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THE BEHAVIORAL SCIENTIST *QUA* SCIENTIST MAKES VALUE JUDGMENTS

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ABSTRACT: I distinguish three matters about which decisions have to be made in scientific activities: (1) adoption of strategy; (2) acceptance of data, hypotheses, and theories; and (3) application of scientific knowledge. I argue that, contrary to the common view that only concerning (3) do values have a legitimate role, value judgments often play indispensable roles in connection with decisions concerning (1)—that certain values may not only be furthered by applications of the scientific knowledge gained under a strategy, but they may also provide a primary reason for conducting research under the strategy. However, this is compatible with making decisions concerning (2) that in no way draw upon values. While, in my opinion, this account applies to all the sciences, it has special salience in the behavioral and cognitive sciences. The behavioral scientist, *qua* scientist, makes value judgments when making decisions about which strategy to adopt, but not when deciding which theories to accept as providing knowledge and understanding of specified domains of phenomena.
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John Staddon, like many authoritative spokespersons of the tradition of modern science, is drawn to endorse that "Value-laden statements should. . .be excluded from [scientific] research entirely. . ." (Staddon, 2001). Why? Apparently because he holds the objective of science to be the discovery of facts and regularities and he believes that, unless "what is fact" is differentiated from "what is value" and value judgments are kept out of scientific research, this objective may not be met and science may not "rise above the level of 'politics by other means'" (Staddon, 2001, p. iii).

There is, however, a straightforward sense in which value judgments cannot be kept out of scientific research. Theories (hypotheses) must be appraised for their epistemic value—the kind of value they have in virtue of their being bearers of knowledge and understanding—in the light of how well they satisfy the appropriate criteria (Scriven, 1974): Is a theory well supported by the evidence? Has it been submitted to appropriately rigorous experimental tests involving sufficiently robust empirical data? Does it display adequate predictive power, a sufficient degree of empirical adequacy, and appropriate explanatory scope? Answering these questions involves making epistemic (sometimes referred to as

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"cognitive") value judgments (Lacey, 1999a, Ch. 3, 2002d), and there is no science without them. Clearly it is not epistemic value judgments that Staddon wants to keep out of scientific research, but moral, social, political (and other nonepistemic) value judgments and statements laden with these kinds of values. (Below when I use "value" without qualification I will be referring to nonepistemic value.)

In this article, in response to Staddon's statement quoted above, I will sketch an argument that value judgments may play an indispensable role in scientific research. When they do so, however, it is only at specific moments, which does not include the moment at which factual judgments are settled upon. I have developed the argument in detail in several recent works in which I address primarily the natural sciences, most comprehensively in *Is Science Value Free?* (Lacey, 1999a; see also 2002a, 2002d); the reader is referred to them for details.

Where Value Judgments May Play a Role in Research

Ignoring some nuances, Staddon and I agree that:

1. There is a distinction between fact and value and between epistemic value judgments and other kinds (moral, social, political, etc.) of value judgments (Lacey, 1999b).

2. The principal kinds of factual judgments made in the sciences—(a) that a datum is a consolidated experimental result, (b) that a hypothesis is well supported empirically, and (c) that a theory identifies the possibilities that may be realized within a specified domain of phenomena (or, more narrowly, that it is successful in generating predictions)—are not, or ought not be, based in any way on value judgments.

But, in apparent disagreement with him, I hold:

3. There are *moments* in research practices in which values may play a legitimate and sometimes an indispensable role.

And so I reject:

4. Value judgments and value-laden statements should be excluded entirely from scientific research.

I emphasize that the legitimate role of values is confined to the right moments. I endorse neither the indiscriminate play of values in science nor currently fashionable views that scientific judgments are fully explicable in social terms and that sound science cannot be separated from ideology, although

sometimes distinguished scientists put forward as sound science what is in fact ideology (Lewontin, 1992; cf. Dawkins, 1999).

