

## Radical Behaviorist Interpretation: Generating and Evaluating an Account of Consumer Behavior

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This article considers an approach to the radical behaviorist interpretation of complex human social behavior. The chosen context is consumer psychology, a field currently dominated by cognitive models of purchase and consumption. The nature of operant interpretation is considered, and several levels of operant analysis of complex economic behavior in affluent marketing-oriented economies are developed. Empirical evidence for the interpretation is considered, and a case is made for the qualified use of the hypothetico-deductive method in the appraisal of operant interpretations of complex behaviors.

*Key words:* radical behaviorist interpretation, consumer behavior, economic psychology

This article discusses an approach to the radical behaviorist interpretation of complex behavior, defined as that which is not amenable to an experimental analysis in the laboratory. Although the method used is believed to have general application to such behavior, it is illustrated here in the context of consumer choice for two reasons. First, consumer behavior has been chosen because it is a familiar sphere of human activity. Many would argue that modern life is most typically expressed in acts of consumption. If an operant interpretation of complex behavior is to succeed at all, it should be able to cope with this defining aspect of current human experience. Second, behavior analysts have conducted some of their most rigorous and far-reaching work in the context of economic behavior, albeit without reaching a consensus on how their findings contribute to the interpretation of complexity. Consumer behavior is, therefore, one of numerous forms of complex, contextualized social behavior. It is not a special class of such behavior, but is of central interest to all who would understand the nature of human choice in contempo-

rary society. Discussing radical behaviorist interpretation in this context thus raises several questions that link the experimental analysis of relatively simple environments with the production of an operant account of complex human activities. The article describes in brief the nature of consumer behavior and the requirements of operant interpretation. It goes on to show how an operant interpretation of consumer behavior in an affluent marketing-oriented economy would proceed. The question of establishing the reliability and validity of such an interpretation arises next and is discussed in terms of inductive and deductive approaches to scientific research and the logic of explanation. The article describes an empirical investigation based on the interpretive model expounded earlier and evaluates the evidence for the account it generates. Finally, general implications for the operant interpretation of complex behavior are discussed. Although the operant interpretation of consumer behavior considered here has been extensively developed and applied elsewhere (Foxall, 1996), the primary focus of the present article is not on that interpretation per se but on the nature of radical behaviorist interpretation itself.

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## CONSUMER BEHAVIOR AS OPERANT RESPONSE

### *What Is Consumer Behavior?*

Consumer behavior includes the activities of buyers, former buyers, and potential buyers from prepurchase to postpurchase, consumption to discontinuance. As conventionally conceived, it embraces the awareness of a want, search for and evaluation of possible means of satisfying it, the act of purchase itself, and the evaluation of the purchased item in use, which directly affects the probability of repurchase (Foxall, Goldsmith, & Brown, 1994). Consumer psychology, the study of this subject matter, is a burgeoning field (Bettman, 1986; Cohen & Chakravarti, 1990; Kassarian, 1982; Tybout & Artz, 1994). But there is a fact that consumer psychology has not grasped: To explain consumer behavior is to *locate* it—in space and time, at the intersection of a learning history and a current behavior setting. For all its practitioners' misuse of the term *behavioral* (as though it were synonymous with *psychological* rather than an adjective derived from *behavior*), consumer psychology is a subject area severely dominated by nonbehavioral thinking. Models of consumer behavior that emerged in the mid to late 1960s, on which the central paradigm for academic consumer research still rests, rely heavily on cognitive social psychologies (Howard & Sheth, 1969; Nicosia, 1966). The basic components of this paradigm are the goal-oriented reception, encoding, representation, and processes of information. The models link this cognitive procedure to behavior by a sequence of belief, attitude, and intention formation that determines such aspects of consumer behavior as store choice, brand selection, repeat purchasing rate, and evaluation of the purchased item in use. Because consumer research is concerned almost exclusively with the internal, intentional processes that allegedly influence choice, its practitioners have only the sketchiest idea of why consumer be-

havior is located where we find it. The agendas of academic consumer researchers include the explanation and prediction of consumer behavior in terms of the attitudes that supposedly precede it, accounting for choice by reference to consumers' traits and dispositions, and the ascription of meaning to what consumers do by uncovering and interpreting their underlying intentionality. Amid this clamor, any attempt to relate consumer choice systematically to its context is easily drowned out.

When it comes to an appreciation of environmental impact on consumer behavior, consumer researchers have produced little more than listings of the components of situations plus some abstracted empiricism that has classified actual situations of consumer behavior in terms of such lists. Consumer research lacks a framework of analysis that allows the situational influences on consumer choice to be identified and investigated in an organized way, or promotes theoretical understanding of how the environment shapes consumer behavior over time. Advances in ecological psychology over the last quarter century have drawn attention to the ways in which behavior in specific settings retains a remarkable consistency irrespective of who is performing it, their attitudes, intentions, dispositional traits, and motives (Barker, 1968, 1987; Wicker, 1987). The implication is that these behavior settings deserve serious analysis based on the finding that the objective environment is responsible for the shape and content of our ultimate explanandum, behavior itself. But, apart from a few ad hoc studies of consumers' subjective reactions to hypothetical situations described by researchers, there has been no such investigation of situational influences on consumer choice, and no appreciation of how the meaning of consumer behavior is systematically related to the circumstances in which it takes place. We do not know—that is, we can neither understand nor explain—where consumer behavior is: We are unable

to trace its occurrence, form, and persistence in familiar locations. Consumer behavior remains largely placeless and decontextualized.

At the same time, consumer researchers are failing to come to terms with the most complete explanatory and interpretive framework in behavioral science, one that is thoroughly, indeed exclusively, concerned with the influence of context on behavior. The thrust of philosophical writing in consumer research over the last decade has tended toward the abandonment of natural science traditions: It has been not just prohermeneutical but postpositivistic; following Geertz's (1973) so-called "semiotic conception," it has reflected the view that social inquiry is "not an experimental science in search of law but an interpretive one in search of meaning" (p. 5). The intellectual tendency of recent consumer research philosophy has not, therefore, been toward greater tolerance leading to genuine methodological pluralism but toward a new retrenchment. This article expounds an alternative, behavior-analytical interpretation for consumer psychology. This task entails more than a simple translation of the phenomena of consumer choice into the language of behavior analysis: It requires a broader understanding of the nature and procedures of operant interpretation itself. The principal purpose of this alternative is not to find ways of targeting marketing activity more effectively on the management of consumer demand, although the implications for our understanding of what marketing is and does are far-reaching (Foxall, 1997d, in press). The main aims are to show that a behavior-analytic interpretation of this complex behavior is feasible and necessary, and to argue for a more adventurous spirit of interpretation among behavior analysts. For both consumer researchers and behavior analysts, the growth of knowledge requires the intellectual enlargement that each brings to the other (Feyerabend, 1970).

### *Operant Interpretation*

Radical behaviorism is capable of making an important contribution to the interpretation of human economic behavior in complex environments, but two tendencies among radical behaviorists appear to impede this. First, interest in economic behavior is confined largely to the consumption activities of nonhumans or to that of humans in rather limited experimental settings (for reviews, see Herrnstein, 1997; Kagel, 1988; Kagel, Battalio, & Green, 1995; cf. Ainslie, 1992). This work does not deserve to be disparaged simply because it deals with a restricted range of economic behavior, but the fact remains that it is unable to provide operant understanding of the complex behavior of human consumers within an affluent, competitive, marketing-oriented economic system (Foxall, 1994). Such understanding can rely comparatively little upon experimental findings even with humans; it requires interpretation. The challenge for economic behavior analysis is the interpretation of complex consumer behavior in marketing-oriented systems. Second, many radical behaviorists have shown a reluctance to engage in the pursuit of operant interpretation, perhaps with good reason. As Skinner (1983) points out, to step outside the dimensional system of science is to gain freedom to speculate without restraint, but one can go too far to avoid theory.

