

1 **WHAT COLOR IS THE SKY ON YOUR PLANET? A REVIEW OF**
2 ***INVESTIGATIONS IN BEHAVIORAL EPISTEMOLOGY***

3 John C. Malone
4 Maria E. Armento
5 Stephanie T. Epps
6 *University of Tennessee*

7 Hayes, L. J., & Ghezzi, P. M. (Eds.). (1997). Reno, NV: Context Press.

8 Radical behaviorism is a philosophy of mind and therefore an epistemology.
9 That simple truth is known by very few psychologists, let alone by the general
10 public or by philosophers and biologists. For most, introductory textbook
11 psychology is the normal referent and, according to *that* authority, psychology
12 divides into cognitive and behavioral—sometimes phenomenological is added.
13 Anything *good and interesting* is cognitive. That includes all of the “richness” of
14 cognitive psychology itself, as well as the wonderful world of imaginary biology—
15 the cognitive neuroscience boom that has added so very much to our understanding
16 of ourselves . . . as it has.¹ Modern behaviorism lies outside this glittery façade of
17 pretend breakthroughs and great moments in public relations. But modern
18 behaviorism is hard to understand and exists in so many forms and degrees that it
19 is hard to believe that all the authors involved *are* behaviorists.

20 The contributors to this little volume show how very wide is the range of
21 modern behaviorism. On one end lies the flaky extreme contextualism of Linda
22 Hayes, co-editor of the book, who begins by questioning the sufficiency of science,
23 and unwittingly discovers Bishop Berkeley’s idealism and then, of all people, the
24 “unnatural scientist” Parmenides. From there it is a small step to the “suchness” of
25 Buddhism and the reduction of space and time to mere verbal constructions. Lord
26 love a duck! You’d think that philosophers would have mulled over all of that by
27 *now*. What would a *materialist* monist like Jack Marr think of that?

28 At the other end of the spectrum lies *science*, anchored in John Staddon’s dish
29 of nematode worms and the “formal representation of data reduced to a minimal
30 number of terms.” Gregory Galbicka’s thinking is not far removed, but he
31 quixotically tries to show that the essence of radical behaviorism, its emphasis of
32 patterns of behavior extended in time, is reducible to momentary/proximal causes.
33 Of course, even B. F. Skinner did that!

34 Between the chilling extremes of Linda Hayes and Galbicka lie some very
35 good and insightful chapters and some very bad and boring ones. The highlights of

AUTHORS’ NOTE: Please address all correspondence to the authors at Department of Psychology,
University of Tennessee, Knoxville, TN 37996-0900. Email: jmalone@utk.edu.

¹ But that was in the 19thC! See the insightful discussion by Glymour (1997).

1 the book (from our point of view) are Baum’s superb chapter on time, Marr’s
2 defense of the material monist ontology of Thales, Smith’s treatment of
3 consciousness, Guerin’s chapter on the influence of language, Staddon’s defense of
4 theories, and Leigland’s marvelous introductory chapter. Leigland’s discussion of
5 methodological and radical behaviorism deserves careful study and it is there that
6 we begin.

7 **Chapters Representing Modern/Radical Behaviorism**

8 *Methodological and Radical Behaviorism*

9 There is a continuing conflict in psychology and allied disciplines, not just
10 within behaviorism. It appears in medicine and the biologies and probably through
11 all the sciences and some of the humanities. It is the never-ending continuation of
12 the basic difference between Plato and Aristotle—and since the Enlightenment,
13 science has ironically sided with the mystic *Plato*, rather than with the naturalist
14 Aristotle. Today the Platonists are called cognitivists and methodological
15 behaviorists. The Aristotelians are called radical behaviorists.² **Leigland** provides
16 the best summary of the two views that we have seen.

17 Methodological behaviorists are people who are proud to be “objective
18 scientists.” For them subjective experience is unknowable—we can only study
19 public, “intersubjective” things, like overt behaviors. They love the experimental
20 method and explain things at a theoretical level, freely using intervening variables.
21 These are the people who Skinner attacked in 1945; the clearest exemplar was the
22 behaviorist Clark Hull, but virtually all psychologists, scientists, and lay persons
23 endorse this view. Their thinking is that of the 18th Century and, as Leigland
24 notes, their theoretical terms come straight from folk psychology. Explanations for
25 what we do are “inside us” and they take the form of images, hopes, dreams,
26 memories, longings, processing stages, and myriad other terms that appear on TV
27 and in newspapers. Thinking, perception, attention, and other faculties are assumed
28 to be “real” and legitimate, owing to common consent over the past several
29 hundred years.

30 This is psychology as S-R connection and cognition—most people don’t
31 dream that there is any other kind. Adherents can say they are following the steps
32 of Galileo and Newton and they can publish, get grants, and stay in academics.
33 And there are only a few drawbacks.

34 For one, we have to settle for an illusory world, since objective reality lies
35 beyond Plato’s veil, “apart from human functions, constructions, and behavior”
36 (Leigland, p. 17). Yet, we now realize that “facts, reality, and objectivity” are
37 largely the product of language, history, and cultural context. Consider the
38 absurdity of the statement that “we don’t know the world as it *really* is,” according
39 to the scientist/methodological behaviorist/cognitive psychologist. They never
40 seem to wonder what “real reality” could possibly be.

² Some are called phenomenologists, but that is not a widely-recognized fact.