My disagreement with Staddon might not be very great. He reluctantly concedes that there might be fields from which values cannot be excluded; then, qualifying the passage quoted above, he says "Value-laden statements should be . . .(lest we abolish much of social psychology) stated in a responsible way" (Staddon, 2001, p. iii). Perhaps item 3 can be interpreted as filling in what "a responsible way" might be. Nevertheless, where Staddon permits responsibly stated value-laden statements as a concession to social psychology, I hold that their role is pervasive and fundamental in all the sciences.

Theses of Impartiality and Neutrality (Cognitive Neutrality/Neutrality-in-Application)

It is often thought that keeping value-laden statements entirely out of research is the way to ensure that value judgments do not infect scientific factual judgments; doing this undergirds what I have called the theses of impartiality and neutrality (Lacey, 1999a, 2002a). According to *the thesis of impartiality*, in scientific practices value judgments are not in fact appealed to (overtly or covertly) as support for factual judgments; the latter judgments are impartial with respect to value judgments. According to *the thesis of neutrality*, well-made factual judgments (i) do not have value judgments among their logical implications, and (ii) on application do not especially favor any particular value outlooks. Impartiality does not entail neutrality, and item (i) of neutrality (*cognitive neutrality*)—which I do not question—does not entail (ii) (*neutrality-in-application*)—which I do question.

Three Logically Distinct Moments in Research

To see why keeping value-laden statements entirely out of research does not suffice to ensure accord with the theses of impartiality and neutrality, it is useful to distinguish three moments (logical or analytical moments, which are typically not sharply distinguishable temporally), or three matters about which decisions have to be made in scientific research practices:

M_1: Adoption of strategy
M_2: Acceptance of data, hypotheses, and theories
M_3: Application of scientific knowledge

No one doubts that value judgments must have a role at M_3, for in this category questions of legitimacy and effectiveness must be relevant; it is at the other two moments that it is commonly denied that they have a legitimate role. In contrast, I will argue that they may have an indispensable role at M_1—but they do not at M_2. (In a fuller treatment, other moments might also be considered: for example, choice of research methods or techniques, in which there arise well-known questions of research ethics that I will not address.)

Value Judgments at M_1, but not at M_2, in the Natural Sciences

At the outset I interpreted Staddon as holding that the objective of science is the discovery of facts and regularities. I prefer to consider the objective in a more encompassing way: to generate and consolidate theories that are accepted in accordance with well-made epistemic value judgments in the light of appropriate empirical data and in accordance with the thesis of impartiality and that progressively incorporate more and more domains of phenomena and possibilities within their scope. On neither of these renditions of the objective of science can a *direction* to research be specified without the adoption of a *strategy*.[1] The key roles of a strategy are to *constrain* the kinds of theories (hypotheses, regularities) that may be entertained in a given domain of inquiry, thus to specify the kinds of possibilities that may be explored in the course of the inquiry; and to *select* the relevant kinds of empirical data to procure and the appropriate descriptive categories to use for making observational reports so that the data can be pertinent to test entertained theories or be the basis upon which theories are generated.

Without adopting a strategy, what counts as worthwhile or *significant* research cannot be defined and, among others, the following questions cannot be addressed coherently and systematically: what questions to pose; what puzzles to resolve; what classes of possibilities to attempt to identify; what kinds of explanations to explore; what categories to deploy both in theories (hypotheses) and observational reports; what phenomena to observe, measure, and experiment upon; and what procedures to use?

Adopting "Materialist Strategies"

Most modern science tends to adopt various forms of (what I call) *materialist strategies* (MS) virtually exclusively (Lacey, 1999a, pp. 68-69, 2002a). Theories are constrained to those that represent phenomena and encapsulate possibilities in terms of their being generated or generable from *underlying* (not immediately apparent) *structure, process*, *interaction and/or law*, abstracting from any place they may have in relation to social arrangements, human lives, and experience from any link with value and from whatever social, human, and ecological possibilities that may also be open to them. (I will call the possibilities that can in principle be encapsulated under MS *abstracted possibilities*.) Reciprocally, empirical data are selected not only to meet the condition of intersubjectivity but also so that their descriptive categories are generally quantitative, applicable in virtue of measurement and instrumental and experimental operations.

