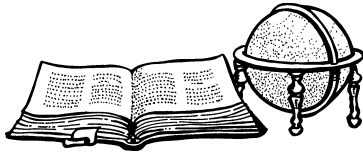


The Strategic Misdefining of the Natural Sciences Within Universities

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Natural scientists and scholars define *natural science* in terms of the natural ontological and epistemological foundations that inform their inquiries. In contrast, people outside of the natural science community tend to define *natural science* in terms of the subject matters studied in the traditionally established natural science fields. Within universities, the political containment of the natural sciences is facilitated by that convenient error, which lends justification to refusals to sanction the expansion of the formally organized natural sciences, especially into the subject matters of behavioral and social phenomena, which have long been regarded as the province of the traditional social sciences. People outside of the natural science community generally concede that the previously established natural sciences are necessary for coping with the environment, yet many deem the followers and practitioners of the natural sciences prone to socio-cultural irresponsibility. Accordingly, in their view, the actions of natural scientists must be tempered by certain kinds of counter-controls exerted from the more humanistic sector. They resist the emergence of a strictly *natural* social science megafield that would bring the efficacy of the natural sciences to bear on the very cultural function that the humanists, traditional philosophers, religionists, and similar keepers of the cultural humanity tend to see as their piece of the cultural business. Furthermore, that kind of revolutionary naturalism would be practiced by a subset of the natural scientists themselves. It would represent a fundamental change in the system of cultural checks and balances from which the traditional keepers of the values of humanity would, for the most part, see themselves excluded. While the pressures of history are building against one side of

that door, it is not surprising that the traditional stewards of humanism brace it from the other—a cultural conflict explored in this article, especially with respect to its implications for the independent discipline of environment–behavior relations known as *behaviorology*.

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Prelude

The behaviorologists have organized an independent natural science discipline that is focused on the functional relations between behavior and the environment in which it occurs. Behaviorology is not yet represented in universities by independent academic departments. In contrast with the disciplinary aims of the behaviorologists, the majority of behaviorists, most of whom self-identify as *behavior analysts*, favor integration with followers of the superstitious alternatives to natural science, especially the traditional psychologists. Those behaviorists tend to be represented within universities by individuals who are scattered throughout the social science units and who, with few exceptions, are limited with respect to the programmatic integrity with which they can endow training arrangements that produce more of their own kind.

Neither of those two divergent strategies for disciplinary development (independence versus integration) have ever represented an officially defined mission objective of either the behavior analysis community in general nor its principal organization, the Association for Behavior Analysis (ABA). However, the relative efficacy of those incompatible programs of disciplinary development have been debated within the general forum of the behavior analysis community. Increasingly, political control of the organizational infrastructure of the behavior analysis movement has passed to the majority faction that favors fundamental change in the traditional social sciences through integration, the strategic alternative that keeps its advocates in contact with the copious resources of the entrenched mystical establishment.

Advocates of that approach express the hope that such merging will lead to an internal conversion of the traditional social science community to a philosophy of naturalism. Particularly, they would like to convert the psychologists, because psychology has long provided the basic philosophical foundations and scientific methodologies for most of the other more applied social science fields.

In the meantime, among the natural scientists and scholars who study human behavior, an independent dis-

ciplinary movement has been organized apart from the behavior analysts under the banner of behaviorology. That movement is now represented by two organizations, the International Society for Behaviorology (ISB, which emphasizes the experimental science component of behaviorology) and The International Behaviorology Institute (TIBI, which emphasizes the educational and cultural–interface components of behaviorology). Those two organizational entities, along with their various professional activities and publications, represent the independently organized natural science of behavior. Its followers are now working to establish the science of environment–behavior functional relations (called *behaviorology*) as one of the recognized basic natural sciences within our culture.

Against this historical backdrop, I report the nature of a recent probe that I conducted into the issue of how, and on what basis, the natural science of environment–behavior relations could take its place among the more traditional natural science units within a university. I am convinced that the maturation and fruition of a natural science of environment–behavior relations can occur effectively only with disciplinary organizational autonomy plus appropriate institutional placement—which, with respect to universities, means exclusive and intellectually unadulterated academic departments located within clusters of other natural science departments.

Introduction: The Academic Vagrants

The natural science departments in contemporary universities are grouped into clusters, often in a College of Arts and Sciences. Although any measurable phenomena can be studied from a natural science perspective, such groupings do not currently include natural science departments devoted to the study of functional relations between environments and behaviors. Within the academy, scholars who pursue that subject matter from the perspective of a natural philosophy and science are typically kept away from the organized natural sciences and dispersed throughout what are known as social science departments located elsewhere within universities.

The phrase *social sciences* is an innocuous label that alludes to behavioral interactions among people, a name derived from the most common aspect of the subject-matters within the various social sciences (Ledoux, 2002a). However, the disposition of natural scientists of environment–behavior relations in contemporary universities is important because the social sciences, throughout which they are dispersed, tolerate and often encourage mystical or superstitious philosophical fundamentals. Unlike the phrase *natural science*, which implies a particular supportive ontological and epistemological perspective, the phrase *social science* carries no philosophical connotations.

While the general subject matter of the social sciences pertains in various ways to behavioral phenomena, the interpretations of the nature of human beings and their behaviors that are rendered by social scientists are typically informed by postulates rooted in mysticism. Such fundamental assumptions may be of religious origin, or they may arise as secular fallacies, as when an observer concludes mistakenly that the behaviors exhibited by an organic body could only manifest as the executed will of a putative inner body-driving agent that autonomously chooses the actions that the body subsequently produces. Because social science faculty members tend to be drawn from the general intellectual faction of the culture at large, we must presume that the so-called social science departments in universities include about the same percentage of persons whose personal ontology and epistemology incorporate superstitious behavior as may be found within the more intellectual subset of the general population.

In contrast, the organized natural sciences feature and promote a kind of ontology and epistemology that anchor them in naturalism, at least in regard to the subject matters upon which studies in the various natural science departments are focused. As an illustration, consider that the practices of water dowsing follow logically from certain mystical basic assumptions if the implications of those assumptions are pursued to the level of practical technology—a development that is facilitated in a community that accepts the relevant superstition as valid (Baum, 1974; Bird, 1979; Voit, 1959). However, water dowsing is not included in the curriculum of geology departments even though experienced water dowers do find ground water often enough to preclude their outright dismissal as totally ineffective fakes.

Water dowsing is excluded from geology because of qualitative distinctions with respect to its superstitious underpinnings (Fraley, 1999). To the extent that experienced water dowers are reliably effective, the assumption within the geology community is that those dowers have become intuitively skilled in the practices of ground water geology while concurrently wasting their capacities for relevant verbal behavior that could be sharing in the even more effective control of those practices. That is, they have become intuitively effective geologists for reasons that they themselves cannot describe, while their verbal capacity is preoccupied with a repertoire of superstitious nonsense pertinent to their redundant manipulation of forked sticks.

A training curriculum in groundwater geology conditions an effective verbal repertoire (called hydrology) to share in the control of water-related practices, which thereby renders water-seeking practices even more effective as a result of those verbal enhancements to their evocative stimuli. Theoretically, such geological training, if provided to a water dowser, would presumably result in that dowser's coming to grips with the redundancy of the

forked stick. Former dowers, once they were geologically trained, could then be more explicit about the antecedent controls on the skills that had been present only in more primitive forms as intuitive behaviors that had seemed mysterious even to them.

Unfortunately, this popular inclination to re-educate superstitious people almost always proves ineffective, because demonstrations of the greater efficacy of the proffered approach are merely interpreted by superstitious people from the perspective of their fundamental superstitious assumptions, which go unaffected by those data. Furthermore, in the rare cases in which such re-education proves possible, it tends to be relatively inefficient. It is economically inefficient to have to eliminate a troublesome repertoire before relevant retraining can proceed. In the interests of both feasibility and efficiency, superstitious people usually have to be left alone and circumvented. That is, new people, properly trained from the outset, who can think more effectively and therefore do better practical work, progressively eclipse and isolate their superstitious counterparts (for a relevant case study, see Fraley, 1992).

Like other university-based scholars of the natural science of human behavior, I have pursued my career without an opportunity to work and teach in a natural science department of environment-behavior relations. Throughout my career, I have been compelled to work, with minority status, in a department primarily devoted to studies of human behavior that are based on fundamentally mystical postulates. Such departments attract students who are already predisposed to view human behavior as the manifest will of a mystical self-agent (Fraley, 1992, 1997). The students in my educational psychology graduate courses, most of whom were at the doctoral level, were, in general, steeped in mythical constructs of mind-body dualism and assumptions of parallel universes in which the physical world of practical experience coexists interactively with an ethereal world of spirits and deities.

The bulk of the students' formal training program in traditional educational psychology comported with those kinds of fundamental assumptions, which most students brought to that training. The traditional psychology curriculum with which they interacted taught only a kind of *methodological* science that precipitated no conflicts with those mystical fundamentals. Any scientific principle or functional relation that implied an underlying naturalism was absent from their psychology curriculum. That is, most students brought their philosophy with them, usually of a mystical sort, and no additional philosophy of social science was explicitly taught in the traditional psychology curriculum. The kind of science that the traditional psychology professors taught was suited only to helping students explore what was construed to be the

practical implications of the mystical postulates that most students uncritically accepted and respected—as did their mentalistic psychology professors.

Departmental Epistemological Dichotomy

Because I and a couple of other behaviorologists were compelled by the prevailing organizational circumstances to work in such a department, our department featured a lopsided epistemological dichotomy: superstition of various strips aligned in the majority on one side, with versions of naturalism represented on the other. Based upon their respective and very different fundamentals, each faction contributed to the maturation of its kind of science and to the development of its kind of technologies for the address of the practical problems upon which the department was supposed to focus. In general, such different philosophical foundations logically support different sciences on the bases of which different intervention technologies develop.

It follows logically that such differently derived technologies will almost always be of unequal effectiveness in dealing with practical matters. In such contests, the currents of modern history seem strongly to favor the naturalists: Regardless of the subject matter upon which the natural sciences are focused, those disciplines seldom if ever lose fair contests of efficacy to their superstition-based alternatives.

Differing basic assumptions about the nature of human beings and their behavior result in different interpretations of what practitioners think that they were actually doing in given situations. For example, within my academic department what one was doing when one was *teaching*, and the processes by which that activity could have an effect, were construed quite differently by members of the mystical and naturalist factions (Fralely, 1997, 1998). Not surprisingly, the conditioned reinforcers of the two factions often differed, which resulted in differing values (Fralely, 1998a). The two factions therefore respected the different ethical prescriptions that comported with their respective values (Fralely, 2003, chap. 23). Frequently the psychologists and the behaviorologists disapproved of each others' professional conduct on ethical grounds that they did not share in common.