1 Radical behaviorism has a different source. Rather than Plato and (much later)
 2 the Enlightenment, it began with Aristotle and was revived by Bacon, Mach, Loeb,
 3 and popularized by Dewey, Peirce, James, and other pragmatists. According to this
 4 view, the subject matter of psychology is solely *behavior* and that includes “any
 5 observable functional actions or activities of the organism or person, including
 6 those available to a single observer.”³ Explanation does not refer to intervening
 7 variables or to hypothetical mechanisms within the organism. We explain by
 8 relating historical, contextual variables to behavior. Note that “behavior” includes
 9 any private psychological activity imaginable, as long as it can be construed as
 10 activity.

11 Unlike the “experimental design” method of methodological behaviorism,
 12 radical behaviorism employs “functional analyses,” at least ideally, seeking the
 13 environmental and historical contingencies that explain the occurrence of various
 14 behaviors. The strategy relies on extending the scope of basic principles to more
 15 complex cases and the use of “increasingly abstract descriptive systems.”⁴
 16 Leigland notes that behavior analysis has been applied to a broad range of applied
 17 areas: clinical psychology, education, verbal behavior, and the origin of cultural
 18 practices. He could have added applications to law and to advertising. And he
 19 notes that critics are puzzled and infuriated by this widespread application! Why
 20 should that be?

21 It is because the *actual* clinical applications and the educational ones that are
 22 familiar to most critics fit their preconception that behaviorism is merely the carrot
 23 and stick caricature of methodological behaviorism. And, sadly, they are correct!
 24 One scans the applied literature for some inkling of appreciation of advances in
 25 understanding that have arisen in basic research. One hopes that practitioners
 26 realize, as Leigland points out, that reinforcement and the other terms of behavior
 27 analysis have only descriptive meaning, that personal history, heredity, and context
 28 determine everything, and that ordinary language does not necessarily refer to
 29 important phenomena. But one looks in vain, as applications seem wholly
 30 restricted to principles at least 50 years old. Practitioners are way, way behind the
 31 times. These so-called “behaviorists,” as well as their critics, would learn a lot
 32 about modern behaviorism if they became familiar with the molar behaviorism that
 33 has developed since the 1960s. A good place to start is Baum’s chapter, “The
 34 Problem with Time.”

35 William **Baum** is a major exponent of the molar behavioral approach, as is
 36 Howard Rachlin,⁵ and others, though they constitute a minority even among
 37 radical behaviorists. They are very concerned with *time*. Time is a problem for us
 38 for the same reason that action at a distance was a problem for Newton—people
 39 like causes and effects to be discrete things, like thunder and lightning, which
 40 occur contiguously. Molar behaviorism is modern radical behaviorism and it relies
 41 on patterns in time, so it seems counterintuitive, just as modern physics does.

³ p. 20

⁴ p. 20

⁵ Rachlin, H. (1994). *Behavior and mind*. New York: Oxford University Press.

1 But conventional “intuitive” accounts are not sufficient. For example “good
 2 manners” describes a pattern of behavior that began in childhood for most of us—
 3 it requires extension in time.⁶ Yet, we often say that early reinforcement of good
 4 manners in childhood leaves patterns stored in the brain and that those control our
 5 current “mannered” behavior! The same foolish simplicity of thinking forced
 6 Freud to describe intrapsychic mechanisms to bridge the gap between early trauma
 7 and adult psychopathology (Gay, 1989).

8 Baum likes to compare populations of behaviors with patterns of types studied
 9 in evolutionary biology. This practice is tedious and unfruitful, in our view, but
 10 Baum uses it to communicate that both fields deal with selection pressures,
 11 mutations, and environments and that neither behavior analysis nor evolutionary
 12 biology predicts *precisely*. Only the pattern of phenotypes or of behaviors over
 13 time tells the story—a still picture is uninformative.

14 The physicist-turned philosopher Erwin Schrödinger provided Baum with
 15 another instance of temporal patterning. This time the issue is the infinite number
 16 of simultaneous causal sequences chugging along in a deterministic world, running
 17 in parallel and often crossing, so that seeming “chance” occurrences change lives.
 18 We missed the train, so we took the plane and met Bill Gates and hit it off and . . .
 19 so on. This “tapestry pattern” renders the tracing of causal chains impossible and
 20 forces a look at the molar picture. Yes, well, whatever.

21 A more inspiring case is that of Benjamin Lee Whorf, the insurance adjuster-
 22 turned linguist who showed that the Standard Normal European notions of space
 23 and time are not as “given” as Newton and Kant thought. One conspicuous
 24 example lies in the language of the Hopi, which has no reference to time, implicit
 25 or explicit, and the verbs of which have no tenses. They use no mass nouns, like
 26 “water,” or “mountains,” and they do not distinguish objects from images of them.
 27 It sounds like epistemological monism to us! We have never seen a better rendition
 28 of Whorf’s work and the epistemology and ontology of the Hopi than Baum
 29 provides here.

30 The Hopi Weltanschauung is incomprehensible to us if we cling to our
 31 dualism of subject and object and insist on the independence of time and space.
 32 But with effort we can get a feeling for it. For example, instead of a world of
 33 objects in space lying in a “stream” of time, we may view experience as “a
 34 coherent pattern of events that becomes clearer as we gain experience with it” (p.
 35 54). Strange as it may seem, that was pretty much the view of Saint Augustine,
 36 writing in the 4th and 5th Century. Baum wants to go beyond efficient causes,
 37 beyond the conception of time as a succession of moments. Nothing occurs at any
 38 *moment*, any more than instantaneous velocity describes the motion of any actual
 39 object.

