Soul, Psyche, Brain: New Directions in the Study of Religion and Brain–Mind Science

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CHAPTER TWO

Brain, Mind, and Spirit—A Clinician's Perspective, or Why I Am Not Afraid of Dualism

JAMES W. JONES

Physicalism reigns supreme. Even theologians have rushed to embrace it. Not the "greedy" (Dennett) reductionistic physicalism of yore but a new, kindler, gentler physicalism called (of course!) "nonreductive physicalism." Rather than the militantly antireligious drive of earlier reductive materialists, the new nonreductive types insist that theirs is a position fundamentally affirming of the religious and moral life (Brown et al. 1998). Rather than eliminating the features of human life on which religion depends, this form of physicalism affirms that "consciousness and religious awareness are emergent properties and they have top–down causal influence on the body" (Murphy 1998, p. 131). "The long-banned subjective states and qualities are now put up front—in the driver's seat as it were . . .," enthuses one of this position's most famous spokesman, the Nobel laureate Roger Sperry (1991, p. 244).

I fail to share this enthusiasm. Not because I am an eliminative materialist or a Cartesian dualist. Far from it. Rather because I am, among other things, a clinical psychologist practicing and teaching in the area of psychoneuroimmunology (or behavioral medicine), as well as teaching religious studies. Working directly at the interface of the body, the mind, and the spirit, with suffering patients, gives one another perspective on the neuroscience and religion discussion. In brief, my argument will be that the nonreductive physicalists' account of consciousness and the spirit as emergent or supervenient properties is not adequate to the data of psychoneuroimmunology. Advocates of this position make a point of affirming the reality of "top–down" causation from mind to body and not just "bottom–up" causation from brain to mind. An affirmation at the heart of mind–body medicine. However, my contention will be that nonreductive physicalism, as currently formulated, cannot account for such top–down activities of the mind.

What Needs to be Explained

Hypnosis

For several years I have practiced clinical hypnosis as part of my behavioral medicine work. I have found it particularly effective in the treatment of anxiety, chronic pain, stress-related disorders, and smoking cessation. My claims in this chapter go beyond clinical anecdotes. Hypnotic interventions have been extensively documented to be effective in these areas (Brown and Fromm 1987). Central to my own practice has been the use of imagery. For example, having patients imagine they are warming their hands over a fire has been shown to increase the blood flow to their hands and so dilate blood vessels. This may help in relieving vascular headaches. Or, in reverse, having patients imagine putting their hands in a bucket of cold water can induce a numbness in the hands, which can be transferred to other parts of the body and so serve to relieve chronic pain (Barber 1996). It is common to remove warts by having the patient imagine them gone (DuBreuil and Spanos 1993). Research has also documented that by using imagery under hypnosis, a person can impact the functioning of his or her immune system (Rurzyla-Smith et al. 1995; Wood et al. 2003). Brain scans of subjects undergoing hypnotic interventions for pain modulation and emotional arousal reveal consistent effects of hypnotic suggestions on the relevant brain centers (Feldman 2004).

It is hard to interpret such findings in any other way than as illustrating the power of mental imagery to affect the body. A person forms a purely inner, mental act (an image) and the *following* result is that the blood pressure changes, or pain sensations decrease, or other physiological processes alter (Sheikh et al. 1996). In light of such practices, it is hard for me to deny that inner, mental activities can control physiological processes. The question for this chapter is the extent to which nonreductive physicalism can account for this.

Biofeedback

Biofeedback often uses interventions similar to those used in hypnosis. But biofeedback goes beyond clinical hypnosis in documenting the effects on the body. Employing imagery, direct instructions for calmness, and various relaxation techniques, biofeedback demonstrates under laboratory conditions that imagining a relaxed state, or heaviness in the limbs, or images of light or color, or prescinding from active thought can reduce heart rate, change skin conductance, relax musculoskeletal tension, and even shift brain wave patterns (Basmajian 1983; Green and Green 1977; Schwartz and Beatty 1977).

The demonstrated capacity to control one's brain waves is most philosophically interesting. Reductive physicalism, and perhaps all forms of physicalism, attribute primary causation to physical factors, that is brain

activity. It is certainly true that changes in electrical activity in the brain correlate with and may be said to cause mental activity in many circumstances. EEG biofeedback of electrical activity in the brain implies that under other conditions, understanding a set of instructions or forming a mental image comes first and is reliably *followed* by changes in patterns of brain activity (Green and Green 1977).

In addition, brain scans comparing subjects visualizing an object with subjects actually seeing the object show differential blood flow to the visual cortex (Kosslyn et al. 1993). Likewise, brain scans comparing hearing music played with a hypnotic hallucination of hearing music and simply imagining hearing the music show that imagining an experience produces a different neuronal pattern than actually having the experience (Woody and Szechtman 2000). In all these cases, it would appear that mental activity (imagining a sound or image) is the primary cause of changes in brain activity and that one can learn to intentionally control his or her brain waves and other neuronal activities.

Other clinical interventions also reveal the possibilities of consciously affecting one's neurophysiology. For example, studies have shown that consciously choosing to redirect attention and act against powerful compulsive urges not only effectively treats obsessive–compulsive disorder (OCD) but also modifies the underlying neuronal circuitry. Brain scans of patients successfully treated for OCD by such cognitive–behavioral treatments reveal significant changes in their cerebral physiology (Schwartz 1999). Similar results have been shown in the treatment of depressed patients. Here too, active psychological interventions have produced measurable and significant alterations in cerebral activity directly attributable to intentional cognitive changes and reliably associated with relief from depression (Goldapple et al. 2004).

While reductive physicalists insist that consciousness is but the result of cerebral functioning, the results of biofeedback, hypnosis, and brain scans of patients treated with active psychological interventions demonstrate that consciously choosing to form an image, redirect attention, refocus thoughts, act differently can directly affect basic cerebral activity. What is the cause and what is the effect here?