Under MS no value-laden categories are used in the formulation of theories, hypotheses, or data. The categories appropriate for representing the hypothesized structure, process, interaction, and/or law-underlying phenomena are deliberately chosen to exclude (or reinterpret) the intentional and value-laden categories that

[1] "Strategy" is a technical term that I have used extensively elsewhere (Lacey, 1999a, 2002a, 2002d). It has affinities with Kuhn's "paradigm" (Kuhn, 1962) and with Laudan's "research tradition" (Laudan, 1977).

pervade ordinary discourse and argumentative discourse like that of this article. When MS are adopted, proposed facts are not expressed in value-laden statements, and there can be no value judgments among the formal entailments of theories and hypotheses. Adopting MS thus suffices to ensure that the thesis of *cognitive neutrality* is satisfied.

Strategies That Are Not Reducible to Materialist Strategies

Adopting MS does not suffice, however, to ensure accordance with the thesis of *neutrality-in-application* (the second component of the thesis of neutrality introduced above). Having made the detailed argument elsewhere with respect to the natural sciences in general (Lacey, 1999a), I will only state its conclusions here. The key to my argument is that the abstracted possibilities of things and phenomena do not exhaust the possibilities of many domains of phenomena. I have used the example of seeds from which crops are grown to illustrate this point (Lacey, 2000, 2001, 2002b, 2002c, 2003). Under MS (e.g., those adopted in biotechnological research) one can identify the possibilities for the transformation of seeds generated by techniques of genetic engineering. Other kinds of possibilities, however (e.g., those that may become realized when seeds are selected for use in productive, sustainable agroecosystems in which biodiversity is protected and community empowerment is furthered) cannot be investigated and thus identified by research conducted only under MS. Nevertheless, they can be investigated and identified by research conducted under (what I call) agroecological strategies (AES), which do not limit what possibilities can be investigated to just abstracted ones (Lacey, 2001, 2002a, 2002b, 2002c).[2]

AES introduce constraints that enable the formulation and investigation of generalizations concerning the tendencies, capacities, functioning, and possibilities of sustainable agroecosystems, their constituents, and relations and interactions among them, where a sustainable agroecosystem supports "maintenance of the productive capacity of the ecosystem, preservation of the natural resource base and functional biodiversity, social organization and reduction of poverty, and empowerment of local communities, maintenance of tradition, and popular participation in the development process" (Altieri, Yurjevic, Von der Weid, & Sanchez, 1996). The generalizations investigated include those in which, for example, "mineral cycles, energy transformations, biological processes and socioeconomic relationships" are considered in relationship to the whole system; generalizations concerned not with "maximizing production of a particular system, but rather with optimizing the agroecosystem as a whole" and so with "complex interactions among and between people, crops, soil and livestock" (Altieri, 1987, pp. xiv-xv).

Research conducted under AES cannot be pursued with a sharp distinction between the researcher and the farmer; the farmer's observations are essential to the conduct of the research. Consider:

[2] The next three paragraphs summarize material developed in detail in Lacey (2002c).

> . . .seeds have multiple characteristics that cannot be captured by a single yield measure, as important as this measure may be, and farmers have multiple site-specific requirements for their seeds, not just controlled condition high-yields . . .the inescapable conclusion is that a different approach, participatory breeding by organized farmers themselves, which takes into account the multiple characteristics of both seed varieties and farmers, is essential. (Rosset, 2001; cf. Tilman, Cassman, Matson, Naylor, & Polasky, 2002)

Relevant empirical data in agroecological research are often obtained from the study of farming systems in which *traditional methods informed by local knowledge* are used (Altieri, 1995). The methods used in these systems have been tested empirically in practice and have been particularly effective over the centuries in "selecting seed varieties for specific environments" (Altieri, 1995, p. 116)—these are often the original source of the seed varieties from which transgenics are engineered (Kloppenburg, 1987).

Research conducted under AES (and research on related approaches to farming—"organic," "biodynamic," "ecological") has been fruitful. This has been amply documented, for example, by Altieri (1995).[3] Some recent studies of "ecological farming" provide further partial confirmation. For example, one conducted on rice crops in Yunnan Province, China, demonstrated that "a simple, ecological approach to disease control can be used effectively at large spatial scale to attain environmentally sound disease control" without loss of productivity, compared to chemically-intensive farming based in monocultures (Zhu et al., 2000); another demonstrates that "greater diversity [with the 'right' components of diversity] leads to greater productivity in plant communities, greater nutrient retention in ecosystems and greater ecosystem stability" (Tilman, 1998).