40 This is also an Aristotelian view, which has been ably promoted by Rachlin
 41 (e.g., 1994) and which is clearly presented in Aristotle’s *Nicomachean Ethics*.
 42 According to this view, extended patterns of behavior account for so-called mental
 43 things. Thus, “intelligence” is a pattern of intelligent activity, just as “love” is

⁶ This view originated in Aristotle’s *Nicomachean Ethics*, as Rachlin (1994) showed.

1 defined as a pattern of acts. Internal states recede in importance because they are in
 2 constant flux and are momentary things—not relevant to molar patterns, though
 3 they are part of them. We have trouble talking about such patterns, because we
 4 want immediate (efficient) causes. So we resort to metaphors that stuff efficient
 5 causes inside us. To say that our seeing is caused by an *image* or that aggressive
 6 acts are caused by *aggressive cognitions* or *emotions* is like saying that electrons
 7 flow through conductors and are pushed by an “electromotive force.” We might
 8 say also that water flows because of the immediate cause of fluidity.

9 The confusion wrought by attributing causality to “names” that signify
 10 nothing is part of the subject of Noel **Smith’s** chapter on consciousness. Smith
 11 discusses modern philosophers and “consciousness”—a nightmarish thought!
 12 Imagine having to read Dennett, Jaynes, and all the rest, dealing with something
 13 that exists only as a *word*!

14 Dennett wants consciousness as the core of the mind, internal states and
 15 channels and something distributed to different parts of the brain . . . a controller of
 16 things. Smith notes that its manner of control is left unspecified. Julian Jaynes
 17 famously proposed that consciousness appeared only 4,000 years ago with the
 18 dawning of messages flowing between the two hemispheres, originally as the
 19 voices of gods. The ancient Egyptians and Babylonians missed out, evidently.

20 Other “consciousness theorists” include Natsoulas, Pribram,⁷ Humphrey,
 21 Farthington, and Chalmers. After considering their various opinions on the subject,
 22 one must conclude, as does Smith, “. . . consciousness is nothing more than a
 23 tangle of verbal inconsistencies.”

24 Smith is the sharp knife in the drawer and takes a historical look at the word,
 25 telling us that it achieved currency only in the 16thC. It represented the
 26 culmination of a long road—the conversion of the real physical universe into an
 27 abstraction—the triumph of constructs over events. This was largely due to the
 28 “verbal constructs of various cults including Christianity” (p. 151). Later the
 29 “interpretative center” of our being became the brain and the idea of *one* organ
 30 “housing” consciousness became commonplace. Then we identified psychic events
 31 as brain activity and assumed that consciousness accompanies this process. We
 32 arrived at a set of “constructs without a referent.” And we lost the physical world,
 33 if not the whole universe.

34 We can trace the denial of physical reality in Western civilization to
 35 Pythagoras, who in the 6thC BC posited an ideal reality beyond the senses. This
 36 view of the experienced world as a rubbishy illusion was adopted by Plato and was
 37 thus transmitted across the centuries to us, the heirs of a bizarre fabrication. Reality
 38 was unsatisfactory, so humankind created a better one, but its reality lies only in
 39 words. Smith writes (year, p. 151),

40 These verbalisms eventually eclipsed all interest in science and helped bring on
 41 the dark ages. When science finally re-emerged in the late middle ages, it was
 42 heavily laden with physical and nonphysical distinctions and the assumption of
 43 the reality of verbal constructs.

⁷ Who seems too good to be in this bunch.

1 There *was* a minority view, however, and that was Aristotle's, of course,
 2 passed on to the Arabs and then to Thomas Aquinas in the 13thC. It has been
 3 promoted in the 20thC by J. R. Kantor, B. F. Skinner, and Howard Rachlin, among
 4 others. That story is beyond the scope of this review. But one author in this volume
 5 inadvertently reprised St. Thomas' treatment of epistemology, that is, the question
 6 of the superiority of reason and "will." While we ordinarily think of knowledge as
 7 a conscious verbal entity, much knowledge comes from intuition, or "unanalyzed
 8 contingencies."

9 In fact, **Steven Hayes** resurrected David Hume *and* Thomas Aquinas when he
 10 discussed nonverbal knowledge—not to mention John B. Watson, who agreed that
 11 "we know more than we can say." For Hume and (especially) Aquinas, nonverbal
 12 knowing involved the will, not reason, and informed us of the Truth of certain
 13 things, though reason could not justify the belief. For Aquinas that was knowledge
 14 of God's existence, though God surpasses our understanding, and for Hume it was
 15 assurance of a world outside ourselves, though it was transcendental.

16 What does "knowing" mean? It is not merely verbal, since a lot of direct
 17 experience produces "knowing" that is never verbalized, you know? And *who*
 18 knows? Is it the verbal self, or the physical organism, or the object of verbal
 19 behavior ("I know"), or just part of (James') stream? Skinner (1974) wrote of
 20 responding to one's own responses—we "see that we see," and Hayes adds that ". .
 21 . one can be conscious of everything except one's own consciousness." We don't
 22 think so—maybe in principle, but conscious of everything? "Deep thought, dude,"
 23 is a comment that fits the tone of Hayes' musings.