Meditation Research

Meditation-derived techniques have been increasingly deployed in the practice of behavioral medicine. The last two decades have witnessed an exponential increase in the number of articles detailing the psychophysiological effects of meditation (reviews by Marlett and Kristeller 1999 and Andresen 2000). For some time now, the clinical literature has described the effectiveness of meditation-derived techniques for the treatment of anxiety disorders (Kabat-Zinn 1990; Kabat-Zinn et al. 1992), stress (Carlson et al. 2003; Kabat-Zinn 1990; Shapiro et al. 1998), and, more recently, eating disorders (Kristeller and Hallet 1999), depression (Segal et al. 2002), and

personality disorders (Linehan 1993). More recent psychophysiological research has demonstrated the impact of meditation on such basic physiological functions as brain hemispheric lateralization, immune system functioning, and emotional processing. Even short-term meditation practice has been shown to increase activity in the left cerebral hemisphere (a result associated with an increase in positive emotional responses) and improve immune functioning (Davidson et al. 2003; Goleman 2003). More advanced meditators have demonstrated, under laboratory conditions, the ability to control fundamental physiological processes, such as basic reflexes, formerly thought to be beyond conscious control (Goleman 2003). Studies have also shown that a variety of cognitive processes can be altered through regular meditation practice (Deikman 2000; Goleman 2003). Meditation has been shown to dramatically improve the mind's ability to focus and maintain attention, and to develop the capacity to detach from engrained emotional and cognitive reactions to familiar thoughts and feelings. This has been demonstrated to be important clinically in weakening and modifying long-standing patterns of anxious rumination, depressive thinking, addictive attachment, or reactive anger. Such meditation-based cognitive changes facilitate the emergence of self-regulatory functions that are experienced as healthier, saner, and more balanced (Austin 1998). Thus, the conscious choice to undertake a meditative discipline impacts a variety of physical and psychological domains.

What does psychoneuroimmunology contribute to the brain, mind, spirit discussion? It would appear to rule out a Cartesian dualism in which the mind or spirit are seen as disconnected from the body. It also seems to rule out an eliminativist physicalism in which mental activity is regarded as epiphenomenal and irrelevant to neurological and physiological functioning. At minimum, it also sharpens the idea of "downward causation," and suggests that a rather strong notion of mental causation is essential to a complete understanding of the role of the mind. The kind of self-regulation currently being demonstrated in psychophysiological laboratories and clinical practice, involving hypnosis, biofeedback, and meditation, demands a robust account of mental causation. The question for this chapter is whether the model of nonreductive physicalism can provide a strong enough account of mental causation.

Nonreductive Physicalism

Arguments in support of nonreductive physicalism must go beyond simply describing the functioning of neural organizations or pointing out correlations between conscious events and neuronal activity. Reductive physicalists, nonreductive physicalists, and dualists, all agree about the functioning of various neurotransmitters, the growth and decay of neuronal cells, and (because of sophisticated EEG monitoring and brain scans) which parts of the brain are more active or more quiescent during various mental activities.

There is little dispute these days about these findings. They are a major part of the data of contemporary cognitive neuroscience and psychophysiology.

Nonreductive physicalism, like its cousin, reductive physicalism, and its antagonist, dualism, is not simply a set of experimental findings. It is, rather, the interpretations of these findings. And, as the history and philosophy of science amply demonstrates, most significant scientific disputes (as well as most contemporary disputes between science and religion) are not about the data but rather about how the data are to be interpreted. For the most part reductive and nonreductive physicalists, and even today's dualists (Eccles 1982; Penfield 1975; Popper and Eccles 1977), agree on the results of current neuroscience experiments. Their disagreements are about the interpretation of these findings. So these disagreements will probably not be settled by appeals to experimental data (on which they all virtually agree) but rather to which position gives the most complete, coherent, and compelling account of that data. This chapter will argue that nonreductive physicalism does not appear successful on that score.

Two constructs have been recently added to the discourse of physicalism to make it nonreductive: emergence and/or supervenience. The category of "emergence" has spawned a metaphysical vision of a hierarchical universe with the higher levels "emerging" from of the lower ones (for a recent review of this discussion, see the *Journal of Consciousness Studies* 2001, devoted to the topic of emergence and Russell et al. 1999). Such a metaphysical position has obvious applications to the problem of consciousness. Roger Sperry writes that the central nervous system is "governed by novel emergent properties of its own" (1991, p. 246). Consciousness is "no longer a mere impotent epiphenomenon of brain activity. It becomes a powerful impelling force in its own right" (p. 239). Conscious agency emerges from neuronal organization and then exercises control over it.

This emergent power of consciousness necessitates a new model of causality, which "combines traditional bottom–up with emergent top–down causation," and in which mental activities "exert a concomitant supervenient form of downward control over their constituent neurocellular activities" (p. 239).[1]

Like Sperry, Philip Clayton also draws on the metaphor of emergence to conceptualize the relationship of the mind and the brain. For Clayton, emergence is less about novel properties and more about new levels of explanation.

> A property is thus emergent only if laws cannot be formulated at the lower level that predict its occurrence and subsequent behavior . . . A set of phenomena is designated as emergentist only when an exhaustive description of the underlying state of affairs, although necessary, is not sufficient for explaining emergent properties. (1999, p. 201)

Labeling consciousness "emergent" means that it cannot be completely explained in terms of neuronal processes. Clayton calls this "the

insufficiency thesis," which "predicts that neuroscience will *not* be sufficient to explain all that we come to know about the human person" (p. 188). Restricted to explanations using only the categories of neurophysiology, the neurosciences can never completely explain domains that emerge out of, and therefore go beyond, sheer physiology. "Without questioning the dependence on the physical," Clayton writes, his position "understands mental properties to be different in kind from those observed at lower levels and to exercise a type of causal influence unique to this new emergent level" (p. 203). Emergence means that something genuinely new, unique, and unpredictable can arise from within the natural order.

Like Sperry, Clayton affirms the reality of downward causation as an emergent property. But neither thinker specifies in detail how such causality might work. In a footnote (p. 195), at least, Clayton recognizes the problem. There he suggests that accounting for the causal influence of ideas would require "nothing less than a new theory of causality," because such a claim "diverges from the standard use of the term causality in science."

In the first instance, the category of emergence appears concerned with hierarchies of explanation since the strongest arguments in its favor appear to say that at each level, new categories of explanation are required. This is part of a much larger discussion in the philosophy of science about whether the theories of particular sciences can all be reduced to or derived from fundamental theories of physics. This seems highly unlikely. Chemistry requires categories beyond those of physics; biology requires categories beyond those of chemistry; and the study of consciousness (Clayton maintains) requires categories that are "irreducibly psychological" (p. 205).