Outsiders can perhaps appreciate the depth of the interpersonal conflicts among colleagues in such a department by imagining the relations between geologists and water dowsers who would actually be forced to work in the same academic department with the imposition of a somewhat formal expectation that, in an intellectual sense, they take each other seriously. Both water dowsers and traditional psychologists, operating on the basis of

their respective kinds of mystical and often superstitious postulates, may nevertheless come under strong natural contingencies that result in instances of intuitively effective practical work.

Regardless of any such intuitively pursued effective practices, for a common reason, neither water dowsers nor traditional psychologists gain informed collegial respect in a natural science community. The scientific professionalism of both of those kinds of people is disrespected in a natural science community because what is construed to be the waste of their respective verbal capacities on superstitious verbal indulgences precludes a class of supplementary scientific controls over their professional activities that presumably would insure even greater effectiveness. Natural scientists and scholars of behavior typically interpret the work of traditional psychologists, first, by specifying the verbal behavior, both philosophical and scientific, that should have shared in the control of that kind of work, and second, by examining the differences between what was produced and what potentially could have been produced had appropriate scientific and philosophical verbal behavior shared in the control of the professional activity in question.

The disciplinarily mismatched organizational arrangement under which my department was constituted may sound absurdly counterproductive, and would be so construed were a corresponding version of it to be seriously proposed with respect to physics, chemistry, biology, or geology (Fralely, 1998b). Yet, in contemporary universities, that is the current organizational disposition of natural scientists and scholars of *environment-behavior relations*.

My thesis is that counter-productivity, with respect to the dispersed natural science faction, may be precisely the point of that dispersal. Not all who supportively accept the organizational dispersing of behaviorists can be expected to clearly understand the strategic implications of such an arrangement. However, we must prudently assume that among those defenders of the organizational status quo are others whose contemplation of this issue does rise to valid analyses of the implications of an organizational scheme that disintegrates the natural science community of behaviorists. One ironic implication is that, with sufficient adaptation to such dispersal, even its victims may come to defend it (e.g., Grote, 1997; Johnston, 1997; Rakos, 1997; Wulfert, 1997).

A Deliberate Probe of the Issues

I do not enjoy the internal politics of universities and have avoided involvement in institutional politics throughout my career. However, my interest in the apparently enforced academic vagrancy of natural scientists of behavior led me to spend a couple of years in the

late 1990s exploring the politics through which this dispersal is made to occur within universities.

The occasion arose when I sought to get an undergraduate version of my basic natural science course in behaviorology approved for credit in the Faculty Senate's Liberal Studies Program within my university. The academics who operated that program oversaw requirements that undergraduate students select a certain number of approved courses from each of three clusters representing respectively the arts, the sciences, and the humanities. Courses in the sciences were divided into two groups: the social sciences and the natural sciences. That required distribution of studies was intended to insure the general education of university undergraduates prior to their pursuit of a specialization. I formally requested that the Liberal Studies Program Committee approve my general behaviorology course for credit in *both* the *social science* and the *natural science* categories.

Liberal Studies credit in the natural sciences was subsequently refused, because, according to the committee's letter of determination, my behaviorology course dealt with behavior, and behavior was a subject matter studied in the social sciences. However, the committee went further. Not only was the course rejected for credit in the natural science area, it was completely rejected for inclusion within the curriculum of the Liberal Studies Program.

The stated reason for its unsuitability for the Liberal Studies Program, even in the social sciences, was that there were "other theories of behavior." That phrase alluded to the fact that my course was constructed as a pure natural science offering, which did not systematically address non-natural approaches to its behavior-related subject matter. In my course that exclusive focus on the subject matter from the perspective of naturalism was similar to the kind of focus that has long been maintained in traditional natural science courses.

Aside from the fact that the committee members did not seem to know the difference between a theory and a basic epistemology, they had, in effect, informed me that undergraduate students fulfilling their Liberal Studies requirements at my university would not be permitted to study human behavior in any course that took an exclusively natural science perspective. Such philosophical exclusivity, the most definitive characteristic of the natural sciences, was *not* tolerated in the social sciences, and within the university any study of human behavioral phenomena was strictly confined to the social sciences.

Due to progress in establishing the organized natural sciences during the past few centuries, students had long been free, within the Liberal Studies Program, to study *non*-behavioral phenomena from an exclusively natural perspective as was characteristic of courses offered by such departments as physics, chemistry, and biology. Teaching

about epistemological alternatives to naturalism has not been an expectation or requirement in the traditional natural science departments. In general, teachers in the traditional natural sciences have never devoted valuable course time to equally detailed instruction in the mystical or superstitious alternatives to naturalism and its scientific implications as if those alternatives represented potentially worthwhile options. Such instruction has occurred there in limited ways only occasionally, usually for comparative purposes, especially to explicate the implication of ineffectiveness that inheres in scientific practices that are informed by superstitious assumptions.

The committee's action had raised important issues with profound implications—some ominous. To posture myself for a probe of these issues and the political machinations that surround them, I took three practical steps: (a) The following year, I resubmitted the course to the Liberal Studies Program Committee—again applying for approval in both the natural science and social science categories; (b) I seized on an opportunity to serve out the remainder of the term of a Faculty Senator from my college who had resigned from the Faculty Senate; and (c) I also volunteered to serve as a member of the Faculty Senate's Liberal Studies Program Committee. Fortunately, I was selected by the Faculty Senate's Committee on Committees, somewhat at random from among the volunteers, to serve on the Liberal Studies Committee. From my new seat on the Liberal Studies Committee, and with the added prestige of my concurrent senatorial status, I then set out to press the issues that had been raised by the previous year's Liberal Studies Program Committee as intensely as I could manage to do it.

It had become clear that much of the anti-science resistance to a natural science of human behavior was manifesting covertly. My objective was to plumb the depths of that resistance, to understand it as accurately as possible, and to distinguish between deliberate tactical expressions of that bias and instances that were only intuitive. The kind of outcomes that were preferred by the opposition had become clear, but I wanted to learn how members of the opposition described to themselves and to each other what they were doing when acting to contain expansion of the natural sciences within the university.

I did not delude myself about actually getting a behaviorology course approved in the natural science area. The substantial majority of the university faculty members represented fields outside of the established natural sciences, and I encountered no other faculty members who appeared to support the expansion of the natural science concept implicit in what I was requesting. Many of the faculty members within the traditional natural sciences *per se* were, in general, insufficiently schooled in the philosophical underpinnings of the natural sciences to overcome ambiguity about the possibility of a natural

science that focuses on human behavior. Their training curricula had, in general, launched into the technical treatment of their respective subject matters while providing relatively little study explicitly in comparative philosophy through which natural science trainees might come to a better general appreciation of the naturalism that is supposed to characterize the intellectual integrity of their academic community.

Thus, many of the university faculty members who regarded themselves as natural scientists were somewhat unprepared to entertain the concept of a scientific approach to human behavior that is informed exclusively by a philosophy of naturalism. While specialists in any one of the traditional natural sciences typically had at least minimal training in some of the other natural sciences, behaviorology *per se* had not been available to them on the curricular menus from which they had elected their extra-major natural science courses. With such a deficit in their preparation, some members of the current natural science community can be skeptical about even the possibility of a natural science of human behavior.

That general lack of sophistication about the general philosophy that informs natural science is understandable. The behaviorology that was unavailable to the vast majority of current natural scientists during their formal training is precisely the natural science of philosophy *per se*. That practitioners of natural science should understand the philosophy that informs their work is too much to expect from persons who have had no opportunity to study the nature of philosophy *per se* or its functional capacity in relation to scientific behavior. People who are vague about the nature of philosophy and how it works, even with respect to their own scientific practices, are left to reap the benefits of natural philosophy only in an intuitive way. They are quite unprepared to deal explicitly with philosophy-related issues at the debating table. Thus, the natural scientists employed as faculty members at my university did not represent a community to which I could turn for unified support in the debate that I was initiating.

In fact, the general lack of sophistication with respect to a naturalistic approach to the study of *behavioral* phenomena throughout the natural science community may be partly responsible for the intrusion of psychology departments into schools and colleges of natural science within a small number of important universities (e.g., the University of California and San Diego State University). Students in those universities are then led to assume that, in studying psychology in a department that is lodged among natural science departments, the quality of that training is equivalent to that in their natural science courses. After scientific methodology has been mastered in the natural science curriculum, that methodology may then be carried to psychological training where it is applied to probing the implications of the mystical and su-

perstitious postulates that tend to prevail within the psychology discipline. The result can be good scientific practice wasted on attempts to get answers to nonsensical questions and the misinterpretation of what may be intrinsically valid data.

My own university had long had a small contingent of *behavior analysts* whose philosophy of science suggested the possibility of support for my position. However, at my university the behavior analysts were concentrated in the social science area, mostly as a minority faction in the psychology department where their respective activities comported with a strategy of infiltration. That strategy precluded their overt support for actions that would have implied that they belonged elsewhere. Thus, the local behavior analysts could be of no help in my effort to breach the traditional natural science establishment with the natural science of human behavior. In the nearly complete absence of any support, it was me against everyone.

While, realistically, my publicly proclaimed objective remained politically beyond reach, an astute analysis of the central issue, which was my real objective, could be accomplished. By listening carefully to what was said both during my participation in the university Faculty Senate and while serving as a member of its Liberal Studies Committee (sometimes after my own deliberate stimulation of the rhetoric), I soon gained an important insight: Among the political operatives who manage the faculty governance of the university—and also among those who hold formal administrative positions within the central governance of the university—the *natural sciences are defined strictly in terms of the subject matters studied, not in terms of any natural ontology and epistemology upon which operations in a natural science unit must be based*. Within the university, the definitive epistemology and ontology of naturalism may be recognized at a personal level by various individuals, but it is not formally acknowledged as the basis for the independent existence of the natural science departments.

I discovered that, among those who controlled the machinery of university government, natural science was regarded merely as the study of energy, matter, life functions, and such combinations of those things as may be apropos of the study of whatever solid, gaseous, liquid, or radiant entities that may be encountered in the known universe. To the extent that a philosophy of naturalism prevailed in natural science departments, the people who governed the university did not, and seemingly would not, recognize a philosophy of naturalism as a definitive characteristic, treating it instead merely as a conceptual artifact. The people who, at various levels, governed the university assigned both courses and faculty members to the natural science units exclusively according to the kind of phenomena that they addressed.

However, the hiring of a new faculty member for a unit was traditionally conducted according to the recommendations of the current faculty in that unit. Thus, the philosophical integrity of a discipline or field was maintained only through that hiring mechanism. The central administrators alone were legally empowered to hire, and their adherence to faculty recommendations was driven only by policy.

