relations to inputs, outputs, and other mental states.³¹ Weak functionalism is weak because it does not affirm that when mental state *b* is referred to in the functional definition of mental state *a*, there must likewise be a functional definition of *b* which contains no mental predicates at all, in order to avoid circularity and to provide definitions of mental states which are topic neutral in the sense that they contain no ineliminable mention of the mental. Strong functionalism is weak functionalism plus this explicit affirmation. (So, strong functionalism entails weak functionalism, but not conversely.) As one commentator has noted, Aristotle sometimes employs mental vocabulary in explicating mental states (e.g., *Rhetoric* 1378a31), and so it is not immediately clear whether he accepts strong as well as weak functionalism and so not evident that his view is reductive in the relevant sense.³²

Even so, there is reason to suppose that Aristotle accepts strong functionalism. It is true that he nowhere explicitly insists that mental states must in principle be definable without reference to other mental states ("in principle" because it is open to the strong functionalist in practice to avail herself of mental states when defining mental states, so long as *some* of those states can be given functional definitions expunged of all mental vocabulary and the rest defined in terms of those). But to return to his canonical definition of anger at DA 403a26-27, it is instructive to note that here at any rate Aristotle provides a definition in wholly non-mentalistic terms. This, of course, does not by itself demonstrate that Aristotle's considered view will be that every mental state admits to such a definition or even that every mental state is definable in terms of other states which admit of such a definition. Nonetheless, it shows that in his most self-conscious account of the appropriate form for definitions of the mental, Aristotle avoids the circularity problem in the manner of a strong functionalist. Thus, the textual evidence, although inconclusive, suggests that Aristotle inclines toward strong functionalism. His being a strong functionalist is compatible with his sometimes invoking mentalistic

vocabulary in defining mental states, and in his most explicit account of the proper form of definitions of mental states, he takes care to avoid mentalistic vocabulary. This practice constitutes evidence, albeit inconclusive, that Aristotle would be willing to embrace strong as well as weak functionalism.

7. Conclusion

Aristotle's functionalism in the philosophy of mind is not articulated with the same sort of precision we have come to expect from contemporary theorists. Even so, it develops out of a highly systematic analysis of kinds and kind membership and shares both substantive and methodological principles in common with contemporary functionalism in the philosophy of mind. Even though the contours of Aristotle's functionalism are teleological in character, one need not embrace teleology as such to accept his brand of functionalism. But there are theoretical advantages to Aristotle's expository strategy. Aristotle's methodology in the philosophy of mind carries the suggestion that only by working to situate functionalist theories within broader, more systematic analyses of property and kind individuation will philosophers provide the deep theoretical support for functionalism required to establish its plausibility as a workable analysis of the mental.³³

University of Colorado at Boulder
Seminar für Klassische Philologie,
Universität Mainz

NOTES

¹ A great deal of work has been done on the vexed matter of Aristotle's ontological commitments in the philosophy of mind. See my "Body and Soul in Aristotle," *Oxford Studies in Ancient Philosophy*, Vol. VI (forthcoming), for a discussion of this literature.

² All translations from the Greek are my own.

³ See, e.g., Ned Block, "Introduction: What is Functionalism?" in N. Block (ed.), *Readings in Philosophy of Psychology*, Vol I (Cambridge: Harvard University Press, 1980), p. 172: "The functionalisms of philosophy of psychology are, however, a closely knit group; indeed, they appear to have a common origin in the works of Aristotle."

⁴ Paul Churchland, *Matter and Consciousness* (Cambridge: The MIT Press, 1984), Chapter Two. Cf. Block, *Readings*, Vol. I, pp. 268-275; Jerry Fodor, *Psychosemantics* (Cambridge: The MIT Press, 1987), pp. 67-68; and Georges Rey, "Functionalism and the Emotions" in A. O. Rorty (ed.), *Explaining Emotions* (Berkeley: University of California Press, 1980), pp. 164-165.

⁵ This analysis of functional properties derives from Stephen Schiffer, *Remnants of Meaning* (Cambridge: The MIT Press, 1987), Chapter Two. Of course, not all functionalists agree on precisely this analysis, but such differences as there are will not affect the present discussion.