24 Hayes proposes to solve the problem of Truth with a two-by-four applied to
 25 the head, perhaps to communicate the "nonverbal" nature of knowledge gained in
 26 that way. The same effect occurs when one absent-mindedly sticks one's hand into
 27 a bowl of molten lead.

28 The fact is that "I" distinguish truth as did St. Thomas Aquinas when he
 29 considered the ranking of reason and will. Aristotle favored reason, and Thomas
 30 was an Aristotelian, but he argued that Truth is often known only by will—we *feel*
 31 it, so to speak, but we cannot say why. That is, real knowledge is always
 32 nonverbal. Another author, Bernard **Guerin**, offered interesting views on this
 33 subject.

34 Guerin considers "how things get done," beginning with the assumption that
 35 reality consists of three parts: *things, people, and intervening activities*. "Well, yes,
 36 I guess," you think, though that seems a crude categorization. But Guerin feels it
 37 sufficient, and he is miffed because our understanding of HTGD has been crippled
 38 by dualisms, as Smith pointed out, so that:

- 39 • people are separated from the external world, including their own bodies . . .
- 40 • people are separated from the language they use . . .
- 41 • words are separated from things.

REVIEW OF HAYES & GHEZZI

1 Some who have escaped this crippling include Roger Bacon,⁸ Claude
2 Bernard, John Dewey, and B. F. Skinner, all of whom believed that we shouldn't
3 just *talk* about things—knowledge is action. Talking leads to the awful absurdities
4 of social constructionism, to Jacques Derrida and others who act as though reality
5 actually *is* nothing but words.

6 So, what are knowledge, truth, and reality? In a sense, it *is* verbal, and it
7 appears as social control—only in speech can we find contradiction, causality,
8 tautology, and error, as well as time, space, and probability. There can't be
9 contradictory *things*; but there can be a cat *and* no cat—that is, contradictory
10 verbal statements.

11 Skinner's (1957) *Verbal Behavior* receives obligatory mention, of course, but
12 we all know that he was hazy and equivocal on the epistemological and ontological
13 role of language. Guerin rightly noted that Skinner paid lip service to the powerful
14 role of verbal context, as he did in *About Behaviorism* in 1974. But he always
15 slipped back to the dualisms of subject and object and leaned on the objective
16 world that he tacitly assumed to exist. Don't look for truth in Skinner's writings!

17 So, for pity's sake, what is Real and what is Unreal? Guerin borrows a page
18 from William James (1890) and the 19th Century pragmatic definition of reality—
19 a good idea, since it is the best handle on reality we have. There is no *real* world
20 outside human concerns, and maybe there is nothing outside *my* human concerns!
21 This, the pragmatic ontology, is the only rationally acceptable one, but no one
22 really (*really*) believes it. Guerin writes that “truth is what gets done,” a clumsy
23 way of putting the old pragmatic axiom: truth is conceptual; it is a tool; the
24 usefulness of a belief is the criterion for truth. So faith, or belief, refers to a
25 readiness to act. If we don't *act* on our belief when the occasion arises, it is not
26 much of a belief.

27 Psychology *is* activity, from the behaviorist viewpoint, and beliefs are
28 readiesses to act. True beliefs are expressed in words (water will put out this fire)
29 that describe actions that perform work that we want done. False beliefs (gasoline
30 will put out this fire) refer to actions that have unwanted results. The
31 pragmatic/radical behavioral ontology does not require “a notion of truth” (p. 229).
32 *What is called truth is always a matter of “words” and no more.* Remember:
33 contradictions, errors, truth, and falsity do not exist in the reality of “things”—they
34 exist only in *words*. A reader who doubts the truth of that statement or who
35 wonders “whether it is true” misses the point and can be reasoned with no longer.
36 Perhaps Linda Hayes could counsel that reader or Steve Hayes could apply his
37 “two-by-four to the temple.”

38 Through all of this cutting-edge deep thinking, we must bear in mind that the
39 same arguments were made not only by Peirce and James a century and a quarter
40 ago, but also by Hume in the 18th Century and by Protagoras in the 4th Century
41 BC. Sadly, the authors thus far discussed seem unaware that these people ever
42 lived. And they are not in concert with the next group of authors, Marr, Galbicka,

⁸ But what of Francis Bacon? True, Roger, a 13thC Franciscan, fits the bill too, but Francis is more familiar to most readers. Guerin probably meant to refer to Sir Francis, not poor Roger.

1 and Staddon, who represent the “behaviorism as conventional science”
2 contributors to the volume.

3 **Behaviorism as Traditional “Science”**

4 In a way, Jack Marr had to consider the “foundations of nature” to deal with
5 the hassle over the proper definition of behaviorism—recent verbal battles about
6 that subject clearly dismay him. He lamented that behaviorism spends too much
7 effort trying to define itself and everyone seems to think that behaviorism must be
8 *one* thing. Well, that’s life—psychology *itself* is undefined, except as an academic
9 field and a professional organization (or two, or three . . .). Within psychology,
10 whatever *it* is, lie horrible amalgams: 500 therapeutic approaches as “clinical”
11 psychology, 47,000 models that comprise the hodgepodge that is “cognitive”
12 psychology, and so on. Define “cognitive neuroscience” precisely!

