"Grounding the Mental"
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GROUNDING THE MENTAL*

Introduction

Most physicalist theories of mind tacitly assume a rule which I shall call the rule of *grounding the mental* (GM). (GM) can be stated roughly as:

> For each and every justifiable mental ascription m made to one or more individuals there has to be (theoretically) some particular non-mental feature r of the individual(s) to show for it.

One implication of GM is that all individuals which are said to be alike in respect m (where "m" is a specific mental idiom or description (must be alike also in respect r (where "r" is a specific nonmental idiom or description). Further, it also implies that for every distinction we can draw concerning various mental ascriptions ("S believes that p," "S wants x," etc.) made to one or more individuals there has to be some commensurate nonmental distinction to be made concerning features of that individual in virtue of which the mental assignments are to be justified. GM is not an epistemological rule, demanding that one be *aware* of different nonmental features which warrant different mental ascriptions; the rule only has it that there *are* such nonmental distinctions which make the mental differences. Abandonment of GM is typically construed as tantamount to a concession to dualism, for mental ascriptions said not to be tied down to specific nonmental features are generally thought to be anchored in some nonphysical ontology.

This paper is divided into three sections. In the first I indicate how two of the most popular versions of the Identity Thesis of Mind utilize GM, and how each faces serious difficulties over it. In Section II, I argue that adherence to GM is *not* a necessary condition for physicalism, in spite of a tradition which presumes otherwise, and sketch out a more plausible direction for such a model of mentality, one which avoids countenancing GM. Finally, in Section III, I summarize our findings and present eight axioms which would be helpful in developing a more formal semantics of the physicalistic position I outline.

Part I

GM has enjoyed quite a reputation as a fighter against dualism, a noble task if ever there was one. We find central state materialists, for example, speaking of various mental ascriptions as attributing distinct mental *states*, *events*, *processes*, and the like to individuals,

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individuals which have, accordingly, commensurate distinct physical states, events, processes, etc., in virtue of which the mental features can be pinned down in theory.[1] If there's a difference between S's believing that p at time t and S's believing that q at time t, which there *seems* to be, then according to central state materialism such a difference has to show up in the actual *physical description* of S's material state at time t. And the same goes for two (or more) individuals who share common mental ascriptions. Yet this leads to difficulties. When we try to identify kinds of mental attributes with kinds of material ones (e.g., "Pains are identical with C-fiber stimulations"), a task that seems necessary since we ascribe common kinds of mental features to different individuals in different material states, we feel the oncoming crunch; the class of possible material states, events, processes, etc., identifiable with each kind of mental state, event, process, etc., looks like an indefinitely large disjunctive one. Moreover, even if we could pin down a relevant list (a supposition too optimistic for some), we are left with the commitment that *all* individuals capable of common mental ascriptions have *very similar* material constitutions, all having what we could call a *central nervous system* capable of binding together a relevant disjunctive class of material states, etc., for the general identification. But this is to flaunt homo sapiens chauvinism with a vengeance, for it puts unduly strict a priori limits on what physical forms of mental creatures we might someday run into.[2] The physical materials, construction, and design of a Martian, for example, would be no doubt quite dissimilar to our own bodies, given the different environments and evolutionary success, but evolution on Mars might have produced individual

[1] See especially D. M. Armstrong's *A Materialist Theory of Mind* (London: Routledge and Kegan Paul, 1968), where he attempts to offer a complete account of the mental as *causal states of behavior*, states which are (as a matter of contingent fact) identical with material states of the central nervous system.

[2] H. Putnam develops nicely this criticism when he writes: "Consider what the brainstate theorist has to do to make good his claims. He has to specify a physical-chemical state such that *any* organism (not just a mammal) is in pain [say] if and only if (a) it possesses a brain of a suitable physical-chemical structure; and (b) its brain is in that physical-chemical state. This means that the physical-chemical state in question must be a possible state of a mammalian brain, a reptilian brain, a mollusc's brain (octopuses are mollusca, and certainly feel pain), etc. At the same time, it must *not* be a possible (physically possible) state of the brain of any physically possible creature that cannot feel pain. Even if such a state can be found, it must be nomologically certain that it will also be a state of the brain of any extra-terrestial life that may be found that will be capable of feeling pain before we can even entertain the supposition that it *may be* pain . . . It's not altogether impossible that such a state will be found . . . But this is certainly an ambitious hypothesis," from "The Nature of Mental States," in D. M. Rosenthal (ed.), *Materialism and the Mind-Body Problem* (New Jersey: Prentice-Hall, 1971), pp. 157-158.

systems with mentality nonetheless. Or, more radically, we might discover someday all-silicon creatures which feel pain, and any a priori demands on this capacity would have to exclude C-fiber stimulation, to dispense with one version of material identity.