Under AES the molecular biological is not sharply separated from the ecological and the social because plants (seeds, etc.) are not abstracted, as they are when investigated under MS, from the ecological and social phenomena and possibilities in which they are implicated. Then ecological and social categories are included among the appropriate theoretical categories that may be used in formulating factual judgments. Although these include value-laden categories such as "sustainable" (as defined above), their use does not prevent arriving at factual judgments (of the kinds indicated in previous paragraphs) that are in accord with the thesis of impartiality. If this is so, then the thesis of impartiality does not presuppose that value-laden categories may have no place in scientific theories. (The argument and relevant references can be found in Lacey, 1999a, Ch. 8-10, 2001, 2002b, 2002c, 2003; see also Lacey, 1997.)

Materialist Strategies and Modern Values About the Control of Natural Objects

Yet, as I have said, in the research supported in the institutions of modern science, MS tend to be adopted virtually exclusively so that, for example, research

[3] Research conducted under agroecological strategies draws freely and indispensably from results gained under MS. I do not pose the choice as MS or AES but as MS virtually exclusively or MS in dialectical interaction with other strategies that presuppose an indispensable subordinate role to MS.

conducted under biotechnological strategies is strongly supported while research that is conducted under AES is downplayed. Why? The reasons cannot be purely epistemic, for the interest of gaining knowledge (or understanding) alone does not account for one of these kinds of possibilities—whether it be the abstracted possibilities of things or their possibilities *qua* ecological and/or social objects—being considered more significant than other kinds. Research conducted under MS has been extraordinarily fruitful. It has led to increased understanding of numerous domains of phenomena in many fields, so its central position is rightly well established in scientific institutions. Fruitfulness of this kind, however, though undoubtedly impressive, does not by itself warrant that research be conducted exclusively under MS. What else might be involved?

Bacon proposed at the outset of modern science that science aims for the increased domination of nature. Although I do not think that this proposal can generally be sustained, I think that its residue has profoundly affected the character of the pursuit of modern science. In particular, I maintain (Lacey, 1999a, Ch. 6, 2002a, 2002d) mutually reinforcing relationships between adopting MS and holding *specifically modern* values concerning the control of natural objects (MVC) are crucial for understanding why MS have been adopted virtually exclusively. (Value judgments play an important role in endorsing the exclusion of value-laden categories from theories, hypotheses, and data.) MVC, which concern the scope of control and its centrality in daily life, minimally involve the following: (1) The exercise of control over natural objects is *per se* a social value that is not systematically subordinated to (or balanced with) other social and moral values.[4] (2) Expanding human capacity to control natural objects—the expansion of technologies into more and more spheres of life and into becoming the means for solving more and more problems—is very highly valued. (3) Control is the characteristic human stance to adopt toward natural objects. Exercising control and, above all, engaging in the research and development of projects in which our powers to control are expanded are essential and primary ways in which we express ourselves as modern human beings, in which are cultivated such personal "virtues" as creativity, inventiveness, initiative, boldness in the face of risks, autonomy, rationality, and practicality. Finally, (4) the implementation of novel technologies has *prima facie* legitimacy, so that the ecological destruction and social disruption often caused by it may be tolerated and portrayed simply as the price of progress.