Radical behaviorists have long recognized that their account of complexity amounts to an interpretation, albeit based upon principles gained in simpler, more amenable contexts (Skinner, 1969, p. 100). Radical behaviorist interpretation proceeds as "an orderly arrangement of well-known facts, in accordance with a formulation of behavior derived from an experimental analysis of a more rigorous sort" (Skinner, 1957, p. 11). That formulation provides the "warrant of assertibility" (Dewey, 1966) of radical behaviorist interpretation and, as the accumulated evidence for operant conditioning in

animals and humans in laboratories and field settings attests, it is a persuasive warrant (Guerin, 1994). But it necessarily differs from the more rigorous accounts of simpler operant behavior: It cannot be complete, for instance, insofar as it alludes to contingencies that often must be inferred rather than observed and measured: "Merely useful," its truth or falsity cannot be ascertained with the certainty available to the experimentalist (Skinner, 1988, p. 364). It is doubtful, however, whether radical behaviorism differs in this respect from any other science; no critic of behaviorism is suggesting the overthrow of evolutionary biology or astrophysics because they interpret where they cannot control. And radical behaviorists claim their interpretations are superior to those that have no experimental warrant at all, or those that are based on the explanatory fictions of centralist theories. However, this said, radical behaviorists have hardly considered the nature and form of their interpretive stance, how it could be evaluated, and its implications for their goals of prediction and control. Two clearcut exceptions are found: (a) generally in the work of Lee (1988), and (b) in the consumer psychology context, in the concept of the consumer situation (Foxall, 1996) that is the central device for interpreting consumer choice with which this article is concerned.

The interpretation of complex behavior requires a "bottom-up" procedure. That is, the interpretation must begin with a detailed understanding of the subject matter, possibly provided by disciplines other than behavior analysis, whose practitioners have assiduously applied observational techniques to describe their topic. Only when this is achieved can the behavior analyst address the subject content systematically and provide a convincing argument that the behavior in question is subject to the contingencies drawn. It is, otherwise, far too easy to invent plausible but untestable contingencies to account for apparent regularities of

response. In a complex environment, discriminative and reinforcing stimuli can always be "found" adjacent or close to the behavior for which an operant account is sought. This is not to impugn the scientific integrity of behavior analysts who have sought to interpret complexity: It is simply to point out that at a superficial level of analysis there is no way of disentangling the environmental factors of which behavior is genuinely a function from a host of possible, potential, plausible candidates for the role of controlling stimuli. Science requires that checks be made on the honesty of its practitioners, which is a central component of its method (Skinner, 1953). Behavior analysts have long recognized that inner causes of behavior can easily be imagined by the cognitivist, but behavioral interpretation must guard against assuming a sketchy understanding of the phenomena to be elucidated. Lack of detailed knowledge of the economic, political, social, and religious spheres of human activity has not always deterred behavior analysts from offering "top-down" interpretations thereof (Skinner, 1953). Top-down interpretations begin with behavior analysis and seek plausible instances of behavior-environment coincidences that may be construed as examples of the three-term contingency. Useful as general interpretations of this kind are as a starting point, they do not penetrate the surface of the complex phenomena they address, and they are scarcely subject to scientific scrutiny. A deeper analysis requires greater knowledge of those phenomena than is usually displayed and, where it is available, an appreciation of the body of knowledge and analysis provided by other social scientists who have specialized in the area.

### **THE MEANING OF CONSUMER BEHAVIOR**

#### *The Meaning of Operant Behavior*

Operant accounts of contingency-shaped behavior are often criticized for

omitting the actor's subjective experience of situations. In fact, behaviorists have tackled this question of individual reaction by accounting for a person's behavior within the situation; the account includes consideration of the individual's verbal behavior, the rule governance of his or her earlier activities, and the continuity of behavior over time. This is achieved by reference to the individual's environmental history (Skinner, 1974, p. 77), for the meaning of an operant response is to be found in what has preceded it. According to Skinner (note that the concept I wish to elucidate later differs from his) the meaning of an act is not found in the current setting: neither in the discriminative stimuli that compose the setting, nor in the responses that take place there, nor in their outcomes. Rather, it is located solely in the history of exposure to similar contingencies that have brought behavior under the control of the current situation (p. 91). Meaning is thus defined in terms of the function of a response, not, as the structuralists would have it, in its topography, and function is determined by the individual's learning history. The meaning of a response is found in the past contingencies that control the topography of current behavior and empower current discriminative stimuli (Skinner, 1974, p. 91). Thus, topographies of behavior may resemble one another closely, but the meanings of the behaviors may differ markedly. Two customers may buy ties from the same assistant, one right after the other, but the meaning of doing so can be quite different if the first tie is bought as a present (and therefore is controlled by a history of gift giving) and the second is bought for personal use (and is controlled by a history of wearing ordinary ties to the office). The meanings do not depend on the reinforcer (the type of tie) but on these histories of buying, giving, wearing, and their outcomes.

Lee (1988, pp. 135–137) proposes as the first question of operant interpretation, "What is this person doing?"

This is an inquiry into the consequences being produced. Equivalent forms of this question are: "What is this act?" and "What is the meaning of this act?" The traditional answer, as we have seen, would be couched in terms of the individual's learning history. Unfortunately, unlike the learning history of the rat or pigeon whose entire lifetime has been altruistically given over to advancing the experimental analysis of behavior, that of the middle-aged consumer in Harrods is not empirically available. We might be able to surmise a certain amount, and the consumer might be able to tell us an uncertain amount, but we shall be left wondering whether we have elucidated the current act in terms of a reconstructed environmental history with any validity. Yet we cannot simply observe the current behavior in order to uncover its meaning. The problem is that of equifinality, that is, the tendency noted by Skinner and numerous other behavior analysts for apparently disparate responses to produce similar consequences and for those responses to form a class. Instead of considering isolated acts of consumer behavior, it makes sense to analyze purchase and consumption in terms of classes of actions grouped by the outcomes they produce. We have already seen that topographically similar responses may produce disparate consequences; so may topographically dissimilar responses belong to the same equifinality class. Ordering a book by mail has a form that is entirely distinct from asking for the same item in a bookstore, but both are functionally equivalent if they have the same outcome. Operant interpretation requires that, in addition to whatever evidence is obtainable for reconstructing the individual's learning history, elements of the current behavior setting and the kinds of reinforcement or punishment they prefigure as consequent upon specific responses also be taken into consideration.

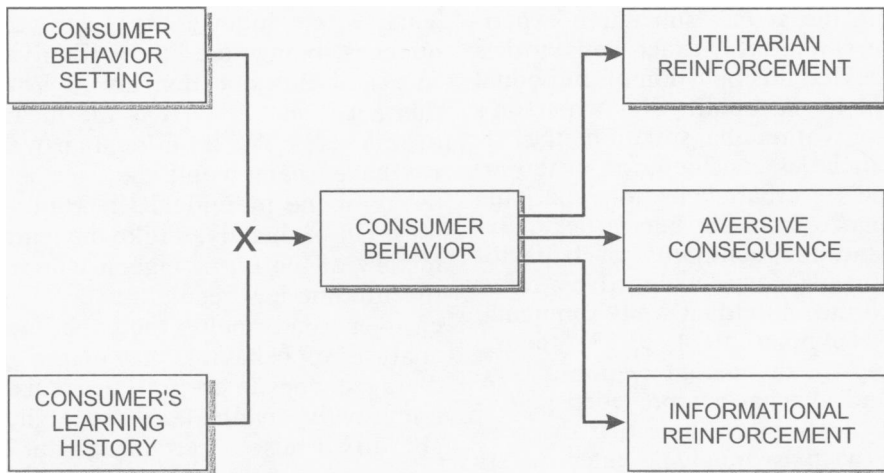


Figure 1. Summative behavioral perspective model.

### *A Behavioral Interpretation*

The behavioral perspective model (BPM) of consumer choice (Figure 1) suggests the form which an answer to Lee's question might take in the context of consumer behavior. The consumer behavior setting—a store, a library, an opera house, or a crack dealership—consists of four kinds of such elements or discriminative stimuli: physical, social, time-based (temporal), and rule-based (regulatory). These antecedent stimuli signal the possibility of three kinds of consequences that determine behavior: utilitarian reinforcement, informational reinforcement, and aversive outcomes.