Earthling Edna and Martian Myra might both believe that p—believe, say, that there are objects in their environment—although differing significantly in their material construction and design. But GM tells us that the common belief that p surely cannot be the *only* relevant similarity; there has to be *something else* in common in virtue of which they *both* believe, that p. If not material construction, then what? In our short story, some version of functionalism is about to be born in an attempt to save GM. Whatever are the details of their different physical descriptions, both descriptions surely include a *logical* feature common to both disparate physical systems; both, for instance, receive and process information requisite for a belief that p, both generate behavior appropriate for the ascription of the belief, etc. As such, some logical feature f, common to both physical systems, is grounds for the ascription of the belief that p to each. While there is no a priori reason to think that the actual materials and design of both individual systems are at all similar, there is good reason, it is argued, for holding that both share some relevant functional operation (logically defined) in their respective systems, such that the two sets of information-input/action-output operations can be described as a belief that p.[3] Now, whether the mental features of individuals identified with functional features of their design are construed as mental states, events, processes, or what have you, we can specify logically such features according to their roles in the system, according to their input/output relationships, relationships that might indeed show up in Martians and Man, dogs and chimpanzees. Thus, GM is salvaged, interpreted in favor of common logical, or functional, features of systems in virtue of which mental features can be grounded.

However, this view is not without its problems. We know that at any given time an individual system can be ascribed an indefinite number of mental features, running the gambit from sensations and perceptions to imagination and desires. If the logical state of any system is to be taken as (as I think it must) a logical state of the *entire* system—a logical global state, so to speak—then it looks as if a system

[3] See H. Putnam, *op. cit.*,; also his "Mental Life of Some Machines," in H. Castaneda (ed.), *Intentionality, Minds and Perception* (Detroit: Wayne State University Press, 1967), pp. 177-200; and "Brains and Behavior," in R. Butler (ed.), *Analytical Philosophy, second series* (Oxford: Oxford University Press, 1965), pp. 1-20; and "Minds and Machines," in S. Hook (ed.) *Dimension of Mind* (New York: New York University Press, 1960), pp. 148-179.

can be in but one logical state at a time.[4] So it seems that either an indefinite number of mental features are to be identified with a *single* logical one or, contrary to popular opinion, we can be attributed only one mental feature at a time. Of course, both options are fraught with difficulties. Hanging fast to GM the search for a mental hook-up continues, and the argument is scrutinized.

Perhaps a physical system *can* be in more than a single logical state at a time. We are told that what we need to do is recognize (or make) a distinction. There are *structural* states of a system, on the one hand, and *functional* states on the other. Structural states come one at a time, so to speak, relative to the particular design of the system and its compositional make-up at any given moment. However, functional states are something else entirely (or maybe not really some*thing* else at all), since structural states are judged to be *in* functional states only relative to some *functional description* of the physical system. A functional state of a system needs to be considered as a structural state *under some functional description* (or other). For instance, a particular garbage disposal might be a *waste-disposer*, a *hog-feeder* and an *organic-garden-mulcher*, given these functional descriptions and their respective purposes, although the total material arrangement and composition of the disposal parts—its structural state—is one and the same throughout. One machine; several functions. The same thing holds for *different* physical systems—different systems in different structural states—which share common functions. Just think of the combinations. Thus a physical system (or systems) *can* be in more than a single functional (or logical) state at once, and hence can be attributed more than one mental feature at a time, assuming that sensations and beliefs are like waste-disposers, are in fact *instantiated* abstract functional states. This rather Platonic way of "pinning down" the mental through instantiations of abstract functions might look fruitful to some, but I am skeptical and, besides, it just *might* turn out to be superfluous in any case.