⁶ See, e.g., Hilary Putnam, "Philosophy and Our Mental Life," in *Mind, Language, and Reality* (Cambridge: Cambridge University Press, 1975), pp. 291-303. Putnam rightly suggests that "two systems can have quite different constitutions and be functionally isomorphic" (p. 292) and cites Aristotle favorably in claiming:

...what we are really interested in, as Aristotle saw [citing DA 412a6-6b], is form and not matter. *What is our intellectual form?* is the question, not what the matter is. And whatever our substance may be, soul-stuff, or matter or Swiss cheese, it is not going to place any interesting restrictions on the answer to this question. (p. 302; his emphases)

⁷ See, e.g., Sydney Shoemaker, *Personal Identity* (Oxford: Blackwell, 1984), p. 139:

It is because I believe that there is an acceptable account of the mental and personal identity that is compatible with materialism, and because I believe there are independent reasons (roughly, the explanatory success of the physical sciences) for believing materialism to be true, that I am a materialist.

⁸ This is not to suggest that all who call themselves functionalists are in agreement about the commitments of their theories. One main source of disagreement concerns whether (with "analytical functionalism") functional definitions are formulated *a priori* or (with "psychofunctionalism") are products of an empirical investigation. See Sydney Shoemaker, "Some Varieties of Functionalism," *Identity, Cause, and Mind* (Cambridge: Cambridge University Press, 1984), p. 272. Also cf. Block, *Readings*, Vol. I, pp. 171-184 and 268-306. The account of functionalism I have just provided is intended only to sketch the minimal commitments any theory must satisfy to be regarded as functionalist. Although the theory I attribute to Aristotle does not move significantly beyond satisfying these minimal conditions, he would seem inclined toward what Shoemaker calls analytical functionalism.

⁹ Translations from the Greek incorporate brackets where I have expanded Aristotle's characteristically terse prose for clarity of meaning.

¹⁰ Several points must be made about this passage from the *Meteorologica*: (1) it comes from a work whose authenticity has been doubted; (2) some translators regard it as locally qualified (it occurs in a passage concerning homoeomerous bodies, and some, e.g., Lee, suppose it concerns these entities only); and (3) it states in an unrestricted form what elsewhere Aristotle tacitly restricts to classes with clear functions (*erga*), e.g., natural kinds. But these observations do not undermine its utility here, since: (1) the *Meteorologica* is not spurious, or at any rate Book IV is genuine (cf. Konrad Gaiser, *Theophrast in Assos: Zur Entwicklung der Naturalwissenschaft zwischen Akademie und Peripatos* (Heidelberg: Carl Winter, 1985), pp. 64-65, with review by Troels Engberg-Pederson, *Classical Review*, N. S. XXXVII, 1987, pp. 53-57); (2) the language Aristotle uses suggests that he intends a general rather than qualified principle, and he elsewhere in similar contexts extends it beyond this restricted class, e.g., *De Partibus Animalium* (PA), 640b18-23 (and even within this passage it is unclear why Aristotle would mention the eye if he were concerned only with homoeomerous bodies); and (3) human beings and mental states will certainly be included in any restricted formulation of the claim that function determines kind membership. Cf. *Meta*, 1029b23-1030a17 and *Nicomachean Ethics*, 1098a7-8.

¹¹ FD is a thesis about class or kind membership. But it can be translated without violence into a thesis about state types or properties:

(FDS) *x*'s being *F* is a token of a state type being-*F* iff *x* is in a state which has the functional role associated with being-*F*.

¹² This is a common claim of Aristotle's. Cf. DA 412b17-22, Meta. 1036b31-33, and esp. PA 640b34-641a5: "And yet a dead body has exactly the same configuration as a living one; but for all that it is not a man. So also no hand of bronze or wood constituted in any but the appropriate way can possibly be a hand except homonymously. For like a physician in a painting, or like a flute in a sculpture, it will be unable to perform its function. Precisely in the same way, no part of a dead body, e.g., as its eye or its hand, is really an eye or a hand." T. H. Irwin, "Homonymy in Aristotle," *Review of Metaphysics* 34 (March, 1981), pp. 523-544.

¹³ See DA 403b3 (with Hicks's note, *Aristotle: De Anima* (Cambridge: Cambridge University Press, 1908), p. 202), 412b11, and esp. 414a25-27: "...the actuality of anything naturally comes to be in what is present potentially [as that thing], i.e., in suitable manner."

¹⁴ See W. D. Ross, *Metaphysics*, Vol. II, p. 207, n. 14, for the motivation for translating this difficult passage as I have. Shortly after this passage Aristotle rejects the position of one Socrates the Younger (*Meta.* 1036b25ff.) and insists that some matter must figure into the definition of man. I take him to mean only that since in humans non-intellective states are realized in functionally suitable matter, such matter must figure into the definition of man. See esp. 1036b30; cf. PA 645b15-22.