*Utilitarian reinforcement.* Utilitarian reinforcement refers to increases in utility (i.e., use value) to the individual organism; although pleasure (which is generally associated with hedonism) is not the essence of reinforcement (a reinforcer is simply a consequence that increases rate of response), many utilitarian reinforcers will also be associated with pleasurable responses as a result of the material satisfactions they bring. Utilitarian reinforcement arises from the characteristics of the product or service obtained in purchase or used in consumption; this corresponds to the use of utility in economics to refer to “the direct satisfaction that goods and

services yield to their possessors” (Gould & Kolb, 1964, pp. 303, 740). Utility theory in economics derives essentially from the psychology of hedonism (Black, 1987; Griffin & Parfitt, 1987; Menger, 1956; Viner, 1925). Hence, although utilitarian reinforcement is akin to value in use, it derives not only from the functional performance of a product or service but also from the feelings associated with owning and consuming it. In addition to the functions performed by a product or service, utilitarian consequences of consumption include the positive affect generated in the process. Utilitarian reinforcement refers, therefore, to all of the benefits derived directly from possession and application of a product or service; it is reinforcement mediated by the product or service; it inheres in the use value of the commodity.

*Informational reinforcement.* Informational reinforcement, by contrast, is symbolic, usually mediated by the responsive actions of others, and is closely akin to exchange value. It consists not in information per se but in feedback on an individual's performance. Informational reinforcement attests to the level of correctness or appropriateness of a person's performance as a consumer; whereas utilitarian reinforcement stems from economic

and functional payoffs of buying and using goods, informational reinforcement results from the level of social status, prestige, and acceptance achieved by a consumer by his or her efforts. It is usually publicly determined, judged by others according to the rules, and thus of primarily social significance. Inasmuch as it is mediated by other people, it is verbal (Skinner, 1957), consisting in speech, gestures, and (when the individual provides his or her own informational reinforcement and thus becomes the "other" person) in private thoughts (Skinner, 1974). From the viewpoint of the consumer, informational reinforcement rests on a comparative judgment of how well he or she is using time and energy relative to other uses to which they would be put: "How well am I exchanging my time and effort for the acquisition of groceries?" If the consumer is being relatively inefficient, he or she may either speed up the shopping trip or postpone purchasing further items. If the consumer is efficient, the time and energy will be left over to accomplish something else. From the social viewpoint, the public consumption of a prestigious product or service is exchanged for the goodwill, praise, positive responses, and so on of others (i.e., for esteem and social status).

For the purposes of this interpretation, the assumption is that utilitarian and informational reinforcement are orthogonal variables; it is left to empirical analyses to determine the veracity of this assumption.

*Aversive consequences.* Finally, there are aversive consequences (which, if suffered, reduce the chance of this behavior being repeated). A defining characteristic of economic behavior, because it includes a reciprocal transfer of rights, lies in its being simultaneously reinforced and punished (Alhadeff, 1982). It incurs reinforcement and response cost as direct and specific consequences of its performance. Economic behavior is determined by the interaction of two response strengths—approach and avoid-

ance—each of which is dependent upon the consumer's learning history, the quality and quantity of reinforcement, reinforcement schedules, and so on (Alhadeff, 1982). Alhadeff's operant theory of economic behavior points out that any consumer behavior meets with both reinforcing and aversive consequences; the strength of the behavior (its frequency and its magnitude on any occasion) is the result of tendencies towards approach, leading to such positive reinforcement as possession and consumption of the utilities and information provided by a purchase, and those towards escape, leading to punishers such as loss of cash, an end to prepurchase deliberation which may be satisfying in itself, and forgoing other products. Whether approach such as purchasing or escape such as saving or buying something else is the outcome depends upon which of these responses is the stronger, that is, upon the learning history of the individual (Alhadeff, 1982).

The relative strength of potential reinforcement and response cost is the net outcome signaled by the discriminative stimuli in the current behavior setting as contingent upon the purchase or consumption response. Alhadeff (1982) portrays purchase behavior as a vector of these two strengths or probabilities, which the BPM represents as a function of the current consumer behavior setting as it is primed by the consumer's learning history. The strength of approach depends upon reinforcer effectiveness (which is, in turn, a function of the consumer's level of deprivation), the schedule of reinforcement (and here we must add to Alhadeff's analysis, the possibility that multiple schedules will be in operation in nonlaboratory settings), reinforcer delay (the length of time by which reinforcement has followed the response in the past; the longer this interval, the weaker the response), the quantity of signaled reinforcement, and the quality of signaled reinforcement. The strength of escape depends upon how aversive the loss of money is to the consumer

who must pay for the product (and this is itself a function of the reaction of others to previous purchases by the individual), the past results of losing the positive generalized reinforcer (money), and the result of having been prevented from acquiring other reinforcers as a consequence of having bought a particular product, the length of delay between the purchase and such punishing consequences, the quantity and quality of the money surrendered, and the reinforcement schedule (Alhadeff, 1982; Foxall, 1990, pp. 65–69). The loss is the opportunity cost signaled by the physical, social, temporal, and regulatory discriminative stimuli of the current setting.

#### *Evidence for Utilitarian and Informational Reinforcement*

The distinction between utilitarian and informational sources of reinforcement is empirically supported by work in behavior analysis as well as in economic and consumer research. Four strands of this research are reviewed here: the duality of consequences for economic behavior, the insensitivity of human operant subjects to utilitarian reinforcement and their corresponding sensitivity to rule-generated reinforcement, the distinct motivational influences of incentives and feedback in applied behavior research, and the implications of human subjects' inability on occasion to show matching.

*The dual causation of economic behavior.* A bottom-up analysis of economic behavior indicates a duality of motivation. Three frequently overlapping disciplines—economic psychology, behavioral economics, and psychological economics—are vitally concerned with the argument that human economic behavior is not fully explicable in terms of neoclassical economic rationality. Such behavior also displays a social psychological consistency and rationale that a full explication of consumer choice must take into account (Katona, 1975; Scitovsky, 1992). Aggregate consumer demand certainly

conforms broadly to the strictures of utility theory, and even individual consumer behavior fulfills the laws of demand in the general sense that consumers seek utilitarian benefits and usually choose more value rather than less value. This is not entirely true, however, and there are often "lapses" that do not lend themselves to an exclusively economic explanation. Any explication of the totality of consumer behavior must recognize that it is under the dual control of its utilitarian and economic consequences and those additional outcomes that consist of social status and the feelings reported as self-esteem. Economists have usually ignored or been unable to deal professionally with the social psychological causation of consumer behavior (Mason, 1988; cf. Earl, 1990). The BPM is founded upon two variables that capture the social psychological influences on consumer behavior. Each of these variables is based on a conception of social psychological influence relative to a significant counterinfluence. First, the concept of the consumer's behavior setting scope contrasts social with individual influences on responding. Consumer behavior setting scope indicates how far persons other than the consumer control the settings in which consumption occurs. This continuum thus provides a measure of personal versus social locus of control. Second, the ratio of instrumental to informational reinforcement allows social psychological influences (informational reinforcers) to be contrasted with economic influences (utilitarian reinforcement). The ratio of utilitarian to informational reinforcement indicates how far the consequences of a consumer's actions are supplied by others (in the form of social approval or socially learned feelings of self-esteem) rather than by the requirements of the consumer's biological and innate individual constitution.