Neither the university administration nor the internal faculty-operated government of the institution formally recognized the philosophy of naturalism that renders the natural sciences *natural*. One implication, relevant to my situation, was that the strict natural science perspective that was maintained in my course on environment-behavior functional relations remained irrelevant to how that course was officially categorized relative to the university organizational scheme.

This issue of that irrelevance is complex. The activities of the individuals who, at various levels of control, govern a university, are typically informed by fundamentally mystical assumptions about human beings and their behavior. For such people to acknowledge philosophical naturalism as a *definitive* characteristic of the well established beachhead that the natural sciences have secured within universities would be counterproductive with respect to their personal and collective investments in superstition.

However, the analysis of this issue reaches beyond the simple matter of personal or even factional self-service. The constitutional endorsement of “free speech” is widely interpreted, in the context of universities, to mean that a public university must not advocate a way of thinking nor require one as a condition of participation at any level of activity. One implication is that a public university, in its teaching program, is permitted only to present, comparatively, a menu of explicated options on intellectual approaches to a subject matter but may not formally impose a particular philosophy as a condition of either student or faculty retention.

In theory, that view on curriculum development does not prohibit a presentation to students of the advantages and disadvantages of various approaches to a given subject matter. However, the emphasis on tolerance for disparate intellectual styles often encourages people to ignore the qualitative differences among disparate intellectual approaches. Also, economic contingencies impinge on this issue. University students often take their tuition dollars elsewhere if they are finding their lessons unwelcome, and that can be especially true of lessons that reveal the fallacies and adverse implications of having made major personal investments in superstition. In such an atmosphere, for a faculty member to explicate the greater efficacy of a particular way to think may come to be deemed socially impolite and offensive, especially if

the less effective alternatives are subjected to an invidious if valid comparison.

In such a social atmosphere, respectful public demonstrations may be garnered equally by evidence of (a) assumptions that foster intellectually immature explanatory recourse to blatant superstition and (b) an alternative class of verbal behavior that functions to preclude such illogic. Students caught in the midst of such socially enforced ambiguity about the qualitative aspects of alternative philosophical repertoires may be confused. Furthermore, a university education that has failed to probe comparatively the implications of blatant superstition and its more valid alternatives hardly represents the best return on students’ tuition dollars.

The essence of effective science inheres in a particular approach to a subject matter. When a putatively “scientific” pursuit fails to comport with that approach it is no longer regarded as *scientific*. The study of a subject matter by effective scientists is governed by the philosophical assumption that all relevant events are functionally determined. Nature is presumed to manifest as a matrix of functional relations—a presumption which, in each instance of inquiry into certain particulars of that matrix, justifies attempts to discover, measure, predict, and ultimately control relations between independent and dependent variables. Thus, the effective and efficient *practice* of science is based on adherence to a particular philosophy. Proper teaching *about* science involves an analysis of how philosophy functions in general and a comparative analysis of how *competing* philosophies bear on scientific activity, with emphasis on the practical implications of those alternative philosophies.¹

However, science is not just *taught* in universities. Science is also *practiced* there, and during that scientific work (often called *research*), the practitioners are expected to respect the tenets of the philosophy of science. A person, employed on a funded science project, who, because of superstitious assumptions, entertains recourse to mystical explanations and interpretations of data, may be

¹ In actual practice, within contemporary universities, where that teaching is typically controlled by a mystical majority, those critical *comparative analyses* are typically avoided. The philosophy of naturalism may be included among mere *presentations* of alternatives in ways that imply that the alternatives may be equally worthwhile. Often students are led to conclude that the best possible outcomes are realized when at least some kinds of phenomena are considered on the basis of superstitious assumptions. Unfortunately, those phenomena often include the essential nature of human beings and their behavior, which happens to be the subject matter of the natural science of behaviorology.

subject to dismissal for engaging in “invalid” procedures. The person’s outwardly exhibited procedures are controlled in part by the person’s thoughts. That person’s firing must be justified, however, on the basis of exhibiting invalid publicly evident procedures, even though, functionally, the objectionable procedures are determined largely by how the person thinks. The distinction between thought and action is functionally meaningless in such a case, but the apparent respect for that forced distinction circumvents potential difficulties that could escalate to the status of a federal offense.

Some may argue that university sponsored research is conducted apart from the teaching of students. They may argue that behavior that comports with the philosophy of science may be required in the conduct of scientific research to a degree that would be inappropriate to demand in the classroom. However, all aspects of university operations are constitutionally bound and remain within the reach of federal law and policy. Furthermore, within universities, students are usually involved in the on-going scientific research projects as part of their training. Under such realities the teaching-research distinction becomes too blurred to endow a right to discriminate among people according to the philosophies that inform their practices, even when credible evidence of its nature is available.

Consider just the teaching. On what basis may religious creationists, for example, receive failing marks on geology or biology tests if those students’ responses have comported with their personal basic assumptions? Suppose for example that a test features the following single thematic item: *Explain the proliferative development of different species from a common ancestral species whose members long ago dispersed among various ecological niches.* Further suppose that a religious creationist student ignores the intrinsic predicates that are imbedded in that question and responds that *God spontaneously created those various similar species and installed them in their various niches, each such niche having been brought spontaneously into existence by God as part of that same creative exercise.* May a geology or biology professor then attach a failing mark to that student’s simplistic response?

The answer is “no,” because the university may not teach natural science in the sense of discriminatively culling students according to the extent to which their practices are implicitly informed by the philosophy of naturalism. The university may teach only *about* natural science. For the professor to flunk that student, the question would have to have been recast. It would have to have begun with a qualification along these lines: “Explain, *in accordance with the philosophy of naturalism,* the proliferative development of different species....”

In that same vein, while religious mysticism is seldom explicitly advocated within public universities due to what remains of the constitutional prohibition of state

endorsed religion, those who operate within universities on the basis of common *secular* superstitious fundamentals typically teach on the basis of those secular mystical notions with impunity. Such teachers may allude to the assumed mystical events or refer more explicitly to them in ways that assert or imply their existence. Typically those faculty members simply assume or expect that students share their superstitious assumptions. It amounts to a routine breach of the same constitutional guarantees that often inhibit a corresponding kind of advocacy by the natural scientists.

For example, an incoming university student, who arrives harboring superstitious assumptions about human behavior manifesting as the executed will of a body-driving spirit (a.k.a. a willful *self*), is normally treated to a broad curriculum that presumes and advocates that idea and makes virtues of its implications. The general requirement that presentations of the natural aspect of the behavioral subject matter be accompanied by qualifications that imply tentativeness—a requirement that can be enforced with respect to the teachings of a university’s natural science community—is not similarly imposed on the purveyors of secular superstition about human behavior. Throughout the university, in the various departments that teach subject matters pertaining to human behavior, the curriculum is typically built around unchallenged assumptions of the reality of a proactive, willful, and responsible self-agent that mysteriously dictates the behavior that its host body then executes. The existence of such a self-agent is treated as a fact. Nobody insists that, in each such instance, the mention or implication of such a behavior-originating entity be prefaced by a qualification such as “according to prevailing secular superstition....”

Throughout the governing bodies at my institution, behavior—especially human behavior—was widely presumed to originate in various spiritual ways. Human behavior (actually, only its operant kinds) was variously construed, by what seemed to be a substantial majority, as a manifestation of the will of either (a) a secular body-driving self, (b) a religiously defined internal soul-like self, or (c) an ethereal body-possessing extension of an external deity. In any such case, behavior, especially the human version, was construed to be of a different fundamental character than the phenomena that defined *nature*. Nature was all else. Nature included the biological body serving as host for the behavior-directing agent plus the surrounding environment toward which behavior was believed to be directed from a somewhat proactive agential source within the body.

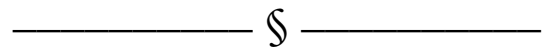
The people who were involved in the governance of the university, most of whom entertained such popular mystical notions of human beings and their behavior, were mostly drawn from the academic scholarly ranks. Few if any of them thought of themselves as superstitious

even though, with respect to human behavior, they were blatantly if unwittingly so. Through various routine activities that comported with the general and prevailing concept of behavior driven by a mystical self-agent, the normally functioning governmental operations of the university were impeding the development of a natural science of behavior—not just through the misclassification of my course, but more importantly, by keeping natural scientists and scholars of behavior–environment relations thinly dispersed among the mystical and superstitious majority where, in most cases, the naturalists can operate only as isolated and disorganized intellectual vagrants (Fraleigh, 1998b).

That dispersal depends on misdefining the natural sciences in terms of commonly accepted traditional subject matters instead of the underlying philosophy of naturalism that informs the practices of natural scientists. Obviously, such an invalid concept of the natural sciences, in addition to its comfortable compatibility with constitutional implications, can be convenient to the forces of anti-naturalism. In the effort to promote my course as a natural science course, I was led to wonder whether the strictly thematic organization of the curriculum with which I had to contend was to some degree a strategic political contrivance to maintain the university as a haven for popular kinds of superstition in which so many people within my university community were heavily invested.

I probed for the answer to that question by first forcing the members of the Liberal Studies Committee to confront the more correct concept of natural science. I concluded that I stood to learn more if I charged the windmills with what the other members would construe to be a vigorously pursued and unrelenting resolve. As a member of the Liberal Studies Program Committee as well as a Faculty Senator, my presentations were likely to receive more consideration than those of a remote faculty member with whom the committee could dispense in a more perfunctory manner.

As was true of the application that was submitted during the previous year, the current request was for inclusion of my natural science course on human behavior in both the social science and natural science course clusters approved by the Liberal Studies Program. I began by appending a special section to that course re-application form, which I submitted to the committee a few months into the academic year. That attachment to my Liberal Studies Program course application, which is quoted below, specifically addressed the issue of how the natural sciences are defined:



Supplementary Statement of Justification for Required Cluster Assignments

This request is for approval of this course for inclusion in both Cluster B [social sciences] and Cluster C [natural sciences]. This course would then be applicable to whichever of those two required areas within the Liberal Studies program that the student would prefer to apply it.

Cluster B, as now constituted, is defined largely by one general subject matter. Its courses address social behavioral phenomena in various contexts. Cluster C, on the other hand, consists of a collection of diverse subject matters all studied in the manner to which we refer as the natural science perspective. Thus, while Cluster B (social science) is defined essentially by a single broadly defined class of subject matter upon which its courses are focused (i.e., social phenomena), Cluster C (natural science) is held together by *how* things are studied rather than by *which* things are studied. While Cluster B is thus defined largely by the general kind of subject matter being addressed (i.e., interpersonal behavior among humans), the integrity of Cluster C, which is reserved for the natural sciences, inheres in an implicit epistemological approach to knowledge.