¹⁵ In this sense, Aristotle's functionalism derives from a broadly based analysis of properties and kind membership. It is striking that on his account, mental states will not be peculiar in being susceptible to functional definitions. At least one contemporary functionalist, Shoemaker, has adopted this more comprehensive approach advocated by Aristotle. Shoemaker suggests that his commitment to a causal theory of properties (CTP; roughly the view that a property is identified by its causal potentialities) entails weak functionalism, where weak functionalism is the view that mental properties, like all other properties, are individuated in terms of their causal features. Though CTP neither entails nor is entailed by FD, the positions are analogous in that both Aristotle and Shoemaker suggest that functionalism in the philosophy of mind tumbles out of a broader analysis of properties and state types. The principal difference is that we find in Aristotle no clear attempt to differentiate strong from weak functionalism. (See section VI below.) Cf. Shoemaker, "Causality and Properties," and "Some Varieties of Functionalism," sections V-VIII together with McGuinn's review of Shoemaker's *Identity, Cause, and Mind*, *Journal of Philosophy* LXXXIV (April, 1987), p.230.

¹⁶ See also PA 656a35-37, 658b27-659b19; DA 421b9-422a6.

¹⁷ The Oxford translation of J. A. Smith has: "Consequently, their definitions ought to correspond, e.g., anger should be defined as a certain mode of movement of such and such a body (or part or faculty of a body) by this or that cause and for this or that end." Hicks has: "Hence, they must be defined accordingly: anger, for instance, as a certain movement in a body of a given kind, or some part or faculty of it, produced by such and such a cause and for such and such an end." Both Smith and Hicks are right to expand their translations to make explicit that Aristotle intends the *causal* relations of the bodily state to be essential to the definition. If we generalize Aristotle's definition here, we end up with the claim that a bodily state will realize a (non-intellective) psychic state only when that state has certain specifiable relations to inputs, outputs, and other mental states. Cf. *Rhetoric* 1378a31 for a parallel definition where Aristotle, significantly, suppresses the

reference to the bodily state and makes explicit the role of other mental states in the definition of anger.

¹⁸ Indeed, Aristotle suggests at DA 403a22-24 that simply being in a token of a certain physiological state type normally associated with a given mental state type is not sufficient for being in that mental state. Thus, having one's blood boil is not sufficient for anger. This suggests: (a) that Aristotle rightly resists any type-type identification of the mental with the physical, and more importantly, (b) that a given physiological state will have the property of being a certain mental state only when that state has the appropriate causal inputs and outputs, as when it plays the functional role constitutive of anger (cf. Meta. 1036b25-27); and (c) that Aristotle marks a rudimentary distinction between what Shoemaker calls core and total realizations of mental states. See "Some Varieties of Functionalism," section II. Cf. also Edwin Hartman, *Substance, body, and Soul* (Princeton: Princeton University Press, 1977), p. 147.

¹⁹ See, e.g., R. Manning, "Materialism, Dualism, and Functionalism in Aristotle's Philosophy of Mind," *Apeiron* **IXX** (1985), pp. 11-23. In an unpublished manuscript, "Changing Aristotle's Mind," M. Nussbaum and H. Putnam establish some similarities. An earlier discussion of some of these issues occurs in A. Kosman, "Perceiving That We Perceive: *On the Soul* III, 2," *Philosophical Review* **84** (1975), pp. 499-519. Two philosophically sophisticated discussions of this topic are Edwin Hartman, *Substance, Body, and Soul*, Chapter Four, section V, and S. Sparkman, "Aristotle's Philosophy of Mind: Does He Give a Functionalist Account?," M. A. Thesis, University of Arizona, 1987.

²⁰ H. M. Robinson, "Mind and Body in Aristotle," *Classical Quarterly* **28** (1978), pp. 105-124. A more concessive rejection of my thesis is to be found in D. K. W. Modrak, *Aristotle: The Power of Perception* (Chicago: University of Chicago Press, 1987), Chapters One and Two.