*Bifurcation of human reinforcement.* Behavior analysis contains the empirical findings that make this dichotomy intelligible in operant terms: It shows



that human operant performance in the laboratory is often relatively insensitive to material reinforcers such as points, money, and food but is highly sensitive to performance feedback in the form of graphs and listings of achievement, especially relative achievement in a competitive setting (Wearden, 1988). Although operant experimenters have generally assumed that the mechanism of reinforcement is identical across species, Wearden draws attention to what may be fundamental differences between conceptualizations of animal and human behaviors and the environmental conditions that maintain them. Whereas food and water, the ubiquitous reinforcers of operant behavior in animal experiments, have utilitarian benefit for the subjects, who are generally kept in a state of reinforcer deprivation, it is difficult to imagine that the tiny, even trivial, rewards presented to human participants in typical operant experiments, consisting as they do of points exchangeable for a few cents or small items of food, confer any such functional advantage. These reinforcers appear to possess neither utility nor exchange value for their recipients who, in some laboratories, have preferred to throw the snacks out of the window rather than to even taste them. The performance of human participants in such studies is frequently erratic; their rate of scoring becomes orderly only when an element of competitiveness is introduced by the public recording of scores in the form of graphs (Wearden, 1988, pp. 199–200).

The reinforcement in these cases appears not to stem from any utilitarian benefits but from the feedback on the appropriateness and correctness of the performance that earned the food or money. This is consistent with the evidence that variable-interval (VI) schedules of reinforcement frequently confuse human participants who cannot deduce what is required of them (Horne & Lowe, 1993). When informational feedback is made available to participants, they are more easily able

to solve the problems even in the absence of nutritional or monetary rewards (Lowe, Harzem, & Bagshaw, 1978; Wearden & Shimp, 1985). Whereas fixed-interval schedules require participants to spend a few sessions in stabilizing their performances and, as noted, promote behavior that is insensitive to parameter changes, “informationally rich procedures” (Wearden, 1988, p. 203) result in smoother behavior patterns that respond “economically” to changes in schedule parameters. This analysis reveals a level of complexity with respect to the contingencies that surround human behavior that has rarely been taken into consideration in descriptions of consumer choice based on extrapolations from animal behavior. Interpretation is confined to the information available to the behavior analyst, which may be scant (Lee, 1988, p. 137), leading to his or her drawing bold inferences about the learning history of the consumer, especially (in the light of Wearden’s bifurcation of the sources of environmental motivation into utilitarian and informational) the pattern of reinforcement that has sustained learned behavior. The sheer number and complexity of possible contingencies render any interpretation incomplete (Lee, 1988, p. 138); only a small proportion of the pertinent contingencies may be obvious to the onlooker who must, among other things, distinguish contingency-shaped from rule-governed behavior and propose the self-generated rules that may account for an individual’s conduct as well as identify the public rules he or she is following.

*Applied behavior analysis.* Empirical support for this distinction also derives from the extensive work of applied behavior analysts who have studied consumer behavior modification in order to assess the extent to which environmental factors control the demand for products and services that have deleterious effects on the physical environment (Cone & Hayes, 1980; Geller, Winett, & Everett, 1982). Often, the unrestricted acquisition of short-term

reinforcers by a limited number of individuals leads to long-term aversive consequences for all users (Hardin, 1968; cf. Foxall, 1979). These behaviors typically occur in relatively open settings and are strengthened principally by utilitarian reinforcers. Programs have incorporated specific, behavior-related antecedent and consequent stimuli. Antecedent stimuli have generally consisted of *prompts* (i.e., warnings, reasoned argument and facts, threats, pleas, etc.) relating to the deleterious effects of actions that exploit or pollute the environment. Two varieties of consequential stimuli have been employed: *feedback* (i.e., information on the actual effects of individuals' actions) and *incentives* (i.e., financial bonuses, praise, and encouragement). Two examples must suffice to indicate the nature of the research.

First, modification of consumers' transportation behavior has been intended to reduce fuel consumption, urban congestion, and pollution by discouraging individual use of private cars and promoting public transportation. The most successful interventions have offered financial incentives: They have, for example, increased the number of users of public travel services by 50% to 180%. Discouragement of car travel has reduced mileage traveled by 10% to 50%. Feedback (on the number of miles traveled, operating costs, depreciation, social costs, etc.) had no effect on mileage traveled, and incentives once again emerge as the most effective means of modifying behavior. Similar effects have been produced in research conducted with commercial truck fleets. Second, attempted modification of consumers' domestic energy consumption also used antecedent prompting, feedback, and incentives, separately and in combination. Alone, information relating to the environmental effects of pollution caused by high consumption of electricity at peak periods had little if any effect on peak usage. Greater effect was achieved by consumer self-monitoring of current energy usage: Peak con-

sumption was reduced by up to 30% of mean baseline levels. Combined feedback and monetary incentives have reduced peaking by about 65% of baseline, confirming the efficacy of combined consequences. Weekly or monthly feedback, corresponding with normal billing periods, is particularly efficacious. Combination of prompts and feedback with incentives (up to \$5 per week for reductions of energy consumption by more than 20% of baseline mean) is even more effective. Comparisons of the individual effects of prompts, feedback, and incentives indicate, however, that only incentives have an appreciable effect on behavior (Cone & Hayes, 1980; Geller et al., 1982).

Some of the reinforcers employed are recognizable as principally utilitarian in nature. These are the incentives: prizes, personal recognition, and money, for instance. All have tangible effects, most have secondary significance in facilitating or motivating other, unrelated behaviors, and most are sought for the pleasure and other emotional satisfactions they directly provide. These reinforcers are distinctive in that they have directly utilitarian effects. This deployment gives rise to use benefits that are enjoyed independently of the mediation of other consumers. Other reinforcers used in such field experimentation present another source of behavioral control: feedback on performance such as the amount of electricity saved, the number of car miles forgone, the amount of litter collected, the amount by which one's bills have been reduced. These are symbolic, conveyed verbally, and are closely linked in significance and usefulness to the behavior enacted. The receipt of these reinforcers does not provide the consumer with direct utilitarian satisfactions; the satisfaction derives from the evidence of performance quality they provide. Often the symbolic properties of such reinforcers are obvious or acquire special salience only in the presence of other people as they enhance the status of the recipient. Ap-

plied behavior analysis demonstrates that these types of consequence have separate effects on behavior, but that their effect may be greatest in combination (Cone & Hayes, 1980; Geller et al., 1982). These empirical studies demonstrate that the BPM identifies salient variables that control behavior and indicates that they are related consistently in the manner prescribed by operant psychology. The elements of the three-term contingency can be readily identified in the empirical studies: Prompts act (or are intended to act) as discriminative stimuli; feedback and incentives are reinforcers. The underlying behavior-analytic model is, therefore, substantiated. The studies further confirm the BPM by supporting the distinction between utilitarian and informational reinforcement, indicating not only that these conceptual categories can be made operational but also that both types of reinforcer are necessary to account fully for complex consumer behavior. For the most part, although the distinction is not absolute, feedback consists of informational reinforcement and incentives are utilitarian reinforcement. Moreover, the general conclusion of the above review must be that behaviors that overexploit natural resources occur in open settings and are strengthened principally by utilitarian reinforcers that are presented with minimal delay. The research also indicates that utilitarian and informational reinforcement also have independent effects on consumer behavior, although—in line with basic behavior-analytic reasoning—behavioral change is greatest when both utilitarian and informational reinforcers are the consequences of the emission of consumer operants.

*Matching.* Behavior analysts have long appreciated the difference between behavior that is contingency shaped and that which is rule governed (Skinner, 1969). A striking example of this difference in the context of economic choice emerges from experiments that have established the matching law among nonhumans and those

that have attempted to demonstrate its applicability to human behavior. (See Herrnstein, 1997, for seminal papers; Davison & McCarthy, 1986, for critical reviews of research; Horne & Lowe, 1993, for descriptions of theoretically important empirical investigations of humans' over- and undermatching.) Nonhuman choices on concurrent VI schedules are described by the matching law, which states that subjects emit alternative responses with frequencies in direct proportion to the frequency of reinforcement available for each response (Herrnstein, 1997).