In Section II, I want to argue that the pursuit of identities, both of the mental/material variety and the mental/functional kind—however "functional" is unpacked—is unnecessary for physicalistic theory, and that the job of the physicalist is not a fortiori one of specifying plausible candidates for identification, as if to admit that failure here amounts to a concession to dualism. In particular I want to see if I cannot make a case for two (or more) individual systems, alike in that both share a common mental ascription, but dissimilar in materials, design, and specific functions, yet where both are subject to a physicalistic interpretation and analysis. In short, I

[4] J. Fodor and N. Block use a version of this line of criticism in their "What Functional States Are Not," in *The Philosophical Review* 81 (1972).

wish to show that GM is too strong for physicalism and should best be dispensed with in theory.[5]

Part II

We often ascribe a common mental feature to individual systems in the context of attributing to each a common *skill* or *capacity*.[6] Let us approach this by focusing on an example of a particular capacity: the capacity to *hide*, to systematically get out and keep out of sight from another who seeks. As hiders-and-seekers you and I have this capacity, as might others who are not seekers but only hiders. As a hider there is a range of *further* fitting abilities any such system should have: the ability to find appropriate objects with which to shield oneself, if such objects are available, the ability to *anticipate* another's movements and to keep out of another's perceptual range, the capacity for *purposive movement*, and countless other abilities relative to the purposes and versatility of the system. We know this not merely from having observed successful hiders in the past, but from a rather a priori source; we know *what* hiding amounts to, how one can hide (in general) and hide successfully. The concept of *hiding* provides us with a host of "hiding-characteristics" that any good hider should have, and once we are told the details of an environmental situation, who is being hidden from, some general description of the hider's motor capabilities, etc., we can fairly accurately specify what a hider should be able to do in that situation.

Now suppose you and I each set out to *build* a hider. Since hiders at least need to distinguish between those objects from which they are to hide and other objects, they need to have some capacity for discovering the appropriate objects. One cannot very well hide from some O if O cannot be individuated. So some sort of *perceptual analysis* requisite for identifying the relevant class of perceptual objects needs to be developed. What else? Appropriate *avoidance-abilities* are necessary, such that the perceptual field of object O (which is analyzed as that object from which to be hidden) can be kept free of the hider. Some sort of capacity to *anticipate* O's behavior

[5] In arguing for this physicalist position I guess I am arguing for what Armstrong calls an "intellectually frivolous" position. See his *A Materialist Theory of Mind*, *op. cit.*, pp. 346-366.

[6] I am indebted to D. C. Dennett for pointing out several of the issues I develop here. He has convinced me of the inappropriateness of the identity theory approach to physicalism, and of the fruitfulness of the one taken by Artifical Intelligence research and systems theory. See his *Content and Consciousness* London: Routledge and Kegan Paul, 1969); "A Reply to Arbib and Gunderson," presented to the American Philosophical Association Eastern Division meeting, Dec. 29, 1972; "On the Absense of Phenomenology," unpublished; "Why You Can't Make a Computer Feel Pain," unpublished.

is needed, so that hider can remain hidden once out of range. The hider should be able to produce what amounts to *inferences* about 0's relative position and to be able to *act* on such information in a purposive manner; something to the effect: "If 0 continues to move in 0's current direction, then 0 will be able to perceive and detect me. I don't want that to happen, so I'd better move in direction *d* (where moving in *d* will keep me hidden)."

Other capabilities will be forthcoming, but let us stop here for now. Suppose you and I succeed in building our hiders and can establish this empirically. Both systems can be *treated* as having beliefs about their environment and about specific objects in it (including themselves), as having desires to be and to remain hidden, and both can act in appropriate ways in face of environmental contingencies, given enough versatility in design. Given our success in building the hiders, adopting the intentional vocabulary when discussing their behavior would have good predicative payoff. Further, each *might* be ascribed other beliefs and desires as well, given specific details in the situation. For instance, suppose we discover that my hider, when cornered and just about to be discovered in the barn, tosses out unnoticed a rock over 0's head, causing 0 to turn and reverse her direction in search of the noise. The hider then quietly dashes away undetected. Seeing my hider do this we come to have further expectations concerning its hiding ability. It can "create its way out of a jam." With such a capacity it might be ascribed beliefs about another's behavioral tendencies, perceptual sensitivity, attributed an ability to *deceive* another through novel behavioral production, furthering its purpose to be hidden, and all that goes along with such a story. More subtly we might say that my hider *believed that 0 could hear*, and that sudden noises might (probably would) lead 0 to search in their direction, away from it, etc. Ascriptions of beliefs and desires will approximate those in line with certain *task capabilities*, and can be used for explaining and predicating behavior produced in connection with getting the appropriate job done.