13 Can behaviorism be defined in such a way as to be coherent and separate from
14 other approaches? We don’t think so—the authors in this volume testify to that.
15 But we propose that there are two characteristics that must be essential to
16 behaviorism/behavior analysis. First, behaviorism must not allow actual
17 representations of an outer reality that are placed inside the organism—that is the
18 very definition of cognitive psychology! Second, *behaviorists must be monists*;
19 there can be no metaphysical distinction between mind and body (mental and
20 physical, organic and inorganic). Behaviorists cannot be dualists.⁹ This brings us to
21 Marr’s encounter with Mayr; that’s Ernst Mayr the biologist and evolutionary
22 theorist.

23 Marr referred to Mayr’s attempt to sharply differentiate biology from physics
24 and chemistry, presumably in order to show its special status, much as the Church
25 and humanists insist on a special status for humans! In a nutshell, Mayr argues that
26 physics (think of high school physics) is deterministic, mechanistic, reductionistic,
27 and requires proximal causes. Biology, as Mayr envisions it, is probabilistic,
28 emergent, selectionistic, and deals with historical causes. These differences
29 separate physics and the physical world from biology and the world of living
30 things, at least for Mayr. Biological entities are far more complex and “iffy,” while
31 physics remains stiff and certain, as it was in your high school textbook! What an
32 absurd argument for a senseless dualism! It’s incompatible with any version of
33 behaviorism and Marr gives it the cabash by showing that everyday physical
34 phenomena, like bouncing a ping pong ball on a table, are as complex and “iffy” as
35 any biological system. Dynamical systems theory considers many phenomena that
36 illustrate this point.

37 On the border between cognitive science and behaviorism lies “dynamical
38 systems theory,” and it is called “dynamical,” not “dynamic.” It is different from
39 the information processing theories of the 1970s and from the connectionist
40 models of the 1980s. Unlike cognitive theory, it does not assume that
41 representations of the world are inside the organism and, like radical behaviorism,

⁹ Behaviorists should also be epistemological monists, disposing of the distinction between subject and object, knower and known. But that is asking a lot.

1 dynamical systems theory traces the history of environment/organism interactions,
 2 seeking mathematical descriptions of the changes in the state of the system over
 3 time.¹⁰ Jack Marr describes this approach in making an ontological argument in
 4 favor of material monism—though he doesn’t cite Thales, the utterer of the first
 5 scientific statement,¹¹ and first to argue for such monism.

6 Dynamical systems theory encompasses many fields, ranging (in a kind of
 7 descending order) from physics, to evolutionary biology, to economics. Examples
 8 of applications include bending beams, animal coloration, and stock market prices.
 9 Marr, through examples in inorganic systems, shows that extreme complexity of
 10 behavior is not only characteristic of *biological* systems, as Mayr held. Animate *or*
 11 inanimate phenomena can show agonizingly complex behavior. Differences
 12 between physical and biological phenomena are quantitative, not qualitative.

13 Pendulum motion is simple, but leave the high school textbook and give the
 14 swinging bob a tap occasionally and motion becomes complex indeed, though
 15 simple Newtonian mechanics still operate. Consider the motion of a beam on a
 16 bridge with traffic passing over it, or try to understand the behavior of a planet
 17 orbiting a two-star system—there is seemingly unpredictable, complex behavior—
 18 yet, simple principles are still operative. The same applies to water freezing on the
 19 outside of a window, hurricanes and tornadoes, shapes of trees, pigeon behavior,
 20 and the behavior of people. All of the complexity, “emergence,” and
 21 unpredictability one could want occurs in both physical and biological systems—
 22 there are no qualitative differences.

23 Herman Helmholtz made the same point in his research as a medical student
 24 in Berlin. He provided the first quantitative proof for the principle of conservation
 25 of energy, by showing that physical/chemical principles were sufficient to
 26 understand the processes occurring in muscular contraction. There was no “vital
 27 force” that was added to physical structure. Behaviorists can’t endure vital force
 28 either and they can’t separate the biological from the physical. That does not mean
 29 that physical reductionism is admissible; it means that whatever vital forces,
 30 spirits, or essences we attribute to ourselves we must also attribute to inanimate
 31 objects.¹²

32 These dynamic¹³ models are actually close to what Skinner must have meant
 33 when he referred to mathematical formulations of environment/behavior relations.
 34 Beer’s (2000) paper can serve as a straightforward introduction that shows the
 35 reader exactly how such models are unlike the symbolic information processors
 36 and connectionist models that we have endured for so long and with so little effect.

37 Gregory **Galbicka** warrants only brief mention here, and his chapter has
 38 absolutely no relation to the rest of the contributions. He chose to question the
 39 molar behavioral interpretation of Morse & Kelleher (1977), promoted also by
 40 others, that emphasizes the role of reinforcement schedules *per se*, independent of

¹⁰ See Beer, R. D. (2000).

¹¹ “All things are made of water,” according to Bertrand Russell (1959, p. 16).

¹² As Thales held. This does not make us dead machines, it just lends some life to nonliving things. After all, carbon, nitrogen, oxygen, and other elements are widely distributed in nature—all nature.

¹³ We just can’t say “dynamical” again.

1 what reinforcers are scheduled. This view has important implications for
 2 understanding behavior and especially for understanding the effects of drugs. Very
 3 few comprehend this work, and there is no point in trying to summarize it here.
 4 Galbicka attempts to show that a molecular account can deal with some of the
 5 fundamental findings of Morse & Kelleher, and others, but he misses the point of
 6 the whole issue in our view. And he cannot account for key data that seem to
 7 require a molar interpretation. We'll consider Staddon's more compelling
 8 arguments for tradition—his championing of the apparent oxymoron "Theoretical
 9 Behaviorism."