The potential of the matching law to describe nonhuman behavior accurately and consistently has been indicated in several applied settings. In addition, human responding often has been described as conforming to these equations. However, some researchers (e.g., Lowe, 1983) have argued that human responding frequently deviates substantially from the matching relationships found for other animals. Horne and Lowe (1993, p. 53) summarize six experiments involving human performances on concurrent VI schedules by noting that "In our studies, . . . less than half the subjects' performances resembled those typically found in animal choice studies. For many of the remaining subjects, there were not mere 'deviations' from the matching typically observed in nonhumans; rather their performance was qualitatively different and could not be described by the matching equations." Departures from the matching law have been reported by several other researchers. Horne and Lowe (1993, p. 54) comment that "Together with the data from our six experiments, these findings clearly demonstrate that human subjects showing ideal matching, or even a close approximation to it, are the exception rather than the rule in the literature." Departures such as these are apparently explained by humans' capacity for verbalizing the contingencies of reinforcement that they believe to be in operation. Information, accurate or otherwise, about the contingencies op-

erating in experimental settings is provided in the instructions given by the experimenter: Use of such information may account for the digressions shown in human behavior from patterns found in experiments with nonhumans (Horne & Lowe, 1993; Lowe, 1979, 1983). Verbal behavior may thus be invoked in the search for the causes of both the relatively simple behaviors emitted in experimental settings and the more complex patterns of response found in the situations of purchase and consumption. The interpretations of such complex behavior can and should be submitted to further experimental analysis (Horne & Lowe, 1993).

An interpretation of these findings lies in the idea that two sources of reinforcement are implicated in the behavior of humans. These sources inhere in *contingency-derived reinforcers* and *rule-derived reinforcers*. Contingency-derived reinforcers are both primary and secondary. Their effect is apparent in the contingency shaping of behavior; it derives from the impact that behavior has directly upon its environment. These reinforcers are generally associated with pleasurable effects for the individual who is in a state of reinforcer deprivation (although behavior analysts usually avoid the notion that something is reinforcing because it is pleasant). But evolution has required that most acts whose rate is influenced by primary reinforcers have pleasant outcomes: eating sugar and avoiding pain, for instance. Secondary reinforcers such as furniture, housing, and music usually also have a utilitarian effect. Contingency-derived reinforcers are, therefore, utilitarian reinforcers. (However, in human contexts, rules may be implicated in the pairing of primary and secondary stimuli.) Rule-derived reinforcers have their effect only by virtue of being specified in rules (e.g., that money is a measure of individual prestige as well as a medium of exchange; people holding university degrees are important as well as employable). None of these derives its reinforcing power from nature; none is

a reinforcer from the organism's birth. They are only useful and reinforcing insofar as they are symbols, because they point to something else such as a level of performance, success, or access to a job. Rule-derived reinforcers are social and verbal; their effect is on behavior that is mediated by others (where the other may be the individual him or herself). Such instructed behavior, the verbal behavior of the listener, is reinforced by the individual's level of achievement of socially (or personally) prescribed goals; the behavior consists of *pliance* or *tracking* (Zettle & Hayes, 1982). Pliance is rule-governed behavior controlled by consequences that the speaker (or his or her agent) regulates (or claims to regulate). The rule, known as a *ply*, refers, therefore, to the social consequences of compliance or noncompliance: "Keeping my breath fresh will get me more dates." Tracking is instructed behavior that, according to the rule, is under the control of the nonsocial environment. A *track* specifies the arrangement of contingencies within that physical or temporal context: "If I turn left at the next intersection, I'll come to the supermarket." A third functional unit of listener behavior has no corresponding unit for the speaker: The *augmental* (Zettle & Hayes, 1982) is a highly motivating rule that states emphatically how a particular behavior will be reinforced or avoid response cost. "Just one more packet top and I can claim my watch!" In the case of pliance, the informational reinforcement derives from the praise, recognition, or acknowledgment extended by the mediating individual to the rule follower. (Informational punishment or, better, response cost, would be the result of noncompliance or countercompliance.) In the case of tracking, the informational reinforcement derives from consonance between the physical environment as it is experienced and as it was described by the mediating individual (who may be the behavior). (Informational punishment or response cost would result from a lack of such con-

sonance.) These reinforcers are always secondary. They derive power from the social status or self-esteem conferred as a result of the behaviors they maintain. Rule-derived reinforcers are, therefore, informational reinforcers.

Matching is found when the source of reinforcement is entirely contingency based (utilitarian, physical) and hence is characteristic of nonhumans. When matching is not found, verbal reinforcers predominate; hence the tendency not to match is exclusive to humans. The subjects in experiments that show matching are typically at 80% of their normal body weight: As we have noted, the utility of the primary food reinforcers typically used in such work is very material to these subjects. This primary reinforcement is clearly contingency shaped. Humans, too, may show matching when their behavior is primarily controlled by physical contingencies. But verbal descriptions of contingencies—rules—provide an extracontingency-based source of reinforcement. The empirical evidence for and against matching thus justifies taking a dual approach to reinforcement and seeking the difference between these sources in verbal response.

#### *Classification of Consumer Behavior*

Consumer behavior itself can be classified in four ways according to the relative levels of the utilitarian and informational reinforcement that have maintained that behavior in the history of the consumer. We can infer this from our interpretation of the likely consequences of behaving similarly now. Hence, when high levels of both utilitarian and informational reinforcement are likely, we speak of the behavior as *accomplishment*; when utilitarian reinforcement predominates, of *hedonism*; when informational reinforcement predominates, of *accumulation*; and when both have a relatively low level of effect, of *maintenance* (Foxall, 1990, 1994, 1996). An understanding of the probable consequences of current consumer behavior, which have through

prior generation presumably brought the consumer to the current behavior setting, is intended as a response to the problem of equifinality. Each of these classes is an operant equifinality class: Placing the behavior in question in one or other of these is the first stage in locating that behavior. Only by isolating these consequences, an act that partly supplements and partly acts as a surrogate for a full reconstruction of the consumer's learning history, can we propose an answer to Lee's (1988) second question of operant interpretation, "What has been done?" In other words, "What ends have been achieved?" and "How is the action effective?"

#### *The Continuum of Consumer Behavior Settings*

The second stage in locating consumer behavior is to summarize the probable effect of behavior setting stimuli on the probability of an approach or avoidance response currently taking place. The immediate contextual influences on consumer behavior comprise the consumer behavior setting, which consists of discriminative stimuli of three kinds, those provided by the physical surroundings (including temporal constraints), the social surroundings, and the verbal community, principally the rules that specify the relationships among antecedent (discriminative) stimuli, behavioral responses, and their consequences (reinforcers and punishers). Discriminative stimuli signal the kinds of consequences likely to follow the performance of a particular behavioral act. The continuum of behavior settings incorporated into the BPM derives from criticism of the tendency of some behavior analysts to generalize their findings beyond the confines of the experimental spheres from which they were derived. This bias is not found in the work of Rachlin (1987, p. 163), which contains the implicit idea of a continuum of settings, more or less amenable to the demonstration of operant control:

A theory that is taken out of the laboratory and applied to the real world will, of necessity, apply most easily to those real-world situations that most resemble the laboratory. Thus, classical physics applies better to stones dropped from the leaning tower of Pisa than to feathers dropped from the leaning tower of Pisa. Similarly, Skinner's radical behaviorism, dealing as it does with prediction and control of behavior, applies in a more straightforward way to situations in the real world where the forces of control are most direct—prisons, factories, armies and the like. Radical behaviorism applies less obviously in situations such as family relationships where control is less obvious. But . . . it does apply meaningfully in those situations too.

In a critique of the comprehensiveness of radical behaviorist explanation, Schwartz and Lacey (1982) go much further, arguing that it properly applies only to behavior settings from which sources of control other than those wielded by the behavioral psychologist have been entirely removed. Such *closed settings*, typified by the operant laboratory, are those in which

only a few reinforcers are available, and usually, only one has special salience; the experimenter (behavior modifier) has control over conditions of deprivation and access to reinforcers; there is only one, or at most a few, available means to the reinforcers; the performance of clearly-defined tasks is reinforced; different tasks are effectively interchangeable for the one that is reinforced; the contingencies of reinforcement are imposed and varied by agents not themselves being subjected to the contingencies; and there are no effective alternatives to being in the setting. (Lacey & Schwartz, 1987, p. 170)

Schwartz and Lacey (1988) argue that many of the contexts in which complex human social interaction takes place do not resemble the closed settings in which the animal experiments, whose results provide the basis of operant analysis, occur. This does not mean that operant control is absent from complex settings, but that it is difficult to identify with the rigor possible in experimental settings, and that radical behaviorism may not therefore provide a comprehensive explanation of behavior. Terms such as *discriminative stimulus*, *reinforcer*, and even *response*, which can be carefully assigned in the laboratory, acquire vaguer meanings when they are employed in program-

matic accounts of verbal and other complex human behavior (Chomsky, 1959; Schwartz & Lacey, 1982; cf. MacCorquodale, 1969, 1970).