I have argued elsewhere (Lacey, 1999a, Ch. 6, 2002a, 2002d) for the proposal that MS are adopted virtually exclusively in modern science *in important part* because of their mutually reinforcing relations with MVC. This is sometimes reflected in the fact that, on application, knowledge gained under MS tends to

[4] I contrast the insubordination of control of natural objects to cultural outlooks in which natural objects have their own integrity and value in virtue of their place in ecological and/or cosmic systems ("wholes") and in which control is balanced by general patterns of sustenance: renewal, nurturing, cultivation, attunement, love (cf. Tiles, 1987), stewardship, restoration, mutuality—analogues of "dialogue" between humans and of respect for human rights.

serve interests strongly linked with MVC especially well.[5] Then, for example, it is acceptance of MVC and their widespread embodiment in leading social institutions, not cognitive factors alone, that account for the general perception that research conducted under biotechnological strategies is more significant than that conducted under AES (Lacey, 2000, 2001, 2002b, 2002c, 2003).[6] The interests linked with MVC tend to conflict with those of people who are engaged, for example, in movements (especially in impoverished countries) that aim to further simultaneously agricultural productivity, sustainability, preservation of biodiversity, and social empowerment of poor communities (Lacey, 2002b, 2003). Where sound agroecological knowledge is available, the interests shaped by holding these values will be better served by it than by the knowledge gained when MS are deployed virtually exclusively in research practices. Because research conducted under MS cannot address the possibilities that may be identified under AES systematically, the knowledge gained under MS serves these latter interests to a much lesser degree. Research under MS (not in each and every instance, but on the whole when pursued virtually exclusively) especially favors MVC (Lacey, 1999a, Ch. 10). It does not accord with the thesis of neutrality-in-application.

Whenever, at M_1, values play a role in choice of research strategy, the factual knowledge gained under the strategy can be expected to clash with the thesis of neutrality-in-application. Getting rid of value categories from factual judgments, while it ensures accord with the thesis of cognitive neutrality, merely disguises that these judgments may be of significance, principally to those who include MVC in their value outlooks. Moreover, given the background (more or less articulate and conscious) commitment to MVC, the judgment (supported at M_2) of the efficacy of a technological device or method is often taken by itself to imply, *ceteris paribus*, the legitimacy of its use. If it is to be a serious aspiration in the scientific community to attain fuller accord with the thesis of neutrality-in-application (and I endorse this aspiration), support must be available in scientific institutions for research conducted under a multiplicity of strategies. Genuine neutrality requires not eliminating the role of values at M_1 but the constructive interplay of a multiplicity of values.

The Thesis of Impartiality Unchallenged

This does not imply that the factual judgments (proposition 2 above) made in research conducted under MS fail to accord with the thesis of impartiality. On the contrary, numerous theories have been accepted, in accordance with it, of many domains of phenomena. That values play a role at M_1 (often the same values that

[5] In the works cited I reject several other explanations (and justifications) for the virtually exclusive role of MS, including (1) the metaphysical view, which has often been appealed to throughout the history of modern science, that things really are the way they can be represented under MS or that all possibilities of things are necessarily reducible to abstracted possibilities, and (2) that it is of the nature of scientific methodology to require such a role for MS. Regarding (2), I have considered empiricist, naturalist, and Kuhnian versions.

[6] See Kitcher (2001) for an interesting discussion of the epistemic and value components of what constitutes scientific significance.

are pertinent at M_3) leaves it open that factual judgments may be based solely on available data and an array of epistemic value judgments. At M_1 what kinds of possibilities are regarded as significant are defined; at M_2 what the genuine possibilities are (if any) is discovered. Not all supposedly factual judgments made in the sciences actually do accord with the thesis of impartiality, and "bias" can sometimes be hard to detect and remove. Nevertheless, to reach accord with this thesis remains an ideal that can reasonably be expected to be more closely approximated. To do so value judgments need not be kept out of scientific research, only confined to roles at M_1 and M_3 and denied any role at M_2.

Indeed, without a role for value judgments at M_1 (and recognition of this role) the significance of certain research programs may not be discerned so that a strategy, under which factual judgment could come to be soundly made, may not even be adopted.[7] Gaining factual knowledge in the sciences depends on the adoption of strategies, and what strategies are adopted determines of what phenomena and possibilities (and within what boundary conditions) we gain factual knowledge. The value judgments that are part of the grounds for adopting a strategy play a causal role in enabling the conditions under which factual judgments can be made, but they are not part of the evidence.