This distinction can be appreciated through some simple examples: Chemistry is the study of the composition, structure, properties, and reactions of substances, especially at the analytical level of molecular systems. More importantly, however, it is the study of that subject matter in a natural science way. Suppose, for example, that those same matter-related phenomena were to be studied from the perspective of a substantially different epistemology, (e.g., the principles and interpretive viewpoint of mystical sorcery). Even if such courses were to be taught in an intellectually respectable manner, because they would involve explanatory recourse to supernatural variables and processes, such courses would not be welcome in Cluster C in parallel with chemistry courses. Likewise, while geology courses pertain to the structure and history of the earth's crust, they also feature a strict natural science perspective. If other courses arose to offer studies of the earth's crust, but featured non-natural analytical perspectives (e.g., an explanatory appeal to a relatively abrupt and re-

cent miraculous creation), such courses would not be inserted into Cluster c in parallel with corresponding geology courses regardless of the intellectual respectability with which they may be cast, because they would not represent a natural science. Similarly, we would not install astrology courses into the astronomy curriculum in Cluster c even though they may focus in part on the positioning of celestial bodies and be offered in a scholarly manner. Only when star systems are studied in accordance with a natural science epistemology do we categorize the courses as *astronomy* and put them in Cluster c.

Likewise, when courses are devoted to the study of behavioral phenomena and are intellectually worthy of inclusion in a university curriculum, yet feature any form of mystical epistemology, we place them in Cluster b. For example, that is where we find behavior-related courses that feature religious faith-based analytical perspectives on behavior, and that is where we also find courses that feature explanatory reliance on fundamentally mystical but secular concepts such as autonomous or semi-autonomous behavior-directing (and implicitly ethereal) self-agents. Whole disciplines exist to study behavior from such epistemological perspectives, a number of which are possessed of sufficient intellectual merit to claim places in the university curriculum. However, as is appropriate, they are not grouped with the natural sciences. At this university they are included in Cluster b, and in our university libraries their literature is shelved apart from the literature of the natural sciences, as is true in university libraries everywhere. Thus, while a place can be found within public universities for most any intellectual perspective, which may represent a reasonable inclusiveness, we have developed these traditional groupings by which to organize them.

The course now before the Liberal Studies Committee poses a simple question with profound implications. It is the same kind of question posed by each of the other natural sciences: If we strip away all of the traditional explanatory reliance on mystical or metaphysical variables, can we develop an effective and worthwhile perspective on the phenomena of concern (i.e., on the subject matter)? With respect to energy forms, the answer was yes, and the result is modern physics. With respect to the structure of matter, the answer was yes, and the result is modern chemistry. With respect to life functions, the answer was yes, and the result is modern biology.

And with respect to behavioral events, the course to which this application pertains brings intellectual resources to the students that they need to construct their own respective answers to that same basic question. To help them do that, this course includes appropriate opportunities for interdisciplinary comparisons. Students not only learn the natural science perspective on the subject matter but also are invited to relate that perspective comparatively to other culturally prevalent perspectives that students are likely to bring to this course.

This course will provide a student with a comprehensive introductory study of human behavior, including its nature and its occurrences. That makes it appropriate for Cluster b, because Cluster b is devoted to subject matters centering around human *interactive behavior*, a topic thoroughly addressed in this course. Any student posting a passing grade in this course will have probed deeply into the general behavior-related subject matter definitive of Cluster b.

At the same time, because this course introduces a natural science address of its subject matter as is characteristic of courses in physics, chemistry, and biology, and also includes undergraduate-level data-based applied research, a student should be allowed to post a passing grade in this course in fulfillment of the Cluster c requirement. Natural science is an intellectual perspective—a particular ontological and epistemological framework of postulates and procedural principles through which a person attains the state of “knowing.” In designating a course as representative of the natural sciences, the particular subject matter that gets studied in that way remains irrelevant. The study of *any* measurable subject matter from that perspective represents a natural science and belongs in Cluster c among the natural sciences. Students will emerge from this course knowing natural science *per se* as well as, or perhaps better than, students who take a traditional course in physics, chemistry, or biology, especially because of the attention within this course to the philosophy of science and its role. The student who takes this course will understand well the natural science approach, and that is precisely the point of studies undertaken within Cluster c—especially within the Liberal Studies Program.

Specifically, it is requested that a student who has passed this course be allowed to count the credit from this course in either the Cluster b category or the Cluster c category, but not both.

Note on the background of the instructor:

The instructor of this course has a 29 year career at this university as a professor in the College of Human Resources And Education during which he has taught behavior science foundations for various specializations featured among the training programs in that college. He holds a doctorate in education that was earned through studies in the technology of teaching and a masters degree earned in a program focused on the principles of natural science with emphasis on physics and biology. His formal training in the natural sciences includes 64 semester hours (and an undergraduate degree) in geology, plus 20 to 30 semester hours in each of physics, chemistry, biology, and mathematics. The instructor's first professional employment (pre-doctoral) was a five-year outing as a high school teacher of physics and mathematics. He has published in the branch of philosophy devoted to the nature of knowledge.

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In accordance with established procedures, the submission package pertinent to this course, including the above addendum, was copied and distributed to all members of the Liberal Studies Program Committee for their individual review in advance of its consideration by the committee. My objective was to educate the members of the committee so that, regardless of what actions the committee ultimately took, those actions could be interpreted in light of each committee member's understanding of the issue as I was framing it.

On the occasion of the first submission of this course during the previous year, the committee had said, in effect, that a natural science course on behavior would not be entertained as such, and that if it were to be placed in the social science category where the committee thought that a proper version of it would belong, it would have to teach a variety of approaches to the subject matter characteristic of an eclectic epistemological mix. That is, an exclusive natural science course for the study of *behavior*-related phenomena could not be offered in the liberal Studies Program.

The current committee chairperson, a representative from the Department of English, had never given any indication either of personally understanding the essence of the natural sciences nor of support for the position that I was taking. I remained concerned about the bias against natural science with which the previous year's committee had greeted this course proposal—a committee on which the current chairperson had served as chair-elect. Follow-

ing the current formal resubmission of my course, including the above addendum, I sent the following note of further clarification to the committee chairperson:

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Courses in the Natural Sciences

In the past, this committee has appeared to be misled about what sort of courses are appropriate for Cluster c, which exists to group course offerings in the natural sciences. Apparently the confusion among committee members pertained to the kind of integrity that lends identity to the natural sciences. At issue is what holds Cluster c together. Some people seemed to think that the natural sciences are defined by *what* is studied instead of *how* it is studied. That is *not* correct.

Last year, members of this committee also made clear that, as far as they were concerned, a natural science course can be offered as a Liberal Studies Program course only if it addresses certain subject matters but not if it addresses others. According to that view, students taking courses within the Liberal Studies Program are permitted to study only committee-approved phenomena from an exclusively natural science perspective.

The committee would be overstepping its authority if it put itself in a position of intellectual censorship by saying that it will allow students to study, via a natural science approach, only those classes of events that the committee members arbitrarily approve. That kind of restriction on the intellectual development of students with respect to their natural science training at this public institution, apart from being unconstitutional, would also disrespect the principle of broad, open, and far-ranging intellectual opportunities upon which the Liberal Studies Program is founded.

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Another influential member of the current committee, and chair-elect for the following year, was also a faculty Senator—an outspoken associate professor of music who, during interactions with faculty colleagues, projected himself as a broadly informed academic who seemed to exhibit an above-average scholarly bent. As Senators, both he and I attended a Faculty Senate retreat held at a

nearby resort to hear and consider the views of a speaker who had been invited by the central administrators of the university to explain to the faculty leaders how, in these times of stringent economic realities, the traditional academic standards of the university must be tempered to keep the university competitive in the student marketplace.

On that occasion, this fellow Liberal Studies Program Committee member and fellow Senator had challenged that speaker by defending academic standards against the kind of subtle erosion implicit in the speaker's remarks. That incident created an opportunity for me to further expound my position to yet another influential member of the Liberal Studies Program Committee. Following that retreat, I sent the following letter to him:

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Dear _____,

I have been intrigued by your general defense of academic standards within the university—especially your participatory remarks during the recent Senate retreat. The featured speaker presented an astute analysis of prevailing economic realities of the marketplace in which the university must compete for tuition-paying students, but he was coy and evasive about how exactly to resolve the tension between economic realities and academic standards in ways that preserve the capacity of the university to contribute to a competitive and effective culture. He hinted at resolutions that would leave the university as a kind of institution to which I would not send my own children or grandchildren for an education. However, I inferred that his hints at those kinds of compromises in academic integrity were precisely what he was invited here to deliver. I have recently published a substantial paper on this theme that may be of interest to you, and a copy is enclosed. I would welcome your reactions to it.

On another front, I wish that I could tease some appropriate respect for the natural sciences from the Liberal Studies Committee. Across the past three centuries the natural sciences have emerged with such intellectual power and effectiveness that the culture has been rendered totally reliant upon those organized disciplines for its prevailing quality of life and its survival in general. It has been observed of our culture that in God we trust, but on science we rely.

Each of the natural sciences poses a similar question with vast implications: If we strip away

all explanatory reliance on mystical variables, even to the analytical level of our basic postulates, can we then develop effective and efficient technologies to cope with our environment? Importantly, no natural science discipline is defined as such simply because of the subject matter that it address. Rather, the definitive characteristic of a natural science inheres in both the natural ontology and epistemology according to which its inquiries are conducted and in the postulates that inform that manner of inquiry. Especially important is the assumption that any detectable and measurable event is functionally determined by other detectable and measurable events that have preceded it.

The Liberal Studies Committee's denial of that long and well established definitive characteristic of natural science is a cornerstone upon which its majority can then justify its manipulation of the curriculum to prevent students from contacting certain subject matters exclusively from a recognized natural science perspective. Conversely, a multitude of current Liberal Studies Program courses teach implicitly or explicitly from a purely non-natural perspective, especially about behavior-related subject matters. The result is that students are routinely compelled to confront certain arbitrarily selected subject matters (mainly behavior-related) only from the fundamentally mystical perspective that has come to characterize the so-called "social sciences."

The Liberal Studies Committee exists to ensure that students have an opportunity to contact both a variety of subject matters and a variety of different ways that people can think about those subject matters. However, the Committee's consistent action with respect both to (a) human behavior as a subject matter and (b) naturalism as an ontology and epistemology seems inequitable insofar as the Committee tolerates behavior-related courses taught *exclusively* from the mystical perspectives of religion and traditional psychology, which feature behavior originating with a mystical self-agent while, at the same time, permitting students to contact alternative concepts that are based on naturalism only as shallow curricular fragments in other courses that feature eclectic paradigmatic mixes (i.e., the Whitman Sampler approach in which only a shallow analytical level is possible).