The same holds for your hider. Have these general abilities of hiders and their mental ascriptions placed any demands on how you and I should actually build our hiders? None specifically, as long as we have not set out to model behavioral controls along essentially human lines. As long as we produce the kind of system appropriate for hiding, given the contingent empirical showdowns, you and I are free to choose the materials we wish and to build the hiders with whatever blueprints we feel will do the trick. While both systems will have to be able to (among other abilities) analyze appropriate perceptual information, requisite for discriminating certain kinds of objects in their environment, and to be able to act accordingly, how and with

what the systems carry out this analysis and rational activity is unimportant unless it hampers the hider's overall ability to hide. Mine might be wired to move only on wheels from one stationary object to another, keeping out of range. Your hider might be designed out of completely different materials, designed to burrow holes and to remain undetected by executing rapid tunnel-digging routines. A more versatile, and perhaps better, hider than our two would be one which combined our hiders' above- and below-ground features, one which multiplied and widened a 'hiding repertoire." Where we stop depends on what hider-situations we can cook up and how ingenious our systems-plans are. An important point to keep in mind is that we can specify in *advance* what a good hider would have to do, given these imaginative situations.

How do these capacities bear on the *appropriateness* of mental ascriptions? As long as the general ability to hide in varying situations is preserved, certain mental ascriptions (concerning beliefs, desires, purposes, intelligence, etc.) will serve our ability to predict what the hiders will do, and when they will do it. If I believe you have built a good hider I can treat it as one, attribute mentality to it (which might alter in its specifics once I watch it for awhile), and try (with success, if my belief pans out) to outguess its moves, given environmental changes which I could control. Hiders should act as they are supposed to and can be dealt with accordingly, barring any malfunction which might displace the need for the intentional vocabulary. You can do the same for my hider. Furthermore, we can do this (and often do this) *without* any beliefs at all concerning *how* the systems actually organize the relevant environmental information, produce their behavior, etc. As *hiders* we come to ascribe specific beliefs, desires, intelligence, and action to them in an open-ended class of possible circumstances, and we are able to do this by having a darn good idea about just what sorts of things hiders should think about, want, be able to reason about, and act upon in virtue of their hider-status in the specific circumstances. As mechanisms which function in elaborate internal ways, all we need to be able to say is that *whatever* is going on inside the respective systems and *however* they map onto the perceptual analysis from input the appropriate behavioral output, the systems are designed *well enough* to warrant being treated as hiders and describable in a fitting intentional vocabulary, such that this treatment has good predictive and explanatory payoff. The systems have mentality insofar as *our* expectations concerning their behavior can be met by treating them as such. Their mental features are grounded, all right, but grounded in our general capacity to

predict their behavior from this "mental vantage point," so to speak, made *apt* by their overall design and behavior.[7]

Now suppose that I find reason (for prediction, say) to ascribe to your system the belief that it is being sought, and you find reason to say the same about my hider. We ascribe this belief independent of any knowledge (or hunch) of its materials and design or specific functional capacities. We simply believe that we have each built a hider, and hiders have such beliefs, since if they did not they would not be able to hide and survive as such. Now we do not know just *how well* each other's hiders hide, but if predictability matters to us (which it certainly *might*; suppose we've each placed a nice bet on outguessing the behavior of our artifacts) we do not want to run the risk of *limiting* our predicative accuracy through underestimating the versatility of each other's systems. Good hiders believe they are being sought (believe that p), and one believing this will no doubt believe that *there are* others who are seekers (believe that q), and if one believes this then one should believe that he is to *hide from* others (believe that r), and so on. Of course it is *logically possible* to believe that p without believing that r, but in virtue of a believer's approximating (to some extent) the ideal we cannot afford to assume specific belief stop-gaps, and should proceed instead by being prepared to ascribe an *indefinite* number of beliefs to the system. Predictability might pragmatically demand it, and will be the final arbiter.