Value Judgments in Behavioral and Cognitive Science

If value judgments can play a role at M_1 in the natural sciences without undermining the proper quest to gain accord with the thesis of impartiality at M_2, I think that we may safely assume that a similar conclusion applies to psychology.[8]

[7] My neo-Baconian thesis about the role of MVC at M_1 is not widely endorsed, perhaps because MVC are so widely held and their role is simply not recognized. This, I think, partly accounts for why research conducted under AES is little appreciated (Lacey, 2000). I do not claim that values *must* be in play at M_1, only that they may be and that in important cases they are—and that this does not undermine the possibility of accord with the thesis of impartiality at M_2. Metaphysics often plays a role at M_1, or historically-based reflections on the character of the objects under investigation, sometimes in concert with values (Lacey, 1999a, Ch. 6). I emphasize that my argument about the role of MVC does not imply that whenever MS are adopted (e.g., in cosmology) it is because of an interest in exercising control. I do not suggest that in all domains there will be (in principle) competing strategies that are potentially fruitful, but I do hold that this is the case in psychology.

[8] My argument for the linkage between adopting MS and holding MVC involves appeal to both (1) research conducted virtually exclusively under MS does not accord with the thesis of neutrality-in-application, and (2) in some of the natural sciences, strategies distinct from MS (e.g., AES) can be adopted fruitfully so that sometimes there is a nontrivial choice to be made at M_1. In this article the argument that I have sketched for (2) depends heavily on the claim that AES support fruitful research. Some readers no doubt will be skeptical of this claim. I cannot hope to allay their skepticism here; I can only refer them to the works cited. My argument does not stand or fall, however, with the fruitfulness of research conducted under AES. As long as there are (potentially) fruitful alternative strategies, my argument goes through. AES functions, for me, are a particularly compelling example, and it also bears mutually reinforcing relations to values that I personally endorse. Elsewhere (Lacey, 1999a, Ch. 9) I have also used "feminist strategies" to back this argument. I do not think that these two exhaust the possibilities. If there are no (potentially) fruitful alternative strategies, then the adoption of MS virtually exclusively might need no explanation (or justification) other than the absence of alternatives. The argument for (1), however, is independent of that for (2). Even if (2) could not be sustained in the context of the natural sciences, as I maintain, a strong case could still be

In psychology, analogously to the natural sciences, at M_1 there are at least two levels of choice: either some variety of MS, or other strategies that permit the use of intentional and value-laden categories in theories; if the former, what kind(s) of MS—behaviorist (and what variety of behaviorist?), cognitivist (representational theory of mind or connectionist?), or other?

What Kinds of Materialist Strategies?

Versions of MS are adopted in most of behavioral and cognitive science. For example (ignoring important details, complexities, and variations), behaviorism constrains hypotheses to those that can represent lawful relations among behaviors and external, principally environmental contingencies, and one approach to cognitive psychology constrains theories to express representations of mental structures and computational accounts of mental processes. Why adopt one version rather than another? Why adopt a behaviorist rather than a cognitivist, sociobiological, or some other strategy? There can be all sorts of pragmatic reasons for individual researchers to adopt a particular strategy. Especially when the strategy demonstrably opens up a fruitful research program, one can be confident that adopting it will lead to gaining some novel understanding. Competing strategies, which might impose incompatible constraints on acceptable theories, can be simultaneously fruitful—as, in my opinion, both behaviorist and cognitivist strategies currently are, in the sense of progressively generating a growing body of reliable experimental data and identifying the lawfulness of a larger array of phenomena. If gaining understanding firmly grounded in experimental results is the objective, then the institutions of psychology should readily tolerate peaceful coexistence among a plurality of strategies. Despite competition for resources to conduct research and for dominant places in the profession, to some extent this does happen.