10 John **Staddon** has long campaigned for the inclusion of *theory* in radical
 11 behavioral research, arguing that the concept of "internal state" is necessary,
 12 acceptable, and inevitable. "States" allow us to differentiate among cases where
 13 the current behaviors of our subjects are indistinguishable but have arisen due to
 14 different histories. Staddon argues that different histories supporting similar
 15 behaviors may exert their influences when conditions change. However, such
 16 efforts cannot be predicted without reference to internal states. Staddon showed
 17 that habituation in a dish of nematode worms required the concept of internal state
 18 in order to be interpretable. Staddon suggests that "Radically behavioristic readers
 19 should not get their knickers in a twist" over this proposal to "explain" data. He
 20 urges us to "Just say '*explain*' means 'a formal representation of the data reduced
 21 to a minimal number of terms' in a calm voice a few times and the anxious feeling
 22 will go away."

23 *What's going on here? Did Staddon forget to wear his knickers?* Staddon
 24 views his proposal as consonant with the spirit of radical behaviorism, although he
 25 wished it changed in *only* one way. He says we need to modify radical behaviorism
 26 by incorporating its antithesis—we need *theory*, "the postulating of events taking
 27 place somewhere else, at some other level of observation (or none) described in
 28 different terms, and measured, if at all, in different dimensions." This is Skinner's
 29 definition of "theory," to which Staddon has never subscribed and about which he
 30 has stated his opposition many times. Staddon's proposal seems at first sight
 31 similar to that of the mediational theorists of decades ago who were superseded by
 32 modern behaviorism. But, it differs in important respects that make it more
 33 amenable to radical behaviorist thinking.

34 That is, Staddon does not propose a list of postulates or a series of processing
 35 stages derived *in advance* from reasonable assumptions about the way that
 36 organisms work. He also does not assume "representations" or other paraphernalia
 37 of the cognitivists. His "internal states" are to be *inductively* determined and to
 38 signify histories of exposure to contingencies, which should have as few as
 39 possible. Staddon's one gigantic drawback is that, in order to infer internal states in
 40 the way he proposes, data are required that are virtually nonexistent in psychology.
 41 He requires clarity of data, and that cannot be found in any table, figure, or verbal
 42 description in the psychological literature.

43 Staddon argues that if internal states are required to explain *even* the simple
 44 behavior of nematodes, such theoretical states must be necessary to explain more
 45 complex behavior. This is the same argument used by Wolfgang Köhler when he

1 demonstrated transposition in chickens and argued that this meant that higher
 2 organisms must be capable of such higher-level functions. But, unless applications
 3 are presented that involve some kind of behavior more interesting than habituation,
 4 Staddon’s internal states seem not to apply to what everyone calls “psychology.”
 5 And if learning, choice, avoidance, imitation, discrimination, generalization,
 6 schedule-induced behavior, masochism, depth perception, and the other myriad
 7 categories of behavior are to be explained in terms of internal states, will their
 8 laboratory analogues need to be so simplified as to be unrecognizable? What
 9 happens to all of social psychology and personality research?

10 Psychology is far from ready for “internal states,” and there is a role for
 11 radical behaviorism—to determine what is it that organisms do on a *gross* level. If
 12 that is ever achieved, internal states will be welcome indeed.

13 **Varieties of Behaviorism Where the Sky is a Different Color**

14 For Ghezzi & Lyons, it’s all words, words and syntax, and. . . . Leeser &
 15 O’Donohue and Linda Hayes were all carried away to a planet where the sky is a
 16 color most of us never see. They represent the humanist extreme fringe of radical
 17 behaviorism.

18 **Ghezzi and Lyons** approach language from both a psychological and a
 19 nonpsychological perspective. The psychological approach views “language from
 20 the point of view of the individual as he or she speaks, listens, reads, and writes the
 21 everyday language of a culture,” while the nonpsychological approach emphasizes
 22 “language as the audible or visible products of human activity” (p. reference).
 23 Examples of the latter are anthropology, sociology, grammar, anatomy and
 24 physiology—that sounds mighty inclusive. Within all these fields, the emphasis of
 25 study is on the development, rules, structure, and function of language as it occurs
 26 in those fields.

27 Notice that for Behavioral Epistemology, science is a *verbal* enterprise. So,
 28 progress in science, with its advances in understanding and knowledge is actually
 29 change in *language*-words and their uses, as Guerin claimed. Yet, the
 30 nonpsychological approach is important because structure fits function. When
 31 there is a defect in the structure, then the function of that structure will not work
 32 properly. It is important to see where these defects lie, and in doing so, find where
 33 people have altered their language. As Smith pointed out in Chapter 8, changes in
 34 cultural practices and beliefs that accompanied the development of major religions
 35 contributed to the disaster that was the creation of the word “consciousness.”

36 The psychological role in language is a fairly new topic, so not much research
 37 has been done, as can be seen from this chapter. This approach involves the
 38 “relationships between the behavior of the individual and the environment,” and
 39 adopts the perspective of behavioral psychology. Language is derived from our
 40 culture, and our culture influences our behavior. Thus, should culture not be the
 41 main focus in looking at language? People are influenced as to what to say and
 42 how they interpret meanings, and their culture and those around them influence

1 these people. Amazingly, Whorf is a key figure in promoting this view; he was
2 discussed by Baum (Chapter 3) but was not even cited here!