Are we to conclude that for *each* belief-ascription there has to be some underlying functional process to show for it? And what possible economy is gained by answering yes? We might indeed discover a certain internal functional organization process f which produces behavior b appropriate for the situation in which I ascribe the belief that p to the system. But for every such internal functional saliency there are an indefinite number of other forthcoming ascriptions of beliefs, intentions, etc., in virtue of what we expect from an ideal-believer-that-p, approximated *somewhat* by this system, including the belief that r. So let us suppose that we *for this reason* ascribe the belief, intention, etc., by being capable of producing these overall behavior b. In treating it as holding belief r I treat it as a bit more rational than I would if I denied it this further belief (pending, say, some *further* behavioral "test-condition" indicating another functional process at work). The treatment of *added* rationality might

[7] The general success of *predicting actions* is the payoff of treating the individuals as rational ones, capable of acting on appropriate beliefs and desires. That such success is not guaranteed by aschewing the mental, and that so-called intentional explanations are appropriate for physicalism, are claims I argue for in "Intentional Scraps," in the *Southern Journal of Philosophy* (Spring, 1975), pp. 13-20.

have good overall predictive payoff, so I include the ascription of belief *r*, not because this specific ascription is thought to be "tied down" to some discoverable, distinct functional process currently going on, or what have you, but because of the wider predictive context resulting from treating it as *being intelligent enough* to believe in implications of its other beliefs. Expectations concerning *overall* behavioral accomplishments are considered to be rich enough to warrant treating the system as sufficiently versatile in intelligence, and *overall* functional features of the system's program and design must prove strong enough to *make good* my rather generous ascriptions of belief, intention, etc., by being capable of producing these overall behavioral accomplishments. But a general dependency *overall* between its warranted mental ascriptions and its underlying functional treasures makes no demand for *specific* functional grounds for *specific* mental ascriptions. As we have seen, some mental ascriptions might seem to correspond rather well to specific aspects of its design, but others *need not*, nor should this bother us as physicalists.

Now, of course, the system's physical design and program can, of course, be used to explain its behavior (and to "reduce" the mental, if one wants to talk like that), and *that is* where physicalism rings true. But to provide a physical account of behavior treated as intelligent activity through a decomposition into mechanical subsystems of behavior need not involve a specific physical identification for *each and every* mental feature ascribed to the system, for these ascriptions need not be construed as specific *references* to distinguishable features *in and of* the system. Yet it is not difficult to see why some have thought otherwise.

Ascribing a belief that *p* to a system is certainly not the same as ascribing a belief that *r* to it. But the difference is not *obviously* a difference between attributing two *separate concurrent mental states* to the system (to be spirited away by sructural states, functional states, or what have you). To assume that it *is* is to begin, for a physicalist, the unenviable search for a suitable distinct set of nonmental grounds, a search which we have seen leads eventually to a proliferation of logical abstractions that somehow get instantiated in the system at the right time, in the right order. If one can build (theoretically) a system with enough versatility to accomplish the specific task at hand, with a rich enough design and program capable of reorganizing its behavioral-control system, etc., —in short a system complete enough functionally to produce the behavior appropriate for the relevant case of intelligent behavior and describable in the intentional tongue—then we can explain that behavior by theoretically *providing for the production of it. Epistemic logic* gives us a table of implications for an ideal believer, and our system, as a believer, is

somewhere on the scale leading to the ideal. So certain implied beliefs will be ascribable and we take liberties when we feel we have got a general perspective on the system's intelligence-ranking. This helps us with our predictions; and if they do not pan out we trim our mental budget, cutting expenditures that were never intended to be paid in terms of specific physical functions in the first place. Mental cutbacks simply make the system a little more stupid, and while this tells us something about its overall design and functional diversity (or lack of it), it is silent over the question of specific operational hook-ups for each belief ascribed to the system.