But Clayton is not satisfied with a purely epistemological argument about the irreducibility of explanatory theories. He moves directly to ground this emergent hierarchy of explanations in ontology. Clayton advocates a "pluralistic ontology" in which the physical domain consists of a variety of entities, some of which may be rather different from what we think of as physical in our ordinary sense. He calls this "property pluralism," but this remains a form of "monism," Clayton writes,

> One's overall ontology should be monist. There is only one natural order, although it includes many different types of things. Mental causation is not supernatural; it is natural. It is thus amenable to explanation in this-worldly terms, although at least part of the explanation will need to employ irreducibly psychological concepts. (p. 205)

In other places, he refers to his position as "emergentist monism" because "monism asserts that only one kind of thing exists . . . monism is a necessary assumption for those who wish to do science" (p. 209). Despite this commitment to monism, Clayton rejects the appellation of physicalism, for "human persons, correctly and fully understood, include a spiritual dimension which, whatever else it is, is more than physical" (p. 212). He is clearly struggling with the problem of continuity and discontinuity within nature.

Science requires continuity and the category of monism supplies that. But theology and spirituality require a degree of discontinuity in order to avoid a hard reductionism. The category of emergence is relied on to provide the necessary degree of discontinuity in order to make such realities as downward causation comprehensible.

Both Sperry and Clayton clearly and forcefully wish to maintain the reality of the spiritual domain. Both recognize that some notion of mental causation is a necessary component of that domain. While Sperry appears to rely mainly on rhetoric, Clayton attempts to work out a more complete metaphysical picture with emergence at the center. The question here is whether their category of emergence can do all the work required of it in order to affirm a robust model of mental causation. This essay will respond with a reluctant "no."

Is Consciousness an Emergent Property?

Clearly, complex systems possess properties that their component parts do not: words, cells, and water have properties that emerge out of the organization of their letters, their macromolecules, their atomic constitution. What, then, are some of the characteristics of an emergent property? At least three minimal conditions must be present. A1 can be said to be an emergent property of system A if:

A1 cannot exist without A.
A1 has constituent elements in common with A.
A1 has characteristics not possessed by the individual components of A.

This would clearly describe the relation between words and letters: a word is a system of letters and it cannot exist without the letters, and both the letters and the word are linguistic, often written, forms. Or the relation between a cell and its chemicals: a cell is a system of chemicals and it cannot exist apart from the chemicals, and the cell and the chemicals that make it up are both composed of atoms and molecules. Or that between molecules of water and the atoms of hydrogen and oxygen; water cannot exist apart from hydrogen and oxygen and both are composed on subatomic elements. But note that all these examples involve properties emerging from systems composed of similar entities (letters, chemicals, atoms).

However, if we say that consciousness is an emergent property of a system of neurons, we run into immediate problems.

1. The claim that consciousness cannot exist apart from the brain is one of the things that such a model was supposed to demonstrate. An argument that begins by assuming this tenet may be simply circular and may end up concluding what it has already taken for granted. However, we might grant that consciousness may not exist apart from

the brain in order to go on and explore the logic of this model. We must beware of using this model, however, to argue that consciousness cannot be separate from the brain since this model of emergent properties seems to depend on precisely this claim.

2. A more serious problem exists: the second assumption points out that this emergent model of the mind depends on the assumption that minds and brains are at least partially similar. Calling this position a form of physicalism underscores this assumption. If all that is real about human nature is physical, and consciousness is real, it too must be in some sense physical, that is, it must in some sense be not just correlated with but rather similar to physiological activity in the brain.[2]

Such a claim has serious logical difficulties. In what sense can thoughts and neurons be said to be similar enough to be parts of the same system? Practically none. Consider:

(a) Neurons and other components of the central nervous system, like all physical entities, are always described in the categories of space and time. Thoughts and images are never described, except perhaps under poetic license, in terms of their mass, energy coefficient, or width.

(b) I may make a claim about the neurons in my brain—their number, density, organization, or development and be mistaken about it. As philosophers have pointed out for centuries, I cannot be mistaken about the ideas or sensations I have in my mind. If I say I feel a pain in my foot, I cannot be mistaken about feeling such a sensation, even if I do not have a foot.

All of this is so obvious that it is a little silly to repeat it except that it seems to be a fatal blow to the emergent model of consciousness, and any physicalist position, no matter how "nonreductive." If thoughts and neurons are neither described in the same categories nor governed by the same logic of explanation, in what sense can they possibly be even partially similar? And if thoughts and neurons are not at least basically similar, in what sense can thoughts be understood as a property of a system of neurons? Certainly not in the same sense that a word can be understood as a system of letters or a cell as a system of chemicals. (An oft-cited critique of this theory on which the system's model appears to depend can be found in Nagel 1974; Poulton 1973; see also Watkins 1982.)

Put most starkly, a thought is not a thing. As philosophers have noted for centuries, the sensation of seeing red is not reducible to or translatable into statements about wavelengths, rods and cones, or neuronal processing (Chalmers 1995; Robinson 1976; Velmans 2000). No description of physics or neurology can lead from there to a description of the experience of redness. They are simply two separate and distinct linguistic systems. One of the claimed advantages of the emergent model in contrast to dualism is that it

removes the dilemma of specifying how mind and brain, spirit and matter, are connected. Renaming consciousness as an emergent property may not account for the emergence of consciousness without some way of specifying how two such different things as thoughts and brains can be aspects of a single system. Of course, the nonreductive physicalist wants to claim that both thoughts and brains are, in some sense, physical. But my point is that specifying in exactly what sense images, thoughts, intentions are themselves physical (as distinct from simply possessing physical correlates) is far from clear. We will return to this point again and again in the coming pages.

The model of an emergent system's properties is supposed to be simpler than its competitors, but it is not clear in what sense this simplicity is a virtue if it provides no explanation of the process that most needs explaining—the connection of neuronal states and conscious states. As fervently as the proponents of this model might hope otherwise, it is not clear that just calling consciousness an emergent system's property removes the need (which dualism also has) to provide a theoretical bridge between brains and thoughts.

Supervenience

Nancey Murphy is less happy with the metaphor of emergence; she prefers the category of "supervenience" (1999b, 1999c). Supervenience defines a dependent but nonreductive relationship between properties: Property G in Domain A is said to supervene on Property F in Domain B, if an x instantiates G is in virtue of x also instantiating F under circumstances c (Murphy 1999a, p. 150). For example, the property of being a penny supervenes on being a copper disk with Lincoln's head under the circumstances of being minted by a legitimate U.S. mint (p. 150). Thus, there is a "*codetermination* of the supervenient property by the subvenient property or properties and the circumstances" (p. 152). The property of being a penny is codetermined by the circular, copper disk and the U.S. currency laws. Neither the physical properties nor the legal context by themselves make something a penny. Thus, context or circumstances can be genuine determining factors for a given property.