3 **Leeser and O'Donohue** explain that their purpose is to provide a better
4 epistemological foundation for normative accounts of thinking, so that cognitive
5 behavior therapy may operate on a sounder footing, bless their hearts! This is an
6 enterprise that seems as reasonable as teaching fish to ride bicycles, but they note
7 that cognitive behavior therapy relies on identification of irrational beliefs without
8 regard for their formation or the reasons surrounding their formation. They claim
9 that the models of rational belief that cognitive therapists work with are often
10 unclear and that they must identify some *standard* model of proper cognition so
11 that the effects of their therapies can better be assessed.

12 How on earth do we define “proper cognition,” a mighty task, so that
13 cognitive therapy, a comparatively minor item, can be improved? These authors
14 propose to point the way by describing three epistemological justification theories
15 (groan) and show how contextualism is an improvement—no great contest there!
16 Finally they consider whether pragmatics should influence belief-forming
17 practices, a question to which we can guess the answer in advance.

18 We needn't pore over the descriptions of *reliabilism*, *foundationalism*, and
19 *coherence* theories of justification of belief unless we are ready for some awesome
20 additions to our vocabulary. The first two appear to represent quasi-pragmatic and
21 old-time logical positivist positions, while coherence theories are what their name
22 suggests. All refer to ways to justify beliefs, presumably to clarify what beliefs
23 *should* be held, so that cognitive therapists can teach us what to believe! In the
24 course of this quest, words and expressions that would sicken any clear-thinking
25 reader pop up. For example, “I am being appeared to redly” (p. 175) is more
26 appropriate than “I see an apple.” We read about proper “basicity” (p. 176) and
27 of beliefs that should be “problematized” (p. 192).

28 Contextualism is pretty good looking after considering the first three options,
29 and it turns out to be simple as pie: justification is contextual! Beliefs are subject to
30 change when science reveals new information on human reasoning, and beliefs are
31 better justified when they survive competent critics. That's all there is to it?

32 Finally, and anticlimactically, Lesser and O'Donohue suggest the need for
33 further research (yawn) in the area of common errors of belief formation. They
34 urge concern with determining criteria for beliefs that should be “problematized.”
35 They want to learn how to teach clients to be self-critical and to seek other
36 problem beliefs and how therapists can evaluate quality of criticisms from objector
37 groups. Last . . . they wonder how to balance the need for belief revision with the
38 need to persevere in a belief until its “verisimilitude” is known. Better they study
39 Taylor & Brown (1988), where the virtues of “improper” self-deceptive cognition
40 are enumerated.

41 What the reader of the chapter leaves with is the hope that someday the lives
42 and minds of people will rest in hands better than those of cognitive therapists and
43 the conviction that no cognitive therapist will be influenced by this “criteria for
44 rational belief” bushwa!

1 We reserve **Linda Hayes** for last. She contributed a thoughtful chapter for
 2 readers who want to understand beyond-the-pale behavioral epistemology. It will
 3 also appeal to those stoned out of their minds and those who have absolutely no
 4 knowledge of philosophy prior to 1997. The points she makes are individually not
 5 *bad*, but taken as a whole, they comprise a creature comparable to that created by
 6 Mary Shelley. Her aim, whether she knows it or not, is to show that behavioral
 7 epistemology is pragmatic and cannot tolerate an objective world.

8 She begins by noting that one’s premises can be applied so as to be self-
 9 negating, as per a simple interpretation of Protagoras’s denial of real Truth. If you
 10 hold that all statements can be falsified, what about that one? Hayes questions the
 11 existence of real (objective) reality and proposes that we deal with constructions of
 12 varying utility—Charles Peirce called that “Pragmatism” in 1863. Then she
 13 eliminates *time*, as did Aurelius Augustine (*a.k.a.* Saint) in the 4th Century.¹⁴
 14 Nothing new, but no reference to these gents.

15 Then . . . there goes *space*, and objects become a reification of function,
 16 almost as Bishop Berkeley argued in the 18th Century and John Stuart Mill did in
 17 the 19th. Mill and Helmholtz (via unconscious inference) come in again, when
 18 Hayes’ sister looks “young and strong and beautiful to me” but “middle aged and
 19 worn to a stranger” (p.). Quite so, and Mill might have used the same words—he
 20 surely wrote the same thing! What might be called immediate “sensations,”
 21 experienced by other onlookers, are only a small part of what we “see.” The rest is
 22 brought by our history. Or, as Skinner (1974) wrote, we don’t respond to a
 23 stimulus, we respond to a stimulus and our histories.

24 Hayes denies the existence of objective time and space, as have many,
 25 including Albert Einstein. But without time and space, what is *change*? Is it
 26 Buddhist “suchness” so that reality is static and all change is psychic illusion?
 27 Linda arrives at the ontology of Parmenides, the ineffable sage of ancient Elea,
 28 whose monist materialism was literally “nonsense.” That is, he denied the reality
 29 of any sensory experience and Zeno had to invent his famous 40 paradoxes to
 30 show that Parmenides was right. Reality is one featureless, changeless,
 31 unknowable “it.” He believed that we know it through logic or some rational
 32 process, but Hayes seems to lean toward Zen.