For humans, arguably, the most important domain of phenomena that we study is behavior, especially human behavior. That importance typically increases when the objective of the study

is to account for behavior. However, across the centuries, behavior has, for the most part, been regarded as too complex and too mysterious for analytical treatment from a natural science perspective. During the historical interval across which physics, chemistry, and biology were emerging, even many natural scientists tended to defer to other kinds of inquiry when concerns turned to behavioral phenomena. In place of a natural science of behavior, the euphemistically named “social sciences” evolved, but followers of the social sciences merely apply scientific methods to pursuing the implications of the mystical postulates that have been carried forward, from nonscientific cultural origins, to constrain the study of behavior—a kind of circumstance illustrated by the old scenario in which the full armamentarium of the physics and chemistry laboratories is to be focused on a specific straight pin in an effort to solve the riddle of how many angels can dance simultaneously on its head. Something is wrong with doing that, and being able to specify what is wrong, and to explain why, is, in my view, a necessary qualification for membership on the Liberal Studies Committee.

Across the past century, a natural science of behavior, focused at its own level of analysis, has finally emerged, with organizational integrity and identity, to take its place at the roundtable of the natural sciences. Founded on a strictly natural science ontology and epistemology, it stands apart from the existing social sciences insofar as it eschews explanatory reliance on assumed mystical variables: In this natural science discipline, the human species is construed to be a product of nature; life and behavior function through natural processes into which the possibility of mystical intrusions is not entertained; and scientific inquiries are conducted to explicate functional relations among real variables rather than merely to pursue the physical implications of putatively mystical events. In its most uncompromised expression, this discipline is known as *behaviorology*, and I am a behaviorologist. As is true of other natural science disciplines, the organizational integrity of behaviorology inheres in its professional organizations and its body of literature, while its intellectual integrity inheres in its postulates and principles.

Apparently, large numbers of people who do not want a natural science of human behavior not only reject it personally but also stand ready to preclude opportunities for others to explore its philosophy and science. I am continually dismayed at how many such people are to be found

within the university community, which presumably exists to explore the implications of all ways to think about phenomena that are of importance to our species—and at how many of that group are willing to engage in political ploys to preclude students having meaningful opportunities to plumb the intricacies and implications of such a paradigm as part of their putatively liberal education. Precluding student access to a natural science perspective on *anything* really besmirches the essence of the university, and I have found that those with the most pious rhetoric about the essence of the university as a cultural institution for the open exploration of knowledge can also be among those most willing to misuse the political machinery of the institution to enforce their anti-science prejudices. Have you noticed that as well?

Indirect evidence suggests that you may disagree with the essence of what I have said here, and because I have found reasons to respect your position on another front, I invite you to share your views with me on this one, and I look forward to hearing from you.

Best regards,

Lawrence E. Fraley

Enclosure: Fraley, L.E. (1998). Adverse implications for university teaching concealed in economically driven policies. *The Behavior Analyst*, 21, 289–305.

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At the next monthly meeting of the Liberal Studies Committee, the person to whom I had sent the above letter made a point of saying to me, in a cordial way, that he had received my letter and that he was preparing to reply to it. I told him that I would look forward to hearing from him, but the fact that a response from him never arrived did not surprise me. However, he was now informed of the issues in a way, and to a degree, that rendered my interpretation of his subsequent actions easier and the conclusions more reliable.

In keeping with established committee operations, a member of the Liberal Studies Program Committee was subsequently assigned to lead the committee’s formal deliberations on my course application. It was a person with whom I had not yet specifically interacted on this matter. It was that person’s task to collect reactions from other committee members prior to the meeting at which

my Liberal Studies Program course application was to be discussed. Based on that person's own views plus those provided in advance by other members, that individual was then to present an overview of the request and offer a recommendation about the course to which the committee would then give further consideration prior to reaching a formal decision. In keeping with committee practice, I was required to absent myself from the committee during its deliberations of my own course application.

In keeping with established procedures, members of the committee who were forwarding preliminary remarks about the course to that coordinating person posted their reactionary comments on the committee e-mail list-serve so that all members of the committee could see them. From those remarks, it seemed obvious to me that committee members were struggling with ways to rationalize keeping this behavior-related course out of the natural science category—a task that I was deliberately making as difficult for them as possible.

Shortly before the meeting at which my course would be considered, I sent the following message to the person who was coordinating committee consideration of my course application:

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This is a straight-forward natural science course with lab work conducted in the form of applied projects. Such a natural science course can and may focus on the study of *any* phenomena that can be identified and measured, and that certainly includes something as common and as much a part of people's lives as behavior.

Hopefully we are safe in assuming that all members of our committee agree that it is not this committee's business to define arbitrarily the subject matters that members of the university natural science community may study and teach from their own natural science perspective. Nor is it the business of our committee to limit arbitrarily the phenomena that students may contact from a natural science perspective within this university's Liberal Studies Program. Breadth of intellectual opportunity has always been the stated goal of our Liberal Studies Program Committee, as well as both breadth and depth in the interpretation of subject matter. Arbitrary limitations would be antithetical to the committee charge and mission.

The application submitted for this course makes clear a couple of especially relevant points:

First, like other natural science courses, this course teaches, as comprehensively as possible in an introductory course, the natural science approach to its subject matter. Furthermore, in keeping with the spirit of breadth, balance, and interrelations that should characterize Liberal Studies courses, this course, while teaching what is for most students a new natural science perspective on behavior, also puts a heavy emphasis on what makes it a natural science course. It does that, in part, by comparing and contrasting its ontological and epistemological approach with those of other prevalent perspectives on its subject matter—at least one of which is already somewhat familiar to nearly every student. The emphasis is not merely on the differing fundamental assumptions that inform those different approaches, but also on the relative capacities of those approaches to support the practical endeavors of various practitioners. That is, how one thinks about what one is doing has important practical implications for the efficiency and effectiveness that one can attain. That is an important point, and it is addressed in this course.

In short, a student taking a natural science course, especially within the Liberal Studies Program, should not only learn some scientific principles and practices pertinent to the subject matter, but should also learn something of why it is generally deemed worthwhile to bother looking at phenomena in that way. The student should emerge from the course with some notion of peoples' differing capacities to deal effectively with a subject matter as a result of the differing philosophical perspectives through which its events may be interpreted. Students should also appreciate the socio-cultural implications of those differences. This course addresses these kinds of objectives and does so at the scholarly level of the undergraduate student. These are precisely the kinds of objectives long publicly endorsed by the Liberal Studies Program Committee.

I recommend committee approval of this course on the grounds that it is constituted to do exactly what a Liberal Studies course is supposed to do. Furthermore, in accordance with the established categories, which feature both the social sciences and natural sciences, this course clearly fits into both categories as argued in the application.

cc: Liberal Studies Program Committee members

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Throughout the prolonged episode it seemed obvious that this Liberal Studies Program Committee would never actually approve this course for inclusion in the natural science area. However, if I had requested *only* the natural science area, where the course belonged, the committee, in denying that request, would thus preclude the course being offered within the program. Because I did want to emerge from this exercise with a course that I could offer within the Liberal Studies Program, it was necessary to frame the request in terms of both the social science and natural science clusters.

A day or two before the meeting at which my course would be considered, I sent an e-mail message to the committee chairperson that was focused mainly on other committee business. However, I included a peripheral mention of the course application and added that "I am looking forward to your interpretive review of the committee's thinking on the issues pertinent to the course application." That remark alluded to the somewhat detailed letter explaining the decision of the committee that the committee chairperson traditionally sent to a faculty member after that person's course application had been considered and acted upon by the Liberal Studies Program Committee.

As I anticipated, the committee kept the course out of the natural science category while deviating from its action of the previous year by approving the inclusion of this course among the Liberal Studies Program social science offerings. Although it was a well established practice to share the rationale behind committee decisions with the faculty members who had submitted course applications, I received a perfunctory letter from the chairperson that announced only the decision without *any* explanatory address of the committee's consideration of the relevant issues.

My general social relations with the other committee members had developed within the envelope of cordiality that characterizes typical working relations among differently disposed academics—and they stayed that way. However, I had deliberately forced the committee into a political decision and had done so in a way that prevented the committee members from concealing that fact behind a cloud of contrived quasi-rationale—a typical approach in academic political circles that the chairperson, perhaps to her credit, had not even attempted when conveying the decision to me.

Following the committee's action on my course, as the semester wound toward its conclusion, it seemed that the other committee members and I mutually understood that the committee's treatment of my quodlibet had received the less scholarly and more political resolution that academics dislike having to render in an un concealed way. My probe had been a solo experiment; I had had no allies on the committee, nor, as far as I could tell, in the faculty senate as a whole—and none to whom I

could point in the faculty at large. At the end of the spring semester, with my probe concluded, I opted to discontinue serving on that committee.

Discussion

The Convenient Implications of an Incorrect Definition

At first blush, misconstruing the essence of the natural sciences may seem like a simple mistake resulting perhaps from insufficient schooling in the philosophy of science. After all, certain strands of commonality among the subject matters of the traditional and familiar natural science fields afford a salient basis for a mistaken definition of their class—especially among the majority of academics who were trained and continue to work outside of the natural sciences. In that commonly held view, the term *natural* is interpreted to refer simplistically to events in the "great outdoors." Some people entertain a more general version in which natural science pertains to the vaguely defined external environment apart from people and their behavior. However, as the not surprising results of my probe imply, mere enlightenment does not necessarily yield an immediate correction of that mistake.

The prevailing non-natural philosophy that informs much academic activity has broader and more important implications than peoples' misconstruing the essence of the natural sciences. The prevailing concept of a university, and convictions about how it should operate, are determined largely by prevailing mystical philosophical perspectives on the nature of human beings and their behavior.

Within universities, an enduring curricular objective is to expose students to variation, which is typically accomplished through general requirements that students select courses from menus that represent the different facets of the human experience. That enforced course sampling is intended to bring students into contact with diversity in both subject matter and in ontological, epistemological, and axiological treatments of subject matter. Natural scientists and scholars of behavior tend to support that objective as well as the typical university approach to its attainment. Support for that approach has become an established criterion for good citizenship within the academy.

The self-selection of courses by students helps in matching the behavioral capacities of the students with opportunities for the expansion of those capacities, because, in selecting courses that will provide new skills, students tend to avoid challenges that exceed the potential of their preparation. At the same time, however, the enforced selection from established *categories of courses* insures some increase in the intellectual flexibility and adaptability of the students as they prepare to cope with

a complex environment. Allowances for the play of student idiosyncrasies through such course sampling by students is tolerated because, as yet, universities have little capacity to prescribe a specific worthwhile curriculum suited to each student.

For the more superstitious and mentalistic faculty majority, student exposure to such curricular options is in keeping with the notion that students, construed as autonomous agents, *initiatively* shop among the curricular offerings. Students are presumed to select contact with facts that are of interest and also to select the best way to think about them. According to that popular but invalid view, course requirements exist merely to influence a student's self-agent to engage in a wider range of shopping and to foster a more thorough acquaintance with the training opportunities that are being made available. However, the choice is supposedly left to the autonomous or semi-autonomous self-agent.