Since supervenience "reflects both dependence and nonreducibility," it "gives us a way of talking about the genuine dependence of human characteristics on the brain, but leaves room for the codetermination of *some* of those characteristics by the external world, especially by culture" (p. 151). On this definition, downward causation exists when a more encompassing set of circumstances effect lower level processes. For example, macroevolutionary processes select for some DNA sequences and not others. Thus, macroevolutionary processes cause some DNA sequences to survive and not others. Selection produces termites with strong jaws and therefore causes their DNA sequences to survive and reproduce (Murphy's example, p. 155).

This position is clearly dependent on that of the philosopher Donald Davidson who she quotes with approval. Davidson argues that the following are observed in downward causation:

1. All higher level processes are restrained by and act in conformity to the laws of the lower levels.
2. Higher levels require lower level processes and structures for their implementation.
3. The emergentist principle. Higher level processes cannot be completely described by the laws and terms of the lower levels. This is a principle of nonreducibility.
4. Laws operating at the higher, organism level, like natural selection, determine events at the lower level, for example, which DNA sequences survive (pp. 155–156).

Applying this to the issue of mental causation, Murphy argues that the macro context of culture provides us with reasons to think, or conditions us to think, that, say, $7 + 7 = 14$ as part of a larger systems of arithmetic. This learning gets instantiated in our brains and in our cognitive processing systems according to the laws of learning and memory, which every beginner in psychology learns. So, when asked what $7 + 7$ is, I immediately think of 14. Hence, my thinking processes supervene on my neurological processes, but it is not sufficient to answer the question of why $7 + 7 = 14$ by simply describing the neuronal activity in my brain. I must also give reasons in terms of the rules of arithmetic. Thus, it is permissible to claim that reasons and reasoning are not simply illusory but have a real effect on our lives in the world, in this case on how we perform addition. The same reasoning, Murphy argues, can apply to moral reasoning. The moral principles and reasons we have been taught, likewise, can be said to affect our lives. These reasons are causally effective not because they directly act on the neurological architecture (Murphy explicitly rejects any such claim!), but rather because culture and learning have linked these cognitions to certain neural–physiological activities.

So supervenience captures a certain relationship between properties, and the way in which a larger context impacts upon lower level processes. Since the lower level physical processes may underdetermine the macro properties (not every copper disk with Lincoln's head is a penny—the one I stamped out in my basement clearly isn't), the subvenient property can cause the supervenient property without determining it. But such underdetermination is not the same as top–down causation, a fact that Murphy herself acknowledges when she says directly "I reject all moves to make supervenience or realization a causal relationship!" (p. 154).

Where, then, does this leave the issue of mental causation? Focused primarily on relationships between properties, the category of supervenience alone cannot speak to that. Murphy attempts to answer this question

directly in an article entitled "Downward Causation and Why the Mental Matters." She rejects Sperry's claim that higher level, emergent mental processes "overpower" or "over rule" lower level physiological processes (1999b, p. 15). Instead, she begins with a crucial distinction between structuring and triggering causes. Triggering causes are the brute physical processes; structural causes direct, channel, and structure the physical processes. Electrical impulses travel through my computer according to the general laws of physics, but the software directs those electrons in certain patterns. Impulses travel between the neurons according to the laws governing the movement of ions through the neurons. But these impulses are structured by the density of the neurons, the amount of neurotransmitters, the strength of the impulses (p. 15).

Mental causation is an example of structuring causation. "Downward causation is not overpowering but selective activation of lower-level processes" (p. 17). A similar position can be found in the works of Meyering (1999) and Van Gulick (1993). This argument depends on an interesting definition of causality. We usually think of causality as a relationship between events. The event of my striking the ball with a cue causes a second event of the ball moving across the billiard table. Murphy proposes "that we enrich our resources for understanding causation by countenancing the causal role of properties of *entities* or *objects*, along with the causal role of events" (1999b, p. 14).[3] This allows her to argue that the property of the brain (an object) having a certain structure can be a genuinely causal factor. So the property of a set of neurons being linked in a certain pattern can be said to cause the electrical activity in my brain to be channeled in a specific way, thereby causing me to think and act in a specific way. But how does this set of neurons acquire this property of being organized in this certain way? In some instances, it may be from the top–down effect of the environment on the brain. Remember the earlier discussion of supervenience in which the larger context (e.g., culture or the environment) structures our neurological activity. "The neural system—because of its plasticity—can be *trained* to perform various operations. Much of this training is thought to happen by means of feedback from the environment" (p.18). As time goes on, this training establishes certain cognitive structures (language, rules of calculation, cognitive schema, and so on). Thus,

> A cognitive process supervenes on a *pattern* of neural activation. These patterns also act in a downward way. Over time the pattern itself activates or deactivates component causal capacities . . . No laws governing operation of the system at the micro level need to be violated; rather, some of the original causal pathways are simply disused. (p. 17)

This appears to be essentially a presentation of a theory of how learning and memory get encoded neurologically. It is not clear how this is really a theory of intentionality and mental causation. Basically, this sounds like a conditioning model of learning applied to the brain. But Murphy goes

beyond simple conditioning by arguing for a kind of self-regulation—a "supervisory system" or a "meta-organizing system," which is a higher level in a hierarchical model of cognitive processing. She seems to be making the traditional argument in cognitive psychology that intentionality and consciousness can be understood as increasingly complex systems of feedback [this appears to me to be the obvious conclusion of her increasingly complex diagrams (p. 20)]. But the claim that consciousness and intentionality can be completely described with the metaphor of feedback loops is far from settled (Jones 1992).

Murphy's idea of structuring causation (which is shared by Meyering and Van Gulick) may be a possible account of the physiology of downward or mental causation. But it is not compelling if the very concept of downward causation itself is flawed, at least when positioned in a nonreductive physicalists framework. The ordinary account (some would say "folk psychology account") of mental causation again suggests that two *events* are causally related: a mental event (the thought "It is raining, I best take my umbrella") and a physical event (I pick up my umbrella). This implicit dualism is said to shipwreck on the lack of an explanation of how the mental can causally impact on the physical; how a mental idea can cause my muscles to contract and my arm to move. The physicalist does not have that problem. Since the mental event is a physical event, there is no problem explaining how one physical event can cause another. The problem is accounting for the consciously experienced connection between the mental event and the physical act. For Murphy, that connection appears to be explained by the laws of learning and conditioning. We learn to associate perceptions of rain with reaching for an umbrella. This conditioning sets up *two* sorts of associations or connections: *first*, between certain neuronal connections and the learned conjunction of rain and reaching for umbrellas *and second*, simultaneously, between those neuronal connections (that connect the two physical events of perceiving rain and reaching for an umbrella) and the thought "it is raining" and the intention to reach for an umbrella. Thus there is, in reality, a rational, learned conjunction between the mental event "it is raining" and the act of reaching for an umbrella. But the thought does *not* cause the action, rather it is conjoined to it or, as Murphy would say, the thought supervenes on the neural physiology of perceiving rain and picking up an umbrella. But, and this is the crucial point here, the mental events as mental are not causative; rather, it is only their physiological substrata that has direct causal connections with the larger neural–physiological domain. As a supervenient (or emergent) property, the mental cannot be exhaustively described in the language of neural physiology alone. And so it acquires an explanatory autonomy while the causal processes are entirely neural physiological (this is based on Murphy 1999a, p. 14). The experience of mental causation is thus artfully defended while the reality of mental causation as mental realities exerting a causal influence is denied. The discourse of thoughts and intentions is explanatorily relevant to human behavior but mental properties or entities are not causally efficacious on human behavior.