²¹ Robinson launches a series of other objections, the most plausible of which concerns the role of *qualia* in functional definitions. Robinson duly notes that Aristotle offers what appear to be functional definitions of mental states but argues that although Aristotle believes that "every biological process has a function which explains why it exists," he has no interest in statements which provide a "reductive account of the experience, feeling, or sensation of [e.g.] pain." Robinson's objection here is obscure, but presumably he understands functionalist definitions to be reductive in the sense that they make no essential reference to their qualitative character, viz. to *qualia*, and supposes that Aristotle would resist any such approach. If so, his characterization of functionalism is apt, but his presentation of Aristotle is unconvincing. First, he does not present a single passage which supports the contention that Aristotle would resist such an approach; and second, we have seen passages (e.g., DA 403a26-27) in which Aristotle proceeds by offering definitions of mental state types which make no reference at all to their qualitative character. Consequently, Robinson's objection is not at all compelling.

He also offers the following objections: (1) there is no positive evidence that Aristotle accepts functionalism; (2) Aristotle has an alternative theory incompatible with functionalism; (3) Aristotle has worries about his theory which no functionalist could have and so "is enmeshed in a more convoluted theory than functionalism;" and (4) Aristotle's distinction between potentiality and actuality preempts a functionalist interpretation. My responses, in short, are: (1) is false, and evidence has been presented to show that this is so; as I argue below (2) and (3) involve the mistaken assumption that a functionalist cannot *independently* articulate the physiology of perception in humans; and (4) is asserted without discernible argument.

²² Modrak, p. 28.

²³ Modrak, p. 184, n. 18; cf. also p. 187, n. 53, and p. 190, n. 26.

²⁴ Modrak, p. 28.

²⁵ Modrak, p. 28.

²⁶ But cf. *Rhetoric* 1378a31, where Aristotle makes no reference to such movement.

²⁷ That most functionalists are materialists suggests they have, for independent reasons, come to believe that only physical systems can be in states which realize the functional roles associated with mental states. Cf. note 7 above. But a functionalist *qua* functionalist is not a materialist. As Block succinctly observes in his "Introduction: What Is Functionalism?": "Functionalists can be physicalists in allowing that all the entities (things, states, events, and so on) that exist are physical entities, denying only that what binds certain types of things together is a physical property" (p. 172). Cf. Fodor, *Psychosemantics*, p. 68.

²⁸ Aristotle himself provides a good example of an independent motivation for supposing that certain sorts of states, viz. material states, are incapable of realizing thought. See DA III 4. Of course, the soundness of his arguments for this conclusion is not at issue here. The point is that Aristotle, like the contemporary functionalist, may have independent reasons for restricting the range of actual systems which can realize a state with this or that functional role and may do so without undermining a commitment to functionalism. In any case, it should be clear that for Aristotle any *general* definition of mental states cannot include essential references to bodily states.

²⁹ The point may also be put as follows. No functionalist commits herself to the perverse claim that just anything can be in pain. No functionalist is constrained to say, e.g., that a carving knife can feel pain when made to cut an especially tough piece of beef. She will endorse the conditional, that *if* it can be in a state with the functional role definitive of pain, the knife will be in pain; but she will rightly point out what is obvious, that the knife is not sufficiently sophisticated in terms of its structure to be in a state with that functional role. Similarly, Aristotle is free to maintain, despite his functionalism, that only certain sorts of material systems can realize mental states.

³⁰ Shoemaker, "Some Varieties of Functionalism," section I. Shoemaker is clear that he takes it as a task of functionalism to provide non-circular definitions of the mental; but not all functionalists have agreed with him.

³¹ The account of functionalism one often sees advanced is, then, properly weak functionalism. See, e.g., Ned Block, "Are Absent Qualia Impossible?", *Philosophical Review* 89 (1980), p. 257; cf. Georges Rey, "Functionalism and the Emotions," esp. p. 165: "Suffice it to say that philosophers [viz. functionalists] gradually came to find mental states inextricably intertwined, in such a way that no one state could properly be identified without mention of the others, no one of them, there fore, being 'reducible' to nonmental terms." Consequently, even if Aristotle's functionalism is non-reductive, this will not distinguish him from many practicing contemporary functionalists.

³² Cf. Modrak, p. 28. Note, however, that Modrak regards this as a reason for supposing that Aristotle is not a functionalist at all. I would prefer to say that without a clear commitment to topic neutrality, Aristotle is a weak functionalist (see note n. 31). In any case, there may be some evidence to suppose that Aristotle accepts strong as well as weak functionalism.

³³ I gratefully acknowledge the Alexander von Humboldt-Stiftung for its generous support. I have profited from conversations with S. Sparkman, J. Anderson, and P. Mitsis in preparing this essay. I am also pleased to thank J-C. Smith and J. Whiting for instructive written comments.