More striking, however, is the fact that frequently those who adopt one strategy challenge the *significance* of research under others. Think of the controversies between behaviorists and cognitivists of 30 or so years ago. Their residue remains active. Significance, I have pointed out, has both epistemic and moral/social components. Giving rise to an ongoing fruitful research program suffices to show that the range of phenomena that become understood is expanding, and this will normally cover the epistemic component of significance *unless* there is another program framed by another strategy that includes all of this and also provides understanding of phenomena not encompassed by the former (Lacey, 1999a, Ch. 9). It does not suffice to cover the moral/social component, however; from the perspective of a particular value outlook, it might not be worthwhile (at least, given higher priorities) to gain understanding of these phenomena. This point is of major importance. It might be true that the range of phenomena of which understanding is becoming gained is expanding, but there

made for it in connection with psychology and generally with the human sciences. In that case, what I have presented as features of the sciences (M_1–M_3 and the potential roles of values at them, respectively) could still be defended (with a recast argument) as features of the human sciences.

still might be phenomena and possibilities (including those especially valued for some particular value outlook) that will remain outside of its eventual explanatory compass. A research program framed by a particular strategy may be capable of indefinite expansion yet still not make contact with phenomena that lie outside of specifiable bounds. The program may lead, for example, to the generation (creation) of more and more experimental and applied phenomena but not to explanatory and anticipatory power with respect to particularly valued phenomena (e.g., those manifested in the conduct of the research itself).

Ideas like these were central to my earlier critique of behaviorism (Lacey, 1996; Lacey & Schwartz, 1986, 1987). I will not pursue that critique here or discuss how these ideas illuminate the controversies between behaviorism and cognitivism. For present purposes it is enough to note that disputes about significance can be rooted in conflicting value outlooks. Again simplifying: for example, radical behaviorist approaches are partly motivated by the value of furthering our capability to exercise control over human behavior, and some cognitive psychology approaches are motivated partly from highlighting the values of rationality and freedom (Lacey, 1980). As long as the values are playing their role at M_1, subsequent results (confirmed at M_2) need not run afoul of the thesis of impartiality. (Once again, deciding not to use value-laden categories may be partly vindicated by value judgments.)

Under each of a plurality of strategies, theories may be soundly consolidated as providing understanding *of specified domains of phenomena*. There is no contradiction between such results, for what is confirmed in accord with the thesis of impartiality is that certain phenomena *under specified conditions* or *within specified spaces* are explicable in terms of the respective theoretical principles and that their possibilities *under these conditions* are well identified by the respective theories. Those working under a single strategy may be tempted to extrapolate their claims to generalizations such as: All behavior is explicable in terms of behaviorist categories, or: All mental phenomena are computable. These claims do contradict each other, but neither has been accepted in accord with the thesis of impartiality. They are both metaphysical claims—generalizations far removed from contact with empirical evidence—motivated (I suggest) by value commitments and sustained by their fruitfulness in guiding research. Awareness of the role that values may be playing at M_1 should lead one to cast a skeptical eye towards such grand generalizations, especially when they are appealed to in order to suggest that it is facts alone that challenge the legitimacy of research conducted under a rival strategy.

Why Adopt Only Materialist Strategies in Behavioral and Cognitive Science?

Why, in most behavioral and cognitive sciences, are versions of MS adopted? Why not make use, within experimental and theoretical inquiries of behavior and cognition as well as of social psychology (where Staddon concedes their use), of the complex set of intentional and value-laden categories that we use routinely in ordinary discourse for many purposes, including explanatory and anticipatory

ones? In part MS are adopted in an attempt to match the fruitfulness achieved in the natural sciences, in some cases because it is assumed that it is of the nature of science (systematic empirical inquiry that enables us to make factual judgments that accord with the thesis of impartiality) to adopt MS.[9] In part they are adopted because materialist metaphysics—most fundamentally, the proposal that all phenomena are lawful—has wide currency, and one plausible version of materialist metaphysics is that only with the categories of MS can we hope to grasp the world *as it really is* (Lacey, 2002d). But they are not adopted because there is empirical evidence that, under MS, greater explanatory and anticipatory power can be obtained of human behavioral and cognitive phenomena, or because results that accord with the thesis of impartiality cannot be obtained using intentional and value-laden categories (Lacey, 1997, 1999a, Ch. 9).