Under that prevailing view of a person, a university is not a center of prescribed behavior engineering but is instead something like an intellectual smorgasbord. Both subject matters (defined behaviorally in terms of environmental variables) and the philosophical perspectives through which they are studied are to be made available on a curricular menu. Each student, as a somewhat autonomous self, makes his or her idiosyncratically determined course selections from that menu. Within a given course, the teaching, rather than being construed as a conditioning procedure, is presumed to be mere *presenting*—and learning implies *selective internalization* at the discretion of a somewhat autonomous and intrinsically mysterious self-agent. The presence of that agent manifests as proactive mental activity.

In reality, this results in course selections in accordance with somewhat unspecified idiosyncratic contingencies that, upon analysis, usually have students behaving in ways that make probable their contacts with familiar reinforcers. Once a specialization is identified, and the student moves into a specialized training phase, a larger fraction of the training objectives are specified by specialists in the field, and the behavior engineering often becomes more clearly defined and more explicit. Instructors in those specializations describe the skills that students are expected to exhibit. The students' involvement in the kind of conditioning necessary for them to meet the specified objectives is simply required.

The students' curricular introduction to diversity can be effected at different organizational levels within the institution, but how it is done is determined by the organizational level at which the requirement of diversity is enforced. A course is typically constructed around a set of related subject matters denoted collectively as a *major topic*. To encounter a substantially different subject matter one must usually take a different course.

Within the natural sciences, the courses tend to be ontologically and epistemologically pure in their comports with naturalism regardless of their respective subject matters. Therefore, with respect to epistemological approaches (as opposed to subject matters), variance will be encountered at the course level by a natural science student only if that student selects courses from university units that range beyond the natural sciences. For example, a student in a physics course in mechanics can encounter a different kind of subject matter merely by taking another physics course—in electronics, for example. However, to increase the likelihood of contact with a different ontology or epistemology, that student would have to enroll in a course that is offered by a university unit outside of the natural science cluster. Throughout the remainder of the university, the philosophy that informs practical activity pertinent to the subject matter may vary.

Unlike the philosophical integrity that characterizes a natural science course, in the *social* sciences epistemological variance can be accomplished *within* courses, or so the theory goes. For example, a typical social science course may feature several units of instruction that purportedly introduce various ways of coming to know about a given increment of subject matter. Those units of study may have titles such as “cognitive approaches to...,” “behavioral approaches to...,” “humanistic approaches to...,” and “religious approaches to...,” all of which pertain to the same block of subject matter as defined in terms of environmental variables.

Except at an elementary level that is below expectations for university student comprehension, such courses can actually do little to prepare students to compare and contrast disparate ontological and epistemological foundations, because the teaching burden implicit in such a grand objective far exceeds the instructional capacity of a typical course. In general, such courses do little more than survey samples of the products respectively produced by adherents to the various philosophies to which such units of instruction allude, with only superficial references to the respective underlying assumptions that informed the production of those products. Treatments of those differing philosophical foundations often appear as little more than a few sentences that begin with phrases such as “the ————ists believe that....”

Advocates of philosophical eclecticism may be made uncomfortable by the degree of ontological and epistemological purity that prevails within natural science communities. Furthermore, such a curricular concept may seemingly transcend the constitutional prohibition against the imposition of thought that many people find implicit in the epistemological exclusivity that prevails in academic natural science subcommunities. The defense of philosophical eclecticism in university courses can then

be carried to an ethical or even a moral level of argument. The belief is then fostered that courses featuring an ontological and epistemological smorgasbord *should* predominate—perhaps even be legislated across the university.

However, the natural sciences, unlike the currently conceived social sciences, cannot respect that model of philosophical diversity and still maintain the naturalistic intellectual integrity that is crucial to their effectiveness. An appreciation of this truth can be realized by examining any of the many detailed scientific accounts that afford a solution to some great mystery—especially the kind of account that weaves the strands of several natural sciences into a comprehensive analysis of a complex and challenging problem to reach a satisfying conclusion. It soon becomes obvious that the important conclusion could not convincingly have been forthcoming had those analytical strands been contaminated with the superstitious and mystical assumptions that are prevalent in contemporary culture. (A book by Ryan and Pitman [2000] provides a particularly good example while rewarding the reader with a worthwhile and fascinating science story.)

In the social science community the prevailing assessment is that naturalism and its alternatives represent ontological and epistemological options that may be of potentially equal merit. In contrast, in the natural science community the prevailing assessment is that philosophical repertoires range along a qualitative gradient that is defined in terms of practicality. In relation to the philosophy of naturalism, the superstitious alternatives are deemed to be less intellectually mature as well as efficaciously inferior ways to think about whatever subject matter is under study. Within a natural science academic community, the proffer to students of such inferior intellectual merchandise constitutes an unethical breach of professorial responsibility.

Natural scientists do entertain one kind of intellectual diversity. It manifests at the theory level in connection with work on what people describe as the *scientific frontiers of a given field* where probes of some phenomenon of interest have yielded incomplete evidence. A theory is a coherent set of verbal behaviors that describes observed events in a way that comports with an incomplete set of evidence. In a given case, any number of such theories may arise. Two possibilities can account for multiple theories: (a) Existing but limited evidence can support more than one kind of account. (b) Different subsets of evidence are taken into account on different occasions. However, as the evidence being taken into account becomes more complete and more available to all parties, the range of theories shrinks, and ultimately a surviving theory may prevail. As that surviving account comes to predominate, having been called a *theory* in the former competitive phase, it then comes progressively to be described instead as a *fact* (e.g., early in 1999 newspapers

worldwide reported that the Pope was now informing Roman Catholics that biological evolution should be regarded as more than just a theory).

The term *fact* refers to a controlling relation between an environmental event and some behavior, in which the behavior proves reliably effective. For example, suppose that an environmental event (e.g., the moon) evokes behavior that was previously conditioned in the presence of rocks that were contacted in non-lunar contexts. The moon is then evoking elements of one's previously conditioned rock-relevant behavioral repertoire. If that moon-evoked and rock-related behavior continues reliably to be reinforced, eventually a fact of that expanded set of controlling relations, along with the appropriate autoclitic enhancements, can result in the statement that "the moon consists of rock"—a statement that, with the continuing accumulation of such a behavior-controlling history, may be described first as a theory and eventually as a fact. That reclassification has its own implications: A description that is reclassified from theory to fact thereby gains a special increment of immunity to contradiction by any further adduction of contrary evidence. (For an excellent example from the annals of modern cosmology, see Arp [1998].)

However, despite such theory sifting in connection with probes conducted on the ontological frontiers of their subject matters, the natural science sub-communities remain relatively consistent at the level of their common fundamental philosophy. The distinction between (a) theories based on differing subsets of adduced evidence and (b) differing ontological and epistemological foundations by which to interpret evidence in the first place—and the implications of that distinction—may elude some people. They may then be led, mistakenly, to regard *theoretical* diversity within a natural science field as evidence of ontological and epistemological inconsistency. Those who are predisposed to dilute the philosophical integrity of the natural sciences may then assert, on the basis of that fallacy, that the touted philosophical integrity among the natural sciences is unreliable. They may argue that, in the face of such internal disagreement, no philosophical integrity exists to be protected.

Such fallacy-laden reasoning facilitates efforts to intrude non-natural philosophies into academic natural science communities and to enforce the implications of such impositions. Pressure to do that is exerted in various ways—for example, as efforts to compel respect for religious creationism in courses in biology, geology, and astrophysics—or to compel respect in behaviorology courses for what are believed to be autonomous body-directing self-agents. Behavior analysts working within psychology departments may be pressured to include in their courses equal time for traditional psychology content with its underlying baggage of fashionable paranor-

mal assumptions. During instruction about behavioral phenomena from the psychological perspective, the paranormal nature of autonomous self-agents often goes unidentified as such. The imaginary nature of the self-agent is accorded analytical immunity. The uncritical acceptance of that construct is neglected in the rush to explicate its implications, which are treated as the important aspects of the subject matter.

To lend verisimilitude to those misguided notions, various physiological mechanisms within nervous systems are misrepresented as real-world effects of putative if de-emphasized mystical forces such as the willpower of the self-agent. However, the subject matter is no less mystical if it consists of phenomena, pertinent to human beings and their behaviors, that make sense only if human beings are inferred to be operated by spiritual entities that go unmentioned or undescribed as such. Merely referring to that ethereal proactive manager as a *self*, which most everyone uncritically accepts, does not enhance the respectability of an intellectual perspective that remains firmly rooted in popular superstition.

Since antiquity, the nature of both human beings and human behavior have been misinterpreted on the basis of non-natural postulates. We continue to live in a predominantly superstitious culture, and universities are culturally created institutions that cannot readily transcend the superstition-based practices and traditions of the culture that has spawned them. The substantial majority of faculty members in those institutions reflect the predominant predisposition to superstition that prevails in the ambient culture. The superstitiously informed behavior of university faculty members need only manifest with appropriate academic sophistication.

Natural science, supported by its foundation in natural ontology and epistemology, represents a unique and fragile emergence—so potent in its efficacy that the culture cannot now be sustained without its products, yet politically vulnerable in its somewhat alienated intellectual isolation in the vastness of the ambient mystical culture (e.g., Ulman, 1993). Within the culture out of which natural science has evolved—a culture that now, in turn, relies upon natural science for its existence and maintenance—many people, ironically, seem to fear sciences based on the postulates of naturalism (Skinner, 1953, chap. 1-3; 1971, chap. 1) as if those sciences were intellectual cancers. Many people remain preoccupied with the political containment of the organizational manifestations of those sciences.

One threatening implication of natural philosophy is that the reinterpretations of phenomena that natural philosophy and science afford are potentially applicable to *all* of reality, not just to the traditional subject matters of the natural sciences. That is, the entirety of the phenomena that define the environment, including

events on both sides of organic skin, are subject to reinterpretation from the natural science perspective.

Behavior, for example, is as susceptible to natural science treatments as any other class of events. Among the first casualties of the intrusion of naturalism into the domain of behavior are the superstitious underpinnings upon which nearly the entire culture has based interpretations of human activity. Cultural institutions of various kinds, some in place since antiquity, face substantial readjustments under the scrutiny of a natural science of behavior. To comport with the realities that are recognized through natural science interpretations, cultural agencies would in many cases have to be reconceptualized and reconstructed—typically in ways devoid of comfortably familiar attributes.

Law, religion, education, welfare, and many aspects of government are subject to recrafting in light of the behavior-related realities that are revealed from a natural science perspective (see Skinner, 1953, section V; specific examples include Fraley, 1998c, 1998d, 1998e, and 1994). Even the traditional discipline of philosophy is subject to a major overhaul (Fraley, 1999) when natural ontology and epistemology are brought to bear in analyzing the traditional discipline that is organized around the study of philosophical issues (i.e., the discipline of *philosophy per se*). Much is at stake in admitting a natural science of *behavior* to full-fledged status within the natural science community. When that happens, the result may be a more intrinsic and fundamental kind of change to the culture than has occurred from the emergence of the currently constituted natural science establishment.