Murphy rejects Sperry's assertion that mental processes can overrule physiological ones. In her discussion of supervenience, she explicitly denies that supervenient properties are causal. Supervenience is a conjunctive relationship, not a causal one. That would seem to eliminate mental causation entirely. Mental processes are important because they are conjoined to physical processes and because they provide "reasons" for our actions. But they do no causal "work" in the physical world. [A similar critique is often made of Davidson's position, see Heil and Mele (1993).]

Of course, to the physicalist, the "folk psychological" account of mental causation is wrong to begin with. It depends on an ordinary model of "event" or "entity" being applied to the mental realm. And, for the physicalist, there are no mental entities or domains. There is only the physical domain that gives rise to the experience of a mental life. But that experience of a mental life is really a physical reality, even though it cannot be exhaustively described in physical categories, even though it requires subjective language to communicate itself. But then again we seem to be back to the earlier discussion of the sense in which thoughts and intentions can be said to be physical—something nonreductive physicalism demands—given their obvious and irreducible differences.

In these discussions of downward causation in relation to the categories of emergence and supervenience, there appears to be a confusion between categories of explanation and causal agents. Most philosophers and neuroscientists agree that higher-order cognitive processes can only be described in categories that go beyond simple accounts of neuronal firings and neurotransmitter releases or synaptic organization. These higher-order cognitive and psychological processes require meta-level categories of explanation and description. I agree that is a sufficient reason for adopting metaphors of emergence and supervenience in our description of mental processes as opposed to a hard reductionist stand. But, as Dennis Bielfeldt writes, "Semantic irreducibility does not entail causal autonomy" (2001, p. 170). Bielfeldt goes on to quote Murphy's own acknowledgment that the language used "at each level cannot be reduced to that of a lower level, even though what happens at each level is uniquely determined by the coordinated action taking place at the lower levels, where it is fully described in terms of the lower level language" (Murphy and Ellis 1996, p. 28). This along with Murphy's rejection of supervenience as a "causal relationship" and Clayton's (correct, in my estimation) claim that mental causation requires a "new form of causation" that "diverges from the standard use of the term causality in science" suggest that supervenience and emergence, while adequate accounts of the relationship among *levels of explanation* required to account for conscious mental life, are not adequate to a robust account of mental causation.

Awareness

Murphy's theory of supervenience focuses primarily on the contents of consciousness—thoughts, reasons, intentions—some of which might readily

become linked to neurological processes in the quasi-conditioning way that she describes. Many authors (Chalmers, Hutto, Nagel, Velmans) suggest that the real problem of consciousness involves not simply its contents but rather the brute fact of awareness itself. And contrary to the physicalist's account, it is not so easy to see how awareness itself can be completely mapped neurophysiologically.

Consider the following thought experiment. It is probably not possible in practice, but it is easy enough to visualize. Suppose you are on an operating table with your brain exposed and a series of cameras and screens allow you to observe your own brain functioning. Since the brain itself carries little sensation, neurosurgery can be done with the patient awake. You notice the color red in the corner of the room, and at the same time you become aware of the neuronal discharge that represents the visual experience of seeing red. And you realize that the neuronal activity in the visual cortex is connected to the experience of seeing red. And, simultaneously, you notice the neuronal discharge that represents drawing the connection between the previous occipital activity and the experience of redness. And then—or simultaneously?—you see the neuronal correlate of drawing the conclusion that the previous neuronal activity represents drawing the conclusion about the experience of redness. And, of course, there would have to be a neuronal correlate of that conclusion, but again, where in the sequence would you see it? And where would you see the neuronal correlate of seeing that?

Why is this so confusing? Because you are watching your brain record the experience of watching your brain record the experience of watching your brain, ad infinitum. You see the brain configuration change as you think new thoughts, but what do you see that goes with the recognition that you are watching the brain configuration change as you think new thoughts? What neuronal activity would you observe that goes with the awareness of your awareness?

The sequence of observing one's own brain might be diagramed as follows, where N.S. stands for a neuronal state and C.E. for a conscious experience:

N.S.1 > C.E.1 (I see my brain)
[N S.1 > C.E.1 (I see my brain)] > [N.S.2 > C.E.2 (I am aware that I am seeing my brain)]
{[N.S.1 > C.E.1 (I see my brain)] > [N.S.2 > C.E.2 (I am aware that I am seeing my brain)]} > [N.S.3 > C.E.3 (I am aware that I am seeing my brain and the connection of that awareness to my brain)]
{[N.S.1 > C.E.1 (I see my brain)] > [N.S.2 > C.E.2 (I am aware that I am seeing my brain)]} > [N.S.3 > C.E.3 (I am aware that I am seeing *my* brain and the connection of that awareness to my brain)] >
[N.S.4 > C.E.4 (I am aware that I am seeing my brain and seeing the connection of that awareness to my brain and seeing the connection of seeing that awareness of my brain to my brain)]

It is harder to imagine mapping an increasing (hypothetically infinite) series of hierarchies onto the shifting linear configurations of neuronal activities when one of those hierarchies represents an awareness of those shifting configurations of neuronal activities and another hierarchy represents an awareness of that awareness of those shifting configurations. What is the state of the system that goes with observing that state of the system? The nonreductive physicalist's model of emergent or supervenient properties, in fact, may not do away with the paradoxical relation between cortical states and conscious experiences, especially when the conscious experience in question is of the cortical state that goes with that conscious experience of that cortical state.

Can Nonreductive Physicalism Explain Top–Down Causality?

Obviously, I agree with the nonreductive physicalists' assertion of top–down causality from mind to brain and then from brain to the other physiological systems that comprise the human being. This is a fundamental assumption of psychoneuroimmunology. And it is required to distinguish nonreductive from reductive physicalism. My concern is that even the strongest doctrine of emergence or supervenience cannot really provide a sufficiently powerful model of top–down causality to account for the findings of psychophysiology.