Knowledge articulated in propositions that use the latter categories is of great importance when we come to M_3, the moment of application of scientific knowledge. Here questions of efficacy and legitimacy arise. It is not enough that a proposed application works; its legitimacy depends on the absence of undesirable side effects (that are of sufficient seriousness and magnitude to override the gains expected from introducing the application). Does, for example, a proposed behavioral technology (that may, for example, produce more efficient behavior in the workplace) have diminishing effects on people's cognitive abilities or weaken their capability to make well-balanced value judgments? I will not answer this question. I pose it not rhetorically but to make clear that questions of legitimacy of applications cannot be settled without answering questions like it—and answering it in a way that can aspire to accord with the thesis of impartiality requires investigation that cannot abstract from intentional and value contexts.

Consider the proposition of the type (P): "There are no serious undesirable side-effects of such and such an application." Research that can address P adequately needs sufficient conceptual resources so that any anticipated or feared side effect can be investigated. Generally this requires categories that are not deployed in the strategy that gave rise to the application but are available when other strategies are deployed. (An application derived from behavioral science rests upon hypotheses and data that do not deploy intentional categories; testing side effects of possible cognitive impairments cannot avoid using them.) To restrict inquiry on P to that which may be conducted under the strategies that gave rise to the application would be justifiable only if there were reason to believe that there are no possibilities that cannot be identified under these strategies. The only reasons that I can think of would depend upon accepting one of the grand metaphysical generalizations mentioned above. Drawing conclusions about P in such a context would be to violate the thesis of impartiality.[10]

This suggests (though not conclusively) that rejecting strategies that deploy intentional and value-laden categories follows from the value (or metaphysical)

[9] My discussion of AES is intended to question this assumption. See also Lacey, 1999a, Ch. 5 for elaboration.

[10] This kind of situation is not unique to psychology; it has direct counterparts in the biotechnology–agroecology example that I used above (Lacey, 2000, 2001, 2002d) and elsewhere.

commitments that motivate the adoption of one's chosen strategy.[11] Certainly there is no evidence to deny that one can gain knowledge in systematic empirical ways that accords with the thesis of impartiality about matters such as the dependence of a person's capability to make balanced value judgments on environmental (social) circumstances or the formation and transformation of values (Lacey & Schwartz, 1996). The use of value-laden categories in theories is not *per se* an impediment to making factual judgments that accord with the thesis of impartiality. As long as one does not forget that decisions about the use of these categories (or not) are made at M_1, due diligence should be able to keep value judgments from clouding the factual judgments made at M2.

A final twist: I have suggested that adequate evidence for P would have to come from research conducted under a variety of strategies. When is P supported by evidence that is sufficient to provide support for the legitimation of the application to which it refers? That would depend upon how serious (morally) the consequences would be if one implemented the application on the assumption that P were true, if in fact P were false. It thus depends on a value judgment. At M_3, then, one cannot keep value judgments out of science.[12] I do not mean the value judgments that endorse an application as worthwhile but rather the value judgment made in concluding that P is supported by sufficient evidence.

Conclusion

I have proposed that there is a closer relationship between M_1 and M_3 than is usually recognized. A strategy may be adopted because, in addition to its promise to generate a fruitful research program, it is expected to lead to the identification of possibilities that are of a kind that is of special interest to the practical projects of those who hold the values. Then, the values that are served by the application of the knowledge gained under a strategy may also be the same ones that motivate (logically or rationally, not necessarily temporally) the adoption of the strategy in the first place. Identification of other kinds of possibilities, of special interest to the projects of those holding different values, may require the adoption of alternative strategies. Research conducted under any particular strategy is likely to be limited (in principle) in its potential scope, so gaining comprehensive understanding of human behavior and cognition is likely to require a multiplicity of strategies—linked respectively with a variety of value outlooks—including those that deploy intentional and value-laden categories. This leaves intact that the experimental results and the theories, regardless of the strategies under which they have arisen, may (at M_2) be accepted soundly in accord with the thesis of impartiality so that the play of values at the moments of adoption of strategy and application of scientific knowledge leaves an accumulating residue of factual knowledge. When the dust settles, perhaps Staddon and I are not so far apart after all.

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[11] I will not address in this paper whether and how the link between adopting MS and holding MVC may apply in the case of psychology.

[12] See Rudner (1953); Douglas (2000). The title of my article is intended to pay homage to Rudner's paper, entitled "The Scientist *qua* Scientist Makes Value Judgments."

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