Within universities, most academics resist the establishment of independent departments, housed among the existing natural science units, where concentrations of natural scientist-scholars of behavioral phenomena would work (Fraley, 1997). However, that resistance seldom appears to result from penetrating and detailed analyses of the adverse effects of a natural behavior science on the various cultural foundations in which academics respectively have personal investments. As the results of my limited probe seem to hint, just an inkling may suffice.

By misdefining the natural sciences (as a class) in terms of currently studied subject matters instead of the common ontology and epistemology of naturalism, which is their true essence, the range of phenomena to which the natural science kind of attention is directed can be contained at its status quo. That containment then requires no more effort than simple rule following based on established categories of subject matter. Importantly, behavior-environment relational phenomena remain outside of the periphery imposed by that false definition of *natural science*. That leaves the study of behavior-environment functional relations to be relegated to the social sciences. However, there it cannot be lodged

as a separate discipline, because, in what, theoretically, are the philosophically eclectic social sciences, philosophical exclusivity is not recognized as a legitimate basis for a separate department nor even for a single course.

The predicament in which this leaves the natural scientists and scholars of behavior is to some extent an implication of constitutional law. The clustered natural sciences within universities represent the only grouping of university faculty that is *functionally* if not formally constituted according to the fundamental ontology and epistemology entertained by its people. All other university units functionally and formally derive their identity and classification from the classes of subject matter, defined in terms of environmental variables, upon which the scholarly attentions of their members are focused.

That traditional kind of relation between university units and the subject matters upon which their faculty members are focused predominates in part, *because how any person thinks about a subject matter is construed to be decreed by the national constitution to remain an independent variable*—an implication of the so-called freedom of speech guaranteed by the First Amendment to the Constitution of the United States of America. Neither a public university, nor one of its academic units, is treated as constitutionally free to dictate explicitly the kind of ontology and epistemology that is to be practiced by a faculty member as a qualification for membership. Neither faculty members, nor the students whom they teach, may be screened on the basis of personal respect for a particular philosophical approach to the subject matter.

Epistemological approaches may themselves legitimately become a curricular subject matter, but a critical distinction inheres in differences between (a) requirements to *describe* a particular epistemological approach and (b) requirements that its tenets share in controlling still other classes of one's behavior (that is, it's one thing to teach about it and something else entirely to enforce personal displays of its functionality, especially in contexts that range beyond training exercises).

The legal status of the natural-science clusters in public universities—that is, the right to exclusive departments and clusters of departments—is formally supported only by subject matter considerations that, under constitutional prohibition, may not penetrate to the level of the ontology and epistemology of the involved people. Within public universities, any philosophical coherence, exhibited by a department faculty that is organized around a particular field of study, is necessarily left to result from prevailing *natural* contingencies. Any relevant requirements that are enforced can have only *indirect* philosophical implications lest they intrude on the First Amendment rights of individuals.

However, those natural contingencies and indirect constraints that support adherence to naturalism have

been sufficiently effective to insure an expectation, and often reluctant acceptance, of the predominant naturalism of the natural science faculty across the university in spite of the prevailing formal constitutional prohibition against enforced philosophical exclusivity. The prevailing natural contingencies, and other means of indirect support, compel respect for naturalism about as effectively as formal policy could compel respect for naturalism.

As a practical matter of cultural reality, to do effectively what the culture relies upon the organized natural sciences to accomplish, they must be granted the level of self-determination implicit in independent academic departments. Within those departments, the combination of means that is necessary to insure such philosophical naturalism is now widely accepted as legitimate.

Those whose recourse to mysticism and superstition could interfere with their doing effective natural science tend to be preemptively screened and rejected during the hiring procedure—a phase in the employment process that, by design, is characterized by relaxed accountability. An applicant for a faculty job is still not explicitly rejected on the basis of the personal philosophical repertoire that would inform that person's work, but on the basis of a preparation history and previous work products that portend an inferior quality of work relative to that of more appropriately prepared applicants. The latent link is the fact that, insofar as one's philosophical repertoire directly and qualitatively informs one's scientific work in a direct functional manner, a person with superstitious assumptions pertinent to the departmental subject matter cannot and does not do effective and worthwhile natural science pertinent to that subject matter.

Obviously, the same methods are applicable to the recruiting in units outside of the natural sciences. Thus, the faculties in many such units are thereby kept as mystical and superstitious as the natural science departments are kept free of those characteristics.

Within natural science units, persons who stray from the natural perspective on the subject matter often encounter increasing difficulty in remaining sufficiently competitive to be retained. The natural science perspective renders people especially competent in scientific and technical contexts. Persons who do not think that way tend to be uncompetitive in natural science units, where performance standards are high to match the degree of control over the subject matter that natural science makes possible for its practitioners. Thus, the elimination of those whose ontology or epistemology is of a non-natural stripe can be accomplished through the enforcement of traditional academic standards for faculty, whereas the relatively ineffective ontological or epistemological repertoires of those people, which precipitated their difficulties, being privately verbal in nature, remain legally immune to formal intrusion. That is, while such people

can be expelled for the poor quality or insufficiency of their products, they cannot be expelled solely on the basis of private philosophical practices that may have been functionally responsible for that inferior record of production.

As has often been observed, superstition does not foster the evolution of good science nor does it support worthwhile scientific activity. If good scientific practice, conditioned in other contexts, is brought to bear on the implications of a superstitious assumption, then methodologically good scientific behavior may be expended on a nonsensical quest. That is why, in the natural science community, good scientific methodology is insufficient. The functional quality control of scientific practice by verbal behavior from a repertoire of philosophical naturalism is equally essential.

Nevertheless, some generally superstitious individuals can secure themselves within natural science communities by narrowing the focus of their scientific inquiries and pursuing those inquiries according to uncritically accepted scientific procedural rules, the philosophical origins of which they largely ignore. That is, they confine their scientific activity to phenomena possessed of no adverse or contrary implications for the mystical postulates that may heavily influence their activities outside of the limited ranges of their rule-governed scientific specializations.

According to conventional academic wisdom, philosophical heterogeneity is valued, because it insures a variety of approaches to the subject matter. In that kind of variance, defenders see a greater likelihood that effective solutions to problems will emerge, so they support a philosophical scattergun approach to curricular construction. Among the majority of academics residing outside of the natural science clusters, ontological and epistemological perspectives that are built around naturalism command no special respect. In a community such as a university, the majority of people are blatantly mystical and exhibit substantial amounts of superstitious behavior—for example, in their frequent explanatory appeals to the presumed interventional powers of both deities and body-driving self-spirits.

Under those circumstances no consensus on the qualitative differentiation of philosophical foundations can be anticipated even though the superiority of naturalism is arguably one of the most salient aspects of modern history. The advantage of naturalism remains a somewhat unwelcome lesson any teaching of which has been conducted only by the tiny minority of the population that has attained the intellectual capacity to move beyond superstition. Not surprisingly, that also seems to be the group that most appreciates the cultural importance of having done so.

Within natural science communities the qualitative advantage of the natural ontology and epistemology is recognized, respected, and—to the extent possible—pro-

tected. In natural science training programs valuable class time is not sacrificed to provide equal billing for the superstitious alternatives to naturalism. The faculties of natural science departments preclude many problems related to that issue through their hiring policies. Thus, geology departments do not hire water dowzers just in case a dowser, during exercises in the field, may find ground water that the geologists have missed—and biology departments do not engage religious creationists to insure at least the possibility of a better accounting than the evolutionary biologists could provide should a new life form be discovered. In natural science units such an eclectic philosophical approach to maximizing effectiveness is regarded as wasteful nonsense.

Within natural science units the advantages of diversity and variation are realized at the level of theory, not at the level of basic postulates. Creative and diverse thinking is encouraged, but within the framework of naturalism, which precludes recourse to superstition. Thus, the advantages of intellectual diversity are realized, but *within* a constraining envelope. That restriction takes into account the fundamental principle that some ways to think yield verbal products that share in evoking what tends to be efficaciously inferior environment-affecting behavior. Not all ways to think about a problem prove to be worthwhile, and that difference becomes important in proportion to the value of what is at risk. That is why, when an effective solution to a problem is absolutely critical, calls for mystics are seldom issued, and people turn instead to natural scientists and engineers.

However, outside of the natural science subcommunities, the remainder of the university community continues to tout the value of ontological and epistemological diversity. In a social science department, where philosophical eclecticism is regarded as appropriate and worthwhile, the professional activity of a substantial number of faculty members should reflect a philosophy of naturalism. However, in spite of endorsements of philosophical diversity, persons with a natural science perspective on human beings and their behaviors may be excluded from various units or may be limited numerically to the point of tokenism, especially among the faculties in social science fields. Applications of the widely professed principle of intellectual diversity may seem to occur only when doing so serves those invested in mysticism. Paeans to philosophical diversity, if forthcoming only on such occasions, can seem more like ploys to disguise political strategy, that keeps the university safe for mysticism, than like exhibits of allegiance to a pedagogical principle.

The situation is different in the natural science units. Divergence in philosophy that would carry to departures from naturalism is not respected in the first place. The fact that ontological and epistemological foundations can be graded qualitatively is one of the grand implications of the

past 500 years of cultural evolution. Some ways of thinking lead to more effective outcomes than do others. More specifically, any set of real phenomena to which human attention can be directed, when regarded as natural and studied scientifically, is subject to a kind of explication that leads to a greater benefit for more individuals, their group, and their culture than can be realized through recourse to any kind of superstitious philosophical alternative. However, to the extent that people are invested in superstition, they cannot afford to know that.

However, bigger changes than mere readjustments in the internal workings of universities would have to occur throughout the culture to fully realize whatever worthwhile implications inhere in that revelation. When recourse to superstitious behavior is widely and intensively promoted throughout a culture especially by its various cultural agencies—when indulgence in certain classes of superstitious activity is widely regarded as a worthwhile aspect of personal development to which parents and teachers should direct their charges—when a substantial fraction of culturally important people earn a livelihood promoting superstitious practices and enjoy exemplary status precisely because they do so—when the extent of personal indulgence in superstition becomes a criterion for the qualitative measure of a person, then exhibitions of superstitious behavior become highly valued within the ambient culture. Behaving in certain superstitious ways is deemed virtuous, and it becomes ethical to support and respect such activity. Such a culture evolves to protect the substantial investments of its people in the particular kinds of superstitious activity that characterize that culture.