As noted before, the term supervenience denotes a conjunction between two sets of properties without having to specify the exact nature of these properties, except to say they can only occur in conjunction with one another. And, in addition, that one level is not easily (or at all) reducible to the other. The characteristics of water—its fluidity, ability to freeze or boil—supervene on its molecular structure. Presumably, any element that has that exact chemical composition (H_2O) would have the same properties. But these characteristics cannot be described by descriptions of oxygen or hydrogen alone. Or the meaning of a sentence supervenes on the sounds of its words. Presumably, any two sentences that sounded alike would have the same meaning. But the meaning cannot be described simply by descriptions of the phonetics of the sound. Or the beauty of the Mona Lisa supervenes on the arrangements of the pigments that compose it. And any similarly arranged set of pigments would be as beautiful. But that beauty cannot be described in terms of the chemistry of pigments alone. Note that so defined, supervenience simply requires conjunction and not causality. The supervening properties cannot be descriptively reduced to the categories applied to the micro properties. But that does not give them any ontological priority or causal efficacy. In this sense, supervenience is compatible with a diversity of positions from the interactive dualism of Popper and Eccles (1977), to the panpsychism of the Whiteheadeans (Griffin 1998, 2002), as well as nonreductive physicalism. By itself, the notion of supervenience does not address the central issue of this chapter—mental causation.

A sufficiently strong doctrine of top–down causation must go beyond simply describing the functioning of neural systems or finding correlations between conscious events of neuronal activity. It must assert that emergent properties now exert direct causal power over the lower levels—something Sperry (1991) does in fact assert very forcefully. In her discussion of supervenience, Murphy directly denies that supervenient properties are causal. However, in her piece on "Why the Mental Matters," she seems to suggest that mental properties can be downwardly causal (and not just conjoined with physical processes) but in a special sense—they provide structuring, not triggering causes. However, if the higher level properties can exert any kind of causality (triggering or structuring) over its constituent parts, this implies that the larger system has causal properties not derived from or controlled by the causal properties of the parts. In this case, that the mind has causal powers not derived from the causal properties of the neurons.

There are at least two questions to be raised about any claim of downward causation (Clayton's, Sperry's, or Murphy's). First, if these powers of causality are not entirely determined by the causal processes in the brain, where do they arise from? From where does the mind acquire the property of downward causation? It is certainly the case that the meaning of a word determines the order of the letters in that word, and that function of a cell determines the behavior of the macromolecules that make it up. In that sense, they are exerting a kind of downward causality. Is this the same as the kind of downward causality the mind demonstrates in biofeedback and the placebo effect? A stronger example might be the ways in which a society regulates the behavior of its members. But this would require seeing the brain as a society of neurons in a very strong sense and not just as a convenient metaphor. For the analogy of brain and society to really work, the neurons would have to be given a certain degree of autonomy and agency (or, perhaps, the mind–brain is a strictly totalitarian state). And that would just push the question down a level to the concern of where the individual neurons acquire this semi-autonomy from. Escaping the Scylla of reductionism only to come close to the Charybdis of panpsychism.

Physical science has assumed the macro features of a system are determined by the causal properties of its parts. The causal processes going on among its macromolecules govern what a cell can and cannot do. The meaning of the words govern what a sentence can and cannot mean. In most, if not all, cases of emergent properties, any causation at the macro level is derived from causation at the micro level. In none of these cases can the macro processes overrule or alter or even "structure" micro level causal activity. But in the case of consciousness, the nonreductive physicalist says that a new principle of causation, "top–down causation," suddenly appears and influences, if not overrules, the micro level processes.

On the issue of consciousness as a cause, the nonreductive physicalist appears to be in a no-win situation. He can maintain the common scientific position that all causality arises from fundamental micro level processes. But then, he would be practically indistinguishable from the reductive

physicalist. And then, mental causality becomes simply conjunction (between neuronal and mental events). Sometimes, when describing supervenience, Murphy sounds like this is her position. Thus, mental causation is effectively denied. Too weak a model of causation for mind–body medicine. Or the nonreductive physicalist can affirm a strong causal power of consciousness to overrule, or at least redirect, those micro level causal properties, but at the cost of leaving inexplicable the origin of this top–down causality.

And by claiming that macro level causality can act on micro level processes in ways at least semi-independent of micro level deterministic laws, he seems to be implying a violation of basic natural law. Of course, he might reply that these macro level causal powers are limited by the micro level properties, as the meaning of a sentence is limited by the meanings of the words that make it up. But that is exactly what a strong model of downward causation must deny. Hence, either downward causation must be weakened into insignificance or basic natural laws must be violated.

The second concern is that if brain processes can be overruled by a higher-order mental causation (as Sperry and perhaps Clayton suggest), then it would appear that the central nervous system is not really a closed, physical system. Again, Murphy denies that mental processes overrule basic physiology but at the cost of weakening, if not eliminating, any doctrine of mental causation. But the principle of the physical world as a closed system, not amenable to intrusions from beyond, is a major assumption of scientific physicalism. Of course, the nonreductive physicalist can assert that the mind too is physical, operating within the constraints of the physical world. But that brings us back to the earlier problems associated with any such "identity" theory. If you simply say that everything that is real is physical, and that consciousness is real, then consciousness becomes physical by definition. A tautology is all that has been produced here: that mental entities are real entails that mental entities are physical, because real is equivalent to physical. The problem has been solved by definition.

But a new problem has been created: what exactly is meant by physical? What are the limits of the physical in the nonreductive physicalist account? It would seem that the domain of the physical is without clear boundaries here, that there are no real criteria for what are genuinely, authentically physical.

The reductionist says simply that the physical is what is described by the physical sciences. Period. Here, the reductive physicalist has the virtue of simplicity. The nonreductive physicalist, on the other hand, needs to assent that mental properties cannot be completely described in terms of physics and chemistry. Otherwise, they would be reductive physicalists. Yet they also want to say that mental properties are physical? In what sense?

Once again, on the issue of consciousness as a cause, the nonreducive physicalist appears to be in a no-win situation. She can insist that mental processes are really physical and so the closure of the system of nature is not violated. But that claim borders on an identity theory that appears problematic for reasons discussed previously and undercuts any real difference

between reductive and nonreductive physicalism. Or she can reject the identity theory and stress the difference between mental and neuronal domains, and hence maintain her nonreductive stance. But then it becomes less clear in what sense her position is really one of physicalism.