The inference Schwartz and Lacey (1982) draw is that behavior-analytic principles do not apply uniformly throughout human activity, or at least that they cannot be shown unambiguously to do so in all contexts. Hence, the greater the extent to which observed behavior is performed in locations remote from the closed setting of the operant laboratory, the more probable it is that a comprehensive explanation of that behavior lies beyond an operant account. Though operant behaviorism will presumably play an indispensable role in such a comprehensive account, they argue, alternative theories may be required either to supplement or to complement it. The BPM does not endorse Schwartz and Lacey's criticisms in their entirety, but it does propose a continuum of behavior settings that differ more in the nature of the operant control they exert than in the fact of such influence. As noted, the experimental settings in which operant research on animals usually occurs represent an extremely closed setting (Schwartz & Lacey, 1982, 1988). The resulting behavior of these experimental subjects is, as we have seen, inescapably economic. The settings in which human consumers naturally behave are all far more open than this extreme: The topographical complexities of such behavior reflect the profusion of alternative settings presented by interindustrial competition, the unpredictability of consumer choice at the brand or store level made possible by high levels of discretionary income, and the variety of patterns of consequences facilitated by marketing mixes that consist of combinations of utilitarian and informational reinforcers too complex to enumerate. Consumer behavior settings can, nevertheless, be described on a continuum from the relatively open to the relatively closed. The relatively open setting in which the consumer browses within an exclu-

sive department store, making decisions among a vast array of consumer innovations and luxuries, can be contrasted with the relatively closed setting in which authorities exact taxation that must be paid if the consumer is to retain his or her rights of citizenship. In the relatively closed setting, the physical, social, and regulatory environments (and the reinforcing and punishing behavioral consequences they convey) are arranged largely or entirely by persons other than the consumer; such settings encourage (or even compel) conformity to the behavior program they sustain and they achieve this by making reinforcement contingent on such conformity, which usually consists in the performance of one or two very closely specified operant responses; punishment is contingent on deviation. At the very least, managers arrange the discriminative stimuli that compose these settings so as to prefigure such enabling or inhibiting outcomes. By contrast, the relatively open setting does not so constrain the consumer who can perform behaviors drawn from a wide range of repertoires to gain a variety of reinforcers. Support for a continuum of consumer behavior settings in which situational constraints determine approach (purchase) or escape or avoidance (rejection, postponement, or substitution) can be found in the marketing literature (e.g., Lynch, 1992). In particular the degree of monopoly enjoyed by the supplier may influence the extent to which consumers purchase its product. As Lynch points out, in more open settings, marketers frequently attempt to overcome the constraints imposed by price or income by offering credit terms or resorting their product portfolios: "Buy the table now and the chairs later" (Lynch, 1992, p. 62).

*Implications of rule governance.* In defining the behavior setting, consumers' learning histories, and the consequences of purchase and consumption, the foregoing analysis has assumed that consumer behavior is shaped and maintained by its contact with the con-

tingencies of reinforcement and punishment. Mention has been made of the possibility of verbal discriminative stimuli influencing purchase and consumption, but no systematic analysis of rule-governed consumer behavior has been undertaken as part of the BPM program. There are occasions when the consumer's immediate setting includes physical, social, and temporal elements that exert no direct influence over behavior. An individual might, for instance, be located in one of a variety of settings when he or she receives a letter threatening legal action unless a debt is cleared within seven days. The immediate physical, social, and temporal setting is unlikely to exert discriminative control over the debt-related behaviors that ensue. The letter bears the verbal discriminative stimuli that signal the control exercised by external agencies, but the more remote contingencies make the behavior setting that actually controls the consumer's subsequent behavior (say, going to the bank to pay the debt) more difficult to observe than would be the case for his or her choosing a strongly featured brand in a supermarket. In the retail environment, the physical, social, and temporal contingencies that guide or constrain the consumer are relatively concrete and objectively available; their counterparts in the case of the debt-ridden consumer are as real in their effect on the consumer's behavior but are more elusive to the observer, to whom the consumer's learning history is not empirically available. The analysis of the resulting behavior would nevertheless be incomplete without an account of the manding responses of the speaker and the interpretation of the listener's actions as pliance. Thus the term *behavior setting* as used in the BPM refers not directly and simply to the immediate environment but to the source and nature of control it exerts, including the possibility of self-control in which the consumer is in a position to arrange the contingencies to which he or she is subject (Skinner, 1953). Sometimes the immediate social, phys-

ical, and temporal setting provides a good guide to the nature of these contingencies; sometimes it is necessary to look further afield to identify the more diffused behavior setting in which the relevant discriminative stimuli are embedded. Further, the above depiction of the role of setting and reinforcing variables suggests that differences in the openness of settings are not simply a function of variations in physical contingencies but of differences in the nature of verbal control of the behaviors encountered in each. As a generalization, it seems probable that the consumer's rule-governed actions in relatively closed consumer settings are characterized by plys, whereas in relatively open settings they are characterized predominantly by tracks. Aumentals are important to both.

*Empirical Evidence for the Closed-Open Continuum*

In addition to the suggestion of several behavior analysts that operant principles are most clearly visible in the control of behavior in settings such as a factory, an army, or a school, there is abundant evidence for this distinction in the operant literature on consumer behavior.

*Token economies.* Token economies are relatively closed settings in which consumer behavior conforms very strictly to the ordinal utility theory of microeconomics (which is operant), to the extent of being delineable by demand curves. Studies of token economies, in therapeutic and other rehabilitative contexts, document the strong influence of environmental stimuli upon action within such closed settings. Second, applied behavior analysis of the influence of consequences upon consumers' environment-affecting behaviors indicates a definite, though in the more open settings less exact, influence of environment upon action. These sets of empirical data also elucidate the distinction between utilitarian and informational sources of reinforcement. Tokens are generalized

conditioned reinforcers; obtaining them is contingent upon performing predetermined responses in accordance with a specified schedule (Kazdin, 1981; Winkler, 1980). Rules may state contingencies in several ways. Any individual's earned tokens may accrue simply to him or her, but there are other options. For example, the performance of the group as a whole may determine the allocation of tokens to each individual; alternatively, in "consequence sharing," the tokens earned by an individual are allocated not only to him or her but to each of his or her peers. Back-up reinforcers purchased by one person may also go to each member of the group (Kazdin, 1981). Punishments or response costs may also be incurred (e.g., as fines for proscribed behavior). Tokens reinforce rule-governed behavior, notably pliance ("Make your own bed every day in order to receive  $x$  tokens"); they may also strengthen congruent tracking ("This is the way to make your bed properly"). Tokens, therefore, are or are related to informational reinforcement because they present evidence of the level of performance achieved by an individual. They are methods of performance feedback—status reports. As secondary conditioned reinforcers, they obtain their control over behavior by association with back-up or primary reinforcers. For the most part the back-up reinforcers are utilitarian in nature: Their control stems from the properties of the back-up items themselves, particularly the utilitarian functions they perform. Tokens, by contrast, control behavior principally through their symbolic nature and function: They are symbols of the amount of work done, of the spending power of those who own them, and thus of their informal social status in the group.