Using the language of the mind to talk about a system when predicting its behavior might *seem* to some to be describing a history of something or other going on in the system, by referring to distinguishable features that have to be individually pinned down to features in the physical system, but this is not obvious, and the assumption that it is *is* should be avoided when possible. *Some* mental ascriptions might enjoy more or less referential specificity: "She's now in pain," "She's presently thinking about her grandmother," etc. As such, one would no doubt expect to find underlying processes responsible for the behavior specific to the situation of the ascription (e.g., head-rubbing, aspirin-taking, speech-reporting, etc.). But even here why drive *pain* into the system through identity? At the level of functional processes, descriptions indicating what specific functions of its design are in fact operating to produce the behavior should leave *pain* and the language of sensation behind, for explaining the *system's being in pain* will involve no doubt a story concerning a *host* of underlying functions, controlling a myriad of bodily motions and verbal behavior. Driving pain underground would only serve to *defer* an explanation of it.

There is probably a spectrum of putative mental references, with ascriptions of sensations and perceptions toward one end, and beliefs and intentions toward the other. But keep in mind that for every internal function that looks promising for a specific mental tie-down there are an indefinite number of further mental ascriptions to be made in virtue of the system's being an approximation of an ideally intentional one, and *not* in virtue of some specific internal function or functional description it has at the time. I suppose one *could* insist otherwise, latching ever so strongly to GM, and argue that an indefinite number (or an *infinite* number, as in the case of the ideal believer) of logical functions—one for each belief ascribed—are instantiated in one and the same structural state of the system. Or, as one recent exponent of functionalism puts it: "One global structural state of the *physical Turing machine* counts as realizing many dif-

ferent global states of many different *abstract Turing machines* respectively."[8] My question, though, is why saddle yourself with this way of talking and then with the problem of making clear sense out of it? GM is not sacrosanct. Moreover, once commitment is made to multiinstantiation of abstract functions, then one is left with the somewhat hopeless task of specifying criteria for individuating mental *states*. Is the state identified with the belief that the pig is to the right of the elephant a *different* state than that identified with the belief that the elephant is to the left of the pig? Does each *belief-ascription* necessitate an ascription of a different mental *state*? The above may be construed as ascriptions of different beliefs, since we do seem to individuate beliefs by their content-description, but does this do the trick for picking out mental *states* (in the relevant sense for identification) as well? Answers are needed if specifiable mental states are to be identified with *anything*, including instantiated functional states or abstract Platonic spooks. The same holds for alleged mental events and processes.

The vocabulary of the mental *might* contain specific references around which parameters of successful reference would need to be forthcoming. But to *assume* for each mental ascription there is *thus* a distinct mental referent, and then to launch a hunt for the appropriate physical treasures is to really set yourself up: if the fountain of youth is not a *physical* fountain, then what must *it be*?

Part III

To sum, then. The prima facie attractiveness of GM, I suspect, has been due initially to the physicalist's understandable obsession to characterize an individual capable of mentality as one on a par ontologically with a system which is devoid of intentional features. And the intentional conservatism of GM complements nicely this desire, for it demands that for every independent mental ascription made one issues a mental I.O.U., so to speak, to be repaid by independent, nonmentalistically characterizable features in the system. Each and every loan must be settled (theoretically) by distinct empirical verifications, or should never be taken out in the first place; the only alternative seems to be a nonphysicalist one.

My attack has been on this presupposed dichotomy, which demands of a physicalist that he either throw in with the adherents to GM or he contradict himself by selling out to the enemy. By arguing that overall functional strength must make apt our mental ascriptions

[8] William G. Lycan, "Mental States and Putnam's Functionalist Hypothesis," in *Australian Journal of Philosophy*, 52 (May, 1974), p. 61.

I've simply reasserted the general physicalistic position that it is the physical construction and design of a system that really counts. But by arguing that each *specific* mental ascription need not be construed as referring to a distinguishable feature in the system, but only to the individual system whose behavioral prediction can be facilitated by making the ascription, I avoid having to specify grounds for *each* independent mental ascription in terms of the physical composition or functions present in the system and accordingly verifiable on inspection.

The grounds for the mental ascriptions are rather pragmatic, of course; if they serve well *another* in her predictions, if she cannot do as well without the ascriptions, then they are warranted. Unwarranted mental ascriptions are, *ex hypothesis,* those which are otiose. Why this endowment which facilitates accurate prediction *holds for this system* will be unpacked in terms of its specific system-design, its general functional strengths, etc. So any *change* in mental ascription of the sort "at time t_1 S believed that p, but now (at t_4) S does *not* believe that p" will require a change in S's physical description from t_1 to t_4. But if, in addition to our ascribing to S the belief that p at t_1, we ascribe to S also the belief that q at t_1, we are not now constrained to pick out two (or more) specific features of S's physical state in order to pin down (through identification) the two independent mental ascriptions. Likewise, for two or more systems who share mental ascriptions, who both believe that p at t_1: *they need not* share a relevant nonmental characterization at t_1.