These considerations leave me wondering whether nonreductive physicalism is really a coherent position. I'm not sure the nonreductive physicalist can have it both ways: trying the maintain both the reductive physicalist's tie to current natural science and the dualists' affirmation of conscious causality without either vicious reductionism or scientific incompatibility.[4]

In addition, it is clearly one thing to simply assert the arising of consciousness from neuronal activity, and something else to specify the actual processes by which that happens. Virtually all writers agree that no such account is currently available (e.g. Chalmers 1995; Hutto 1993; Libet 1982, 1996; McGinn 1989; Velmans 2000). Some go as far as to suggest that we cannot even conceive of what such a count might hypothetically look like. All attempts to do that based in contemporary science have had serious problems. Quantum theories have trouble finding places in which quantum events immediately appear in the ordinary world of brains and choices. Theories drawing on nonlinear dynamics and the emergence of complexity have trouble locating such processes in ordinary neurophysiology. Contrary to both quantum indeterminacy and chaos theory, the neurons in brains seem to obey deterministic biological laws. And, more to the point, advocates of quantum theories or nonlinear dynamics agree that such processes by themselves probably could not give rise to a strong version of downward causation (Scott 2004; Silberstein 2001). I do not want to push this point too hard. It is, after all, something of an argument from silence. The future may well produce a compelling scientific model of how neuronal processes give rise to conscious experience. But it should, at least, suggest a more humble and nuanced position than a plain assertion that consciousness is simply produced by the brain.

The Problem of Incompleteness

Before we consider the implications of this discussion for religion, we must note something about the nature of scientific theorizing, especially as applied to consciousness. Any present or future neurological theory of consciousness, including various forms of physicalism, will be incomplete in at least three senses.

Goedel's Incompleteness

My thought experiment involving the possible neurology of our awareness of our awareness points to another aspect of this problem. Essential to human consciousness is the self-reflexiveness that makes conscious accounts of consciousness possible. The mathematician and philosopher Kurt Goedel

demonstrated that formal systems of reasonable complexity cannot validate all their assumptions and claims and are "incomplete" in that sense. His investigations included claims within a formal system that referred to that system itself, thus involving him in the problem of self-reflexiveness and leading him to conclude that there is an inherent incompleteness in any account involving self-reflexiveness. In diagramming my thought experiment regarding the observation of the brain state that goes with observing that brain state, I created a set of Goedelian sentences (Findlay 1952), suggesting a possible incompleteness in every description of consciousness.

The application of Goedel's theorem to the problem of consciousness has a controversial history, much of it centering around a paper by J. Lucas (1964) in which he argues that Goedel's theorem makes a consistent materialistic philosophy of mind impossible (a position Goedel himself may have held) and thus supports a kind of dualism, almost by default [a discussion of the controversy and critique of Lucas can be found in Hofstadter and Dennett (1981), especially pp. 276–283]. While covering much of the same ground as Lucas, my discussion is not necessarily designed to argue for dualism, but rather only for incompleteness.

Experimental Incompleteness

Contemporary neuroscience has uncovered areas of incompleteness in the investigation of brain functioning—Penfield's failure to access or localize self-awareness, for example, or Libet's experiments, which appear to demonstrate a serious disjunction between sufficient neuronal activity and the correlated conscious experience (at least in the area of somatic sensations) (Libet 1967, 1978, 1982), or the lack of an agreed-upon theory of the transformation of neuronal processes into conscious experience (Chalmers 1995; Libet 1996, 1982). These may be resolved by further investigation. They may also reflect an incompleteness inherent in the subject under study.

There is a paradox in neuroscience: the primary instrument for studying the mind–brain is the mind–brain. Does that make neuroscience different from, say, physics or chemistry? It would probably be misleading to say that physics consists of electrons studying electrons or chemistry consists of chemicals studying chemicals, but it is not misleading to say that neuroscience consists of the brain studying the brain. The study of consciousness may contain a limitation that can never be completely resolved, since we are using the brain to study the brain and using the categories of cognitive processing to study the categories of cognitive processing.

This may parallel the dispute in physics about the "collapse of the wave function" in which experimental phenomena set limits on our knowledge of the subatomic domain in Heisenberg's "uncertainty principle." Schrodinger, Wigner, Jeans, and others suggest that the uncertainty principle not only puts an inevitable limitation on our knowledge of the physical world, but also points to the irreducible nature of consciousness, which has become an indispensable component in the experiments of quantum mechanics (Jones

1984; Morowitz 1981). Likewise, some gaps in our current neurological knowledge of consciousness may well be filled by further investigation; others may reflect intrinsic and abiding limitations on the field.

Put another way, in our investigations of consciousness, we never stand outside the domain of consciousness. Even the latest and most sophisticated brain scanning technologies still take place within the field of consciousness. Only a conscious and intentional agent can invent such machines, design experiments using them, gather the results, and interpret the data. Consciousness is presupposed in every experiment. It is never studied entirely from the outside; rather, all experiments and model building take place within the field of consciousness.

Theoretical Incompleteness

The issue of incompleteness is as much a philosophy-of-science issue as a neurological one. I have argued elsewhere (Jones 1981) that, as a matter of logic, no scientific theory can or will ever be complete. It is not a criticism of any neuroscientific model to say that it is not a complete account, for all theories are incomplete in several senses—for example, selectivity must limit a theory's range and scope.

Using the analogy of a painting: I can give a complete description of the chemistry of the pigments, but is that a complete account of Picasso's *Guernica*? Obviously not. Many aspects of the work are not touched by such a discussion. Each field-dependent analysis may be complete on its own terms but cover only certain aspects of the painting. [The analogy is discussed in more depth and detail elsewhere (Jones 1981).]

What are the implications of these different types of incompleteness for the model of nonreductive physicalism? As we have seen, the need to be in continuity with the worldview of mainstream science has created serious problems for nonreductive physicalism, especially because of mainstream science's commitment to the causal closure of the physical world. From a pragmatic perspective in the philosophy of science, such postulates as the causal closure of the physical world can be seen as heuristic instruments, not as inviolable natural "laws" (Jones 1981; Toulmin 1960). If all scientific claims are incomplete or limited in the senses just mentioned, this would apply to the model of nature as a causally closed system. For purposes of scientific investigation, the natural world is framed as a closed causal system. Part of the motivation of science is to see how much heuristic gain can be obtained from investigating the world on the assumption. Obviously a lot. But the explanatory successes of science may have blinded us to the inherent limitations of all human systems of knowledge and led us to regard such principles as the causal closure of nature as absolute truths rather than as exceedingly fruitful heuristic tools. If nonreductive physicalists could loosen the grip of the principle of causal closure on their thinking, they might be able to fashion a more coherent position. But, to be sure, one less in continuity with current scientific models.