All of this is suggestive of a closed setting. The contingencies are determined by agents who are not themselves subject to them. Moreover, the staff are subject to a quite different set of contingencies as a result of their training and career aspirations (Kazdin,



1981, p. 71). The conditions under which the token economy is operated may be relaxed by allowing tokens to be administered by peers or by self-administration of reinforcement (in which participants grant themselves points or tokens). The scope of the setting, however, remains essentially closed, whatever the schedule and whoever decides it: The behavior of inmates is systematically monitored, and certain behaviors are designated "prosocial" or "desirable," not by the inmates but by those who ultimately control the setting. Reinforcers are similarly chosen by persons other than the inmates, as are the tokens; finally, the rules and schedules by which tokens might function as exchange media are externally determined (Krasner & Krasner, 1973, pp. 354-355). The behavior modification inherent in the token economy involves "*planning the environment* so as to shape and maintain 'desirable' behavior . . . [it is] a *systematic and planned approach*" (Krasner & Krasner, 1973, p. 352). Tarr (1976, p. 1136) speaks of such contexts as "closed economies." Battalio et al. (1974) support the suggestion that token economies are closed behavior settings: "The individual lives in the controlled environment . . . 24 hours a day . . . [subject to the] routine maintenance of controls." The token economy is "a therapeutic environment for an institutionalized population" (p. 52). Given that inmates cannot usually physically leave locked wards, classrooms, and prisons, the reinforcers in question can be made entirely contingent upon prescribed behavior.

The behaviors involved are relatively simple, as are the contingencies. Few, if any, alternatives are on offer; on the whole, there is no competitive source of supply of the utilitarian (back-up) reinforcers. It is predictable, therefore, that behavior in token economies will be orderly and that few, if any, inmates will deviate from the expected pattern. This has been borne out in those experiments, generally in therapeutic environments, that have found

individual token-economy behavior to conform to the patterns described by microeconomic theory and, overall, to be "exactly" like that found in a national economy (Tarr, 1976; Winkler, 1980, p. 271). In the case of microeconomic relationships, for instance, a study at the Central Islip State Hospital (Battalio et al., 1974) found that price and quantity demand relationships were as predicted by neoclassical theory (Tarr, 1976, p. 1136); "the data fulfill the fundamental theorem of the theory of consumer behavior . . . that compensated demand curves slope down . . . through systematically varying prices on a weekly basis over a seven week period, it was found that aggregate weekly expenditures raised in the manner predicted by consumer theory" (Tarr, 1976, p. 1139). Of 38 participants in the study, 36 "acted consistently with revealed preference theory"; the behavior of the remaining 2, which appeared initially to contradict the theory, turned out on closer inspection to confirm it, though after a time lag (Battalio et al., 1974).

Additional evidence for the conformity of behavior in token economies to macroeconomic expectations comes from a number of experiments in a state psychiatric hospital in Sydney, Australia (Winkler, 1980). The studies showed consumer behavior to vary with basic demand theory in three respects, confirming the predicted relationships between income and total expenditure, income and purchases of luxuries versus necessities, and the price elasticity of demand of luxuries versus necessities (Winkler, 1980, p. 272). These studies took savings into consideration and found that when the stock of savings increased, the earning of tokens decreased; when excess saving stocks were available, moreover, any increase in the amount of reinforcement available became progressively less effective in the control of behavior.

A key consideration arises from whether the behavioral changes effected in token economies are maintained

when the participant leaves the therapeutic community. Although hundreds of studies indicate that token economies effect behavior change and do so more effectively than alternative methods (Kazdin, 1981, p. 69), it appears that behaviors often revert to pretreatment levels when the principles are no longer used. The question of response maintenance and transfer is clearly of the utmost importance to the staff of the institutions involved and the social administrators who have devised and sought to benefit from the programs. It is also of great relevance to any attempt to generalize about the influence of the environment on operant behavior. Actually, the fact that behavior often returns to baseline levels when the individual is removed from the structures of the token economy, although problematic for those directly involved in therapy and rehabilitation, confirms the importance attached by the BPM to the immediate setting as a determinant of current behavior. The means at the disposal of administration of token economy programs to effect long-term posttreatment behavior change also support the BPM approach. The evidence is that response maintenance and transfer are feasible if the discriminative stimuli that control behavior in the token economy are established in the naturalistic setting. Strategies advocated for such response generalization, which provide evidence for this proposition, include the following (Kazdin, 1977, p. 196). First, similar contingencies must be implemented across the settings: This strategy increases response maintenance in the short term; moreover, when the contingencies are withdrawn completely, further response maintenance is more probable. Second, the contingencies should be gradually faded during training: The effect is to maintain a level of performance in the face of progressively decreasing reinforcer influence. Third, if reliance on discriminative stimuli is increased in the course of training, and if the relevant stimuli are repeated in the naturalistic environment, the prob-

ability of maintained positive social behavior is increased. Fourth, response transfer is more probable if reinforcement has become progressively more intermittent during training, or if the time lag between the response and the reinforcer has been increased. Finally, encouraging the individual to take more personal control over his or her reinforcement makes response maintenance more likely. This includes the use of self-reinforcement (as when a person praises himself or herself for appropriate behavior); self-instruction training (in which rules are internalized and rehearsed); and the extension of discriminative stimuli so that aspects of the individual prompt behavior.

*Applied consumer behavior analysis.* Consumer behavior investigated in the field experiments of applied behavior analysis is clearly under environmental control but not to the same degree as was apparent for the token economy. This evidence supports the BPM in two ways. It draws attention to the influence of consumer behavior settings on behavior in addition to the limited effect of reinforcers, substantiating behavior setting scope as a separate explanatory variable (though not an entirely independent factor, because the control exerted by discriminative stimuli depends ultimately on pairing with reinforcers and punishers). The strategies for response maintenance and transfer also raise an important issue for the study of consumer behavior: How far can the control of behavior be attributed to the environment when the setting is relatively open? The implication of treating behavior setting scope as a variable is that the more open the setting, the less specific will be the environmental control of behavior. The evidence produced by a large volume of research on the effect of consumer behavior on the natural environment and on attempts to change ecologically damaging behavior by means of contingency control also supports the treatment of behavior setting scope as an important variable in influencing choice. The studies typically

have taken the form of field experiments with real consumers who have voluntarily agreed to take part, whose participation in the experiment must compete with their everyday activities, and who can leave the experiment or act contrary to its stated aims at any time. Although the experimenters provide an additional source of refinement to those found in their lives in general, therefore, this is by no means the sole source of motivation, and there are plenty of alternative behaviors available to the participant, each with its own set of contingencies. A feature of all of the settings involved is that positive reinforcement from current behavior (that which the experiments have sought to change or eliminate) is usually immediate and directly available to the individual who acts, whereas aversive consequences are usually delayed and relatively inconsequential for the individual because they are diffused among and felt by the community at large. In all these respects, the settings in which the field experiments have taken place can be regarded as open. In contrast to the results of the token economy studies, the relationship between reinforcement and behavior change is less clear-cut, less orderly, and is less likely to apply to all of the participants. A case can be made that the environmental consequences of behavior account for the rate at which it is performed.

*Demand management.* Evidence for the influence that the scope of the consumer behavior setting exerts on purchase and consumption choices also is provided by the ways in which marketing managers cope with the problem of overpopulation or overdemand (Wicker & Kirmeyer, 1977). Managerial action in such events frequently takes the form of an attempt to affect the scope of the setting, usually by closing it. Overdemand often arises as a result of the density of the consumers in a physical setting that interferes with the level of service available to satisfy demand. This service level is relative not only to the size of the public pres-

ent in the locale but to the level of staffing available to deliver the required service. More significantly, it is relative to the quality of staff, and particularly their marketing proficiency.