I submit that most (if not all) versions of the identity thesis run together three distinct questions in their eagerness for an ontologically benign category of the mental; each is extremely important and must be sorted out by any clear physicalistic theory.[9] They are:

(1) Can two (or more) individual systems share mental ascriptions (for instance, can both believe that p) without sharing any relevant nonmental descriptions?

(2) Can a mental ascription *come to be true* of a system (can the system change in its intentional characterization) without some relevant nonmental description changing?

(3) Must there be (according to any physicalistic theory) *independent* nonmentally characterizable features of a system for each *independent* mental ascription made to it?

Running these questions together generates appeal for the GM rule, and one way of showing that common versions of the identity thesis which accept GM overstate the physicalist position is by way of unpacking the above questions in light of a highly general

[9] Special thanks go to D. C. Dennett for pointing out these distinct questions.

physicalistic model. I have tried to show that (1) is to be answered "yes," (2) and (3) "no."

To conclude on a more formal note, the semantics of the position I have argued for can be approximated by eight basic axioms regarding mental ascriptions made to individuals and their relationships to corresponding physical descriptions of these individuals. In fact, a fruitful way to clarify various theories of the mental would be to carefully specify how each views such relationships.

Let's first interpret a list of *predicates* (monadic and polyadic) as follows:

Let "M" be "is justifiably ascribed *m*" (where "*m* is a particular mental, or intentional, idiom or expression: "a belief-that-*b*." "a desire-for-*a*." "a memory-that-*b*," etc.). The sentence "Mx," for instance, tells us that the sentence "x is justifiably ascribed *m*" is true, or that the mental ascription "x *m*′ *s*" —e.g., "x believes that *p*"—is justified.

"A" is "is the subject of several justifiable mental ascriptions."

"C" is "has a physical composition describable in ways that in some relevant sense "correspond to" each justifiable mental ascription made to the system" (where "correspond to" can be spelled out in whatever nontrivial way the particular GM adherent wishes).

"P" is "is in some determinable physical state" (described structurally, functionally, or what have you).

"S" is "is in the same (relevant) kind of physical state as" (shares a structural state-description with, or shares a functional state-description with, etc.).

Let the variables "x" and "y" range over individuals, or individual systems, and "t" range over times, to be written with or without subscripts signifying "before" and "after" temporal relations.

The axioms:

A1	(x) (t)	$(Mxt \supset Pxt)$
A2	(x) (y) (t)	Poss. $[((Mxt \ \& \ Myt) \ \& \ (x \neq y)) \ \& \ -Sxyt]$
A3	(x) (y) (t)	Poss. $[(Mxt_1 \ \& \ Myt_2) \ \& \ -Sxyt_1{}'t_2]$
A4	(x) (y) (t)	$[(-Mxt_1 \ \& \ Myt_2) \supset -Sxyt_1{}'t_2]$
A5	(x) (y) (t)	$[(Mxt \ \& \ Sxyt) \supset Myt]$
A6	(x) (t)	Poss. $[Axt \ \& \ -Cxt]$
A7	(x) (t)	$[Axt \supset Mxt]$
A8	(x) (t)	$[Cxt \supset Pxt]$

A1 is probably the weakest physicalistic demand, viz., that every individual capable of a mental ascription is a physical system, or one

subject to some determinable physical characterization. The remaining seven axioms, however, spell out more carefully how mental ascriptions involving one or more systems over a period of time relate to nonmental characterizations of their physical states. A2 implies an affirmative answer to question (1), A4 a negative answer to (2), and A6 a negative answer to (3). The formal semantical details would have to be developed more fully, of course, but any refined physicalistic theory would need to be clear on the relationships mentioned in these axioms. Otherwise, such a philosophical model runs the risk of overstatement and oversimplification, vices that continue to plague nowadays a good many theories.

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