Under those circumstances, a common self-deception tends to occur. Superstitious behavior tends not to be recognized as such (a kind of declassification of the activity as *superstitious*). Speaking of such activity in other terms precludes the kind of critical self-analysis that the term *superstition* otherwise tends to evoke due to the punishment that is commonly reserved for the other kinds of superstitious activity exhibited among disrespected classes of people—often outsiders. By labeling as “superstitious” certain practices of a remote and little understood group, its members and their culture are thereby easily ridiculed. This can easily be done by people who themselves exhibit blatant and extensive superstitious behavior that goes unnoticed by those belittlers in part simply because they do not label their own versions of such activity as *superstitious*.

Summary

Many members of the social sciences, arts, humanities, traditional philosophy, and religion entertain the view that, while the traditional natural sciences may be necessary for coping with the environment as they understand it, the followers and practitioners of the natural sci-

ences are prone to socio-cultural irresponsibility (Skinner, 1953, chap. 1). Those who entertain that view tend to argue that the actions of natural scientists must be tempered by certain kinds of counter-controls exerted from what they see as the more *humanistic* sector.

The natural scientists and scholars of human behavioral phenomena counter with the proposition that *no* behavior-related phenomena of any importance can be identified for which superstitious regard portends better outcomes than its regard according to naturalism. They incredulously ask when, where, and with respect to what are we presumably better served by recourse to superstition than by recourse to naturalism. True, adherence to the natural perspective implies a substantial overhaul of the culture. However, those whose activity is informed by naturalism point to the gratuitous self-service, the damage to the common intellect, and the personal suffering that continues to result from reliance on superstition. They argue that a substantive beginning on such a cultural remake is long overdue—that a culture relatively free of superstition is not only possible, but could be far *more* humane in its practices than a culture that is based on grand scale self-deceptions by its people.

The emergence of a strictly *natural* social science megafield would bring the efficiency and effectiveness of the natural sciences to bear by way of the very cultural function that the humanists, traditional philosophers, and religionists tend to see as their piece of the cultural business. Furthermore, that kind of revolution would largely displace the traditional prescribers of human conduct and virtue, because that revolution would be effected by a subset of the natural scientists themselves—namely, those who concentrate their studies on human environment-behavior relations (primarily, a subset of the behaviorologists). The conversion of the social sciences into natural science fields would represent a fundamental change in the system of cultural checks and balances from which the traditional keepers of the values of humanity would, for the most part, see themselves excluded. While the pressures of history are building against one side of that door, it is not surprising that the traditional stewards of humanism brace it from the other.

Contrasting Strategies of Disciplinary Emergence

Most natural scientists and scholars of behavior-environment relations would like to see their discipline take a leading role in moving the study of behavior away from superstition and mysticism. They regard behavior as a natural phenomenon and believe that it is most productively studied from the more efficacious and intellectually mature perspective of the natural sciences. In general, natural scientists and scholars who share common interests and goals tend to organize—informally at first, and then in more structured ways.

With respect to the *behavioral* scientific community at large, professional organization has occurred in two forms, each supporting a different approach. One approach is practiced in the Association for Behavior Analysis (ABA), which has focused the energies of its members on converting the mystical majority to naturalism through strategies of infiltration and integration. The other approach is practiced in a pair of organizations, the International Society for Behaviorology (ISB) and The International Behaviorology Institute (TIBI). These latter two organizations are focused instead on disciplinary independence in ways that circumvent the existing mystical majorities in the culture at large. The two contrasting approaches (i.e., change through infiltration and conversion of the traditional mystical establishment and change through independent organization apart from that traditional establishment) are incompatible.

Apart from such professional organizations, a further kind of potential disciplinary organization can occur within universities where the followers of discriminable disciplines and fields tend to be clustered accordingly.² Governments also recognize organized disciplines and fields in various ways, but governmental recognition tends to reflect the organization of disciplines and fields within universities.

Behaviorists, especially within universities, work to promote recognition of a natural science of environment-behavior relations and to secure organizational arrangements that will foster the maturation of their discipline. However, the two incompatible strategies of disciplinary emergence have each gained proponents within the community of natural behavior science: (A) Infiltrate departments, previously organized within universities, in which less effective thinking about the behavior-related subject matter predominates, and change how their faculty members think about human beings and their behavior. (B) Organize independently within the university (Ledoux, 2002b). From within those independent departments, exhibit the more efficacious ways of thinking that characterize the natural sciences, produce effective products, and eventually prevail across a protracted period of informal *competition* with units that are separately organized around superstitious assumptions about the behavioral subject matter. These alternatives for promotion of the discipline have been debated vigorously (e.g., Azrin, 1977; Epstein, 1984, 1987; Fraley, 1987, 1997, 1998a, 1998b, 1998f; Fraley & Ledoux, 1997/2002; Fraley & Vargas,

1986; Grote, 1997; Harzem, 1987; Johnston, 1997; Lee, 1987, 1989; Leigland, 1985; Malagodi & Branch, 1985; McDowell, 1991; Proctor & Weeks, 1988; Rakos, 1997; Skinner, 1993; Ulman, 1993; E. Vargas, 1987, 1993a, 1993b, 1994, 1995; J. Vargas, 1989; and Wulfert, 1997). Continuing debate can be anticipated on this contested issue.

The majority of behaviorists has adopted the A strategy, and in doing so has set for itself the task of converting superstitious people, most of whom have lifetime investments in mystical perspectives on human beings and their behaviors. Many followers of that infiltration strategy have justified that quest to themselves by hewing to what some others argue is a misconstrued concept of the task. Those pursuing that integrate-and-influence-strategy have often assumed that the misguided social scientists will change their intellectual direction in response to evidence-based demonstrations of the greater effectiveness of the natural science approach that behaviorists usually stand ready to provide (for a more detailed analysis of the perils in that strategy, see Fraley, 1997). In general, that strategy requires that the behaviorists gain the cooperation and trust of those whom they strive to change, because under that strategy the behaviorists must share an organizational infrastructure with them.

Some of those infiltrators actually hold little hope of converting their mystical faculty colleagues to naturalism and instead strive merely to establish an island of opportunity within the host department in which some fragmented approximation of natural science training can be conducted. Inherently, all such infiltration strategies require affectations of deception, which, with prolonged maintenance, begin to affect the infiltrators about as much as they affect members of the target group. That is, the behaviorists risk starting to believe the platitudes and euphemisms of their own tactical subversive rhetoric.

On the other hand, a minority of behaviorists has adopted the B strategy, and in doing so has set for itself the task of establishing behaviorology as another autonomous member of a natural science federation that, alas, may not welcome it. In general, the current members of the various traditional natural sciences are so untrained in the application of their own naturalism to *behavioral* phenomena that many natural scientists doubt the feasibility of applying the natural science approach to behavior-related events. Furthermore, any attempt by natural scientists of behavior to establish themselves within the natural science federation must occur under a constitutional prohibition of the right to organize formally around the particular philosophical exclusivity that gives the behaviorists a natural science identity. However, that difficulty was previously confronted and largely overcome by the faculties of physics, chemistry, biology, and geology departments, so it is not prohibitive.

² The variables that define a *field* of study are found in the environment and are constituent elements of the subject matter of concern. The variables that define a *discipline* are among the analytical and interpretive verbal behaviors of those who study a particular subject matter.

Both approaches to disciplinary development (i.e., integration vs. independence) are difficult, but not equally so. The lessons of history seem clear on one point: Groups whose integrity is based on a well rehearsed ontology and epistemology of a particular subject matter can be much more expeditiously and economically circumvented than converted. That the majority of behaviorists are nevertheless pursuing the strategy of infiltration and conversion merely attests to the strength of the classes of extraneous contingencies that support that particular strategy, even in the absence of any realistic promise of success (Fraley 1997, 1998b).

Established academic communities are generally well prepared to resist change from within, especially when such change is promoted by intruding intellectual carpetbaggers. On the other hand, such communities are much less able to prevent inter-community competition on a level playing field. We now tend to celebrate the eclipse of water dowsing by ground water geology. However, would we yet have anything to celebrate had the early and outnumbered ground water geologists foregone their independent organizational activities and instead dispersed themselves thinly among the multitudinous ranks of the water-related mystics of the world? How absurd that idea—the scattered and isolated individual geologists here and there hoisting little flags of evidence in the gale of well organized hocus-pocus that, with each passing year, would surely have become more sophisticated in its contrived rationalizations and justifications.

The Next Step

Natural scientists and scholars of behavior should approach the traditional natural science federation—the physicists, chemists, biologists, geologists, and others—perhaps through points of contact in their respective professional organizations. The mission of those ambassadors of behavior science would have three facets.

One objective should be to remind the people in those communities of the definitive essence and characteristics of the natural sciences at both the scientific and philosophical levels of consideration—and to emphasize that, under the umbrella of naturalism, *any* real phenomena can be studied from that perspective, including behavior-related events. With respect to ontology and epistemology, behaviorologists are certainly on a qualitative par with the more established kinds of natural scientists. On that issue we can, in general, interact with the best of them from a posture of intellectual equality.

The second facet of the mission would be to educate members of the other natural sciences about the rudiments of the natural science of behavior–environment relations. Although the majority of the training received by traditional natural scientists was centered in their major fields, most of them got at least rudimentary training

in other natural sciences, except for the natural science of behavior–environment relations. Training in that particular natural science was generally unavailable.

Consider, for example, the physiologists. The formal education of most physiologists left them more or less skilled in a general way in physics, chemistry, and perhaps certain of the applied natural sciences. Nevertheless, many physiologists remain ignorant of the extensive natural science of behavior-related phenomena that reaches beyond the largely respondent class of behavior that is typically included in biological curricula to aid in the interpretation of animal behavior. Many physiologists whose work pertains to behavior rely naively on traditional psychology for the behavior-related foundations to which they can relate their behavior-related studies at the physiological level. One result is the spectacle of leading neural physiologists interpreting their studies of behavior-related brain activity in terms of popular superstition-based concepts about operant behavior such as the putative will power of a body-driving self-agent, information processing, and similar fallacies.

The third facet of the mission should involve educating members of the traditional natural science communities about the respective and contrasting implications of scientific cooperation with (a) mystical social science communities and (b) the natural science sub-community that addresses behavior–environment relations. The traditional natural scientists need to become more discriminating in that regard and more aware of the implications of their being seduced into cooperative intellectual departures from natural reality.

It is into that natural science federation that we behaviorologists need to move, so we should begin to pave the way for our acceptance. It is a long process during which members of the traditional natural science community will have to become even more natural in their general perspective. Because behaviorological science is both the science of science and the science of philosophy, our discipline will help make that kind of improvement possible and feasible for the other kinds of natural scientists. That will be one of the intellectual gifts that we bring to the celebration of our union with them. With our science represented at their disciplinary roundtable, the traditional natural scientists can become better of their own kind, and it is time to plant the seed of that idea.✻

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