33 Who wants to know *real* truth anyway? Hayes’ message appears in pieces
 34 through the millennia, and it says that neither we nor any kind of science can know
 35 Truth. We cannot understand space and time and neither of them is “real,”
 36 whatever that means. She summed it up succinctly when she wrote that “. . . to go
 37 beyond science is to step into the silence.” But we knew that. Anyway, science is
 38 pragmatism, and Truth is replaced by truth. So Newton’s laws of mechanics are
 39 still true, but less true than Planck’s field theory. Nobody looks for the real,
 40 unvarnished, everlasting truth anymore, at least not in science.

¹⁴ Confessions, Book XI, Chapter 14, in Kaufmann, 1961.

1

What is Behavioral Epistemology?

2 Epistemology is the study of the origin and nature of knowledge, which is
 3 also the study of learning and memory and belief and perception and *everything*. In
 4 a way, it is the study of “what is reality?” For some, like Linda Hayes, it is stoned-
 5 out-of-your-skull musings about “suchness” and the limitations of science. And it
 6 is focusing on *context* so strongly that one wishes that she had taken Philosophy
 7 110, where we learn that “colors aren’t *really* out there!” It’s awful to learn it in
 8 middle age and present the fundamentals of the last two thousand years of
 9 philosophy as newly-minted truths. Parmenides was a joke in his own time too,
 10 called the “unnatural philosopher” by Plato and by Aristotle.

11 But the flaky contextualism of the Nevada behaviorists does have some
 12 virtue, if we just rein it in, gain some perspective, and realize that it is just Peirce’s
 13 pragmatism—a view that was a breakthrough in his day and which beats out any
 14 subsequent attempt to define reality! This is presented more congenially by Baum,
 15 who adds the crucial element of temporal patterning, so that behavioral
 16 epistemology is the study of organism/environment relations extended in time.
 17 Whorf’s work is appropriate to illustrate the alternative ways of construing reality
 18 that incorporate this non-standard normal European insistence on absolute time and
 19 space. Though different at first sight, the systems theory promoted by Marr
 20 expresses a similar theme. Whatever principles describe behavior, they apply to
 21 both inanimate and animate nature—behavioral epistemology has to be
 22 metaphysical monism or it’s not behaviorism.

23 Smith shows that the creation of the word “consciousness” resulted from
 24 cultural institutions that developed over centuries and culminated in the denial of
 25 physical reality and the substitution of an abstraction that was treated as reality.
 26 This is illustrative of the relation between culture and language that was discussed
 27 by Ghezzi and Lyons and the malleable nature of “reality” described by Steven
 28 Hayes, and by Guerin.

29 Leigland eloquently and accurately distinguished methodological and radical
 30 behaviorism. Baum represents the molar radical behaviorism that has developed
 31 over the past four decades while Galbicka carries on the struggle of the old
 32 molecular view, a view that was usually endorsed by Skinner himself. The old
 33 molecular view was obliged to refer to internal states to account for behavior that
 34 was not obviously controlled by current conditions. So “drives,” “memories,” “S-R
 35 connections,” “images,” and many more hypothetical internal states were
 36 employed. Behaviorism cannot tolerate reliance on internal mediators and that is
 37 the usual definition of “theory.” But Staddon argues that behaviorism must become
 38 theoretical and that this has nothing to do with internal mediators as usually
 39 construed. However, for Staddon’s strategy to work, behaviorists must lower their
 40 expectations and deal with phenomena that are tractable.

41

1

References

- 2 Beer, R. D. (2000). Dynamical approaches to cognitive science. *Trends in Cognitive*
3 *Sciences*, 4, 91-99.
- 4 Gay, P. (Ed.). (1989). *The Freud reader*. New York: Norton, p. xi.
- 5 Glymour, C. (1997). Déjà vu all over again? In J. D. Cohen & J. W. Schooler (Eds.),
6 *Scientific approaches to consciousness* (pp. 373-377). Mahwah, NJ: Erlbaum.
- 7 Hayes, L. J., & Ghezzi, P. M. (Eds.). (1997). *Investigations in behavioral epistemology*.
8 Reno, NV: Context Press.
- 9 James, W. (1890). *The principles of psychology*. New York: Holt.
- 10 Kaufman, (1961). *Philosophic classics Volume 1: Thales to St. Thomas*. Englewood Cliffs,
11 NJ: Prentice-Hall, pp. 589-601.
- 12 Morse, W. H., & Kelleher, R. T. (1977). Determinants of reinforcement and punishment. In
13 W. K. Honig & J. E. R. Staddon (Eds.), *Handbook of operant behavior* (pp. xxx-xxx).
14 Englewood Cliffs, NJ: Prentice-Hall.
- 15 Peirce, C. S. (1962). How to make our ideas clear. In W. Barrett & Henry D. Aiken (Eds.),
16 *Philosophy in the twentieth century* (Vol. 1, pp. 105-122). New York: Random
17 House. (Originally written in French for *Revue Philosophique* in 1877 and published
18 in that journal with a translation in Volumes 6 and 7, December, 1878 and January,
19 1879)
- 20 Rachlin, H. (1994). *Behavior and mind*. New York: Oxford University Press.
- 21 Russell, B. (1959). *Wisdom of the west*. London: Rathbone Books, Ltd.
- 22 Skinner, B. F. (1953). *Science and human behavior*. New York: Crowell-Collier-
23 Macmillan.
- 24 Skinner, B. F. (1974). *About behaviorism*. New York: Knopf.
- 25 Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological
26 perspective on mental health. *Psychological Bulletin*, 103, 193-210.