Put more bluntly, science does not say that science is the only valid way to envision the world. Some scientists may hold that as an article of faith. However, such a claim is hardly an empirical one; no experiment could demonstrate its truth. Nor is such a claim necessary for the conduct of science. Many brilliant scientists have also held various, nonempirical, religious, and metaphysical views of reality, which have not interfered with their scientific work. The standing incompleteness—in the senses previously discussed—within all current (and I think future) neurological theories leaves room for multiple models of consciousness. No neurological account of the human person can be used to preclude all theological ones (Jones 1992).

Implications for Religion

The stark truth seems to be that natural science as currently conceived cannot provide a robust enough account of mental causation to account for the findings of research in behavioral medicine, meditation, hypnosis, and other fields of psychophysiology. Others have reached this same conclusion: Bielfeldt (1999b); Khilstrom (2002); Velmans (1996, 2000, 2002); as well as those philosophers who find nonreductive physicalism wanting on philosophical grounds. And Clayton seems to share it too when suggesting the need for a new theory of causation. If self-regulation research continues to be borne out (and I see no indications in the literature that it will not be), we may well have to revise our scientific consensus. We may be at one of those historical points where scientific research is uncovering data that cannot be adequately explained in the terms of the reigning consensus of what is "scientific." This might serve as a warning to those engaged in the science–religion discussion not to base all their theorizing on a model of physicalism that may be empirically fraying at the edges.

It could also mean that the future may hold a rethinking of what constitutes the physical. This is the stand of those who argue that only an expansion of what constitutes the boundaries of "the physical" can solve the problem of mental causation on physicalist terms. This is the position of the Whiteheadians such as David Griffin and those like Chalmers and Velmans who want to say that consciousness is simply another irreducible dimension of the universe. Another more radical option is to abandon physicalism and the doctrine of the universe as a closed system as metaphysical commitments (Bielfeldt 2001).

Religious people have additional intellectual resources to address the problem of consciousness. That is one of my assumptions here. For example, religious people for whom the system of nature is part of a larger and more encompassing reality need not, and probably should not, absolutize the metaphor of nature as a casually closed system.

In a more encompassing religious framework, proposed solutions to the problem of consciousness that make no sense in a more limited physicalist

framework become coherent. For example, Chalmers's (1995) and Velmans's (2000, 2002) proposals that there is an *urgrund*, which subsumes both consciousness and physical reality, makes sense in the context of those religious philosophies that have always affirmed that the physical world has a spiritual dimension or is the expression of a spiritual *grund*.

Or, meditative practices can train the practitioner to experience the ways in which consciousness gives rise to the thoughts and the categories through which we experience the world, including the scientific models we use to study consciousness. Such experiential knowing makes it harder to lose sight of the fact that in all our studies of consciousness we never escape the domain of consciousness.

Consciousness is presupposed in every human method of understanding. It is the final basis of every claim we make. In that sense, it pervades every object we know. In meditation, this theoretical assertion is given experiential validation; we may become aware that central to mind or consciousness (as they are known experientially) is the activity of generating our awareness and the categories that shape that awareness. This insight into the creative power of consciousness and its inseparability from everything we know is a window on a reality beyond the subject–object duality, the radiant *grund* from which the world as we know it springs. Such is the testimony of generations of Buddhist and Christian contemplatives, as well as those from many other traditions (Jones 2003).

Since they can now be placed within an empirically derived framework, values and beliefs and moral choices are acceptable to the nonreductive physicalist. One result of this is a Kantian reduction of religion to ethical behavior (Sperry 1991), or ethical behavior plus belief in a revealed, transcendent God (Murphy 1998). And certainly, many religions, especially monotheistic ones, might subsist on such a primarily ethical model of what religion is. But of course, all religions contain other traditions besides this purely ethical self-definition. Such traditions, which might loosely be called "mystical" or "contemplative," claim that within the depths of human consciousness is a window on the universal and the divine. In all religions, such a claim is presented as a quasi-empirical one—one that can be demonstrated within experience by those willing to undertake the requisite spiritual disciplines (Jones 2003). Those whose religious practice involves the immediate experience of the divine *grund* as well as ethical behavior may require a rather different understanding of human nature than that offered by nonreductive physicalism. Or, to put it differently, nonreductive physicalism, like all strict physicalisms, may provide too narrow a definition of human nature to support the full range and richness of religious practices and experiences.

Notes

In 1992, in *Zygon*, I published an article "Can neuroscience provide a complete account of human nature," which covers some of the same ground as here. This chapter is an expansion, elaboration, and up-dating of some of the points made there.

1. I have described and discussed Sperry's position at length elsewhere (Jones 1992) and will not repeat that discussion here.
2. Clayton maintains that his position is not a form of physicalism. But he affirms a naturalistic monism. So, if consciousness is not physical, it must at least be similar enough to what is physical to be part of the same system. Clayton does not specify what that similarity is. Sperry and Murphy both call their positions forms of physicalism.
3. This question of what constitutes a "property" or an "event" is exceedingly controversial in the philosophy of mind and is far beyond the scope of this chapter. See Heil and Mele (1993).
4. In many ways, my argument here follows that of J. Kim (1998), where he repudiates his earlier advocacy of the position of nonreductive physicalism. Clearly, however, I am using it in the service of a radically different position. And I am arriving at it more from the standpoint of clinical and experimental evidence and less from a strictly logical analysis. Also, after completing this chapter, I came across a paper by Dennis Bielfeldt (1999a), which covers much of the same ground as this chapter. Bielfeldt draws on Kim's work more directly and his concerns are theologically focused on using downward causation to explain divine action rather than to account for research in self-regulation and behavioral medicine.

   Kim's (1998) treatment illustrates the way in which the argument about physicalism and mental causation depends upon certain (rather robust) models of causation. This raises the further question of whether such strong (virtually classical) models of causation are compelling. Although he does not directly assert it, Silberstein (2001) implies that contemporary physics offers a rather different model of causation, which might be relevant to the issue at hand. In Jones (1984), in an analysis of the theories David Bohm, I also suggest a more open-textured model of causation. How such a new model of causality might impact our understanding of mental causation and the relationship of consciousness and the brain is way beyond the scope of this chapter. Sufficient to say, with as much caution as possible, that such more current models of causality will probably not produce a view of the physical universe as inimical to a religious vision as did classical models of causation (Jones 1984).

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