Marketers may deal with such overdemand in three ways, all of which involve a change in the scope of the setting, usually in the direction of closure, but all of which can promote an increase in consumer satisfaction. Wicker and Kirmeyer (1977) present the following examples in the context of ecological psychology. First, marketers seek to control the entrance of consumers into the setting, as when consumers are scheduled through an appointments system. Alternatively, managers use demarketing techniques to reduce demand, for example, by modifying the volume or frequency of their persuasive marketing communications. Sometimes the standards required for admission are increased, as when patrons are required to wear suitable attire or admitted only on payment of a higher price. On occasion, customers are channeled into a holding area, such as the bar annexed to a restaurant, until a table becomes free. Ultimately, unauthorized entrance may be entirely precluded, say by the banning of smokers (Owen, Borland, & Hill, 1991). Second, managers control the capacity of the setting. An obvious means is altering the size of physical facilities, for instance by flying larger airplanes. Alternatively, the temporal setting variables are sometimes modified by extending opening hours. Some businesses are able to compensate for staff shortages through mechanization, as in the use of automated teller machines. Third, the amount of time consumers spend in the setting is controlled. This is an instance in which managerial action may increase rather than decrease the scope of the setting. One possibility is dealing with customers more quickly, as when a barber cuts hair faster, but users' length of stay can also be checked, as when motorists are allowed only one hour's parking and their return is prohibited for another

|  |   | BEHAVIOR SETTING SCOPE                        |        |
|--|---|---|--------|
|  |   | Closed ←                                      | → Open |
| <b>ACCOMPLISHMENT</b><br>(high utilitarian,<br>high informational) | <b>Contingency<br/>Category 2</b>                 | <b>Contingency<br/>Category 1</b>             |        |
|  | FULFILLMENT<br>+ P<br>+ A<br>- D                  | STATUS<br>CONSUMPTION<br>+ P<br>+ A<br>+ D    |        |
| <b>HEDONISM</b><br>(high utilitarian,<br>low informational)        | <b>Contingency<br/>Category 4</b>                 | <b>Contingency<br/>Category 3</b>             |        |
|  | INESCAPABLE<br>ENTERTAINMENT<br>+ P<br>- A<br>- D | POPULAR<br>ENTERTAINMENT<br>+ P<br>- A<br>+ D |        |
| <b>ACCUMULATION</b><br>(low utilitarian,<br>high informational)    | <b>Contingency<br/>Category 6</b>                 | <b>Contingency<br/>Category 5</b>             |        |
|  | TOKEN-BASED<br>CONSUMPTION<br>- P<br>+ A<br>- D   | COLLECTING AND<br>SAVING<br>- P<br>+ A<br>+ D |        |
| <b>MAINTENANCE</b><br>(low utilitarian,<br>low informational)      | <b>Contingency<br/>Category 8</b>                 | <b>Contingency<br/>Category 7</b>             |        |
|  | MANDATORY<br>CONSUMPTION<br>- P<br>- A<br>- D     | ROUTINE<br>PURCHASING<br>- P<br>- A<br>+ D    |        |

Figure 2. The BPM contingency matrix and pattern of emotional response to consumer situations. +P, +A, and +D indicate, respectively, high pleasure, high arousal, and high dominance; -P, -A, and -D indicate, respectively, low pleasure, low arousal, and low dominance.

two. Furthermore, marketers may act to alter the scope of behavior settings by modifying procedures, rules, or physical facilities that control the flow of customers into, through, and out of the setting. Some cafeterias require orders to be placed at one counter and obtained from another. Behavior setting scope is the extent to which the current consumer behavior setting compels a particular pattern of behavior (as a grand opera house induces people to wear evening dress, remain seated and silent during arias, and applaud wildly at the end; compare a rock festival where one is free to walk about, shout, sing, smoke, eat, and drink and do many other things during the performance). The scope of the for-

mer is said to be relatively closed; that of the latter is relatively open. The BPM proposes eight general contingency categories defined by the operant class to which the situated behavior in question belongs and the scope of the behavior setting in which it occurs (Figure 2). Allocating consumer behavior to one or the other of these on a functional basis (i.e., in terms of the consequences produced and the stimuli that signal them) takes place then at a second level of analysis.

### *The Consumer Situation*

The third level of interpretive analysis is that of the consumer situation. Consumer behavior is located at the

meeting place of the consumer's learning history and the current consumer behavior setting. This intersection is the consumer situation. Both of its components are necessary to the operant reconstruction of the meaning of a particular response or behavior pattern to the consumer. The consumer's learning history determines what can act as a discriminative stimulus of current behavior; that learning history thereby also determines what is a potential reinforcer or punisher. But that learning history, which shapes the individuality of the consumer, his or her unique response potential, is activated by the consumer behavior setting. It has no meaning in itself and can confer no significance on the current behavior of the consumer unless an opportunity to act presents itself: That opportunity is afforded by the current setting that primes the learning history's capacity to shape current consumer choice. When this has occurred, whatever consumer behavior takes place is a function of the interaction of historical and current environments: It can be located in time and space. In practice, this third, most detailed level of analysis so far, relates particular consumer responses—browsing, evaluating, buying, using—to the elements of the consumer situation in which they arise. In accounting for the approach, avoidance, and escape responses of consumers, this microlevel interpretation involves identifying the discriminative stimuli that compose the setting, the consequences to which they point, and, as far as is feasible, the learning history of the individual. Ultimately, the purpose is to understand the meaning of the observed pattern of behavior for the individual consumer. The inclusion of learning history considerations transforms the analysis from a molecular account of the current contingencies represented by the behavior setting into a molar account of the consumer's longer term pattern of responding. The meaning assumed by the elements of the behavior setting on contact with a relevant learning history is derived

from and, in turn, influences the molar pattern of responding.

Because direct empirical access to the consumer's learning history is denied the observer, an operant interpretation often necessarily concentrates on those environmental factors that can be observed or inferred, notably elements of the behavior setting. The assumption is—and all interpretive systems rest upon an act of faith—that the reinforcing consequences these setting elements prefigure are broadly those that have shaped and maintained similar behavior in the past; such setting elements and behavioral consequences can thus be used as a guide to the predisposing and inhibiting nature of the consumer's learning history. But there is no reason why the resulting account cannot be checked, corroborated, and amended by the individual's own recollection of that history; no reason why the consumer's verbal account cannot provide the interpretation; no reason—*pace* Geertz (1973)—why the operant interpretation cannot be “thick” rather than “thin.” The sole criterion is our resulting understanding of “how the action of interest makes a difference to the person's life. That is, what does the action produce or present that would not be produced or presented otherwise?” (Lee, 1988, p. 137). The framework could easily accommodate a fourth interpretive level to embrace the detailed, self-described, and analyzed experience of an individual consumer related to the organizing environment. The need to obtain an operational measure of the consumer's learning history is more problematical. Clearly the quantitative radical behaviorist intent on scientifically explaining consumer choice must somehow reconstruct the learning history of the individual whose current probability of emitting a given purchase or consumption response is to be accounted for (even predicted and controlled). It is clear nonetheless from the foregoing that consumers' learning histories are not empirically available to the researcher, as are those of laboratory animals to

the experimenter who has observed them from birth or, at least, from the point of their initiation into operant research. There may be no alternative here than to turn to verbal surrogates of a learning history, to ask respondents to report on the antecedents and consequences of this prior behavior (although this, of course, assumes a good deal of self-knowledge). Moreover, if the quantitative measurement of learning history is required, it should be noted that a sophisticated technology already exists for the measurement of consumers' evaluations of the likely outcomes of this future behavior: The theory of reasoned action (Fishbein & Ajzen, 1975), the theory of planned behavior (Ajzen, 1985), and the theory of trying (Bagozzi, 1992) are essentially methods by which respondents articulate their learning histories by reference to the consequences that specific target behaviors have previously wrought.

The theory of reasoned action, for example, asks respondents to evaluate this belief that performing a particular response will have a specified consequence, to express their motivation to comply with the anticipated wishes of others with respect to the target action, and to forecast the probability that they will again perform this behavior under closely specified conditions. The origins of this approach lie, moreover, in verbal operant conditioning (Dulany, 1968). In Dulany's theory of propositional control, the individual is assumed to form a rule or "verbal hypothesis" summarizing his or her learning history that describes the reinforcing and punishing consequences of performing a given act. The influence of such "contingency awareness" on current or future behavior depends also upon the individual's positive or negative evaluation of the consequences of similar behavior in the past, something which once again can be a function only of his or her learning history (Fishbein & Ajzen, 1975, pp. 298-301; in the context of consumer research and marketing, see Foxall,

1997d). Further, the attributes of the "product" under investigation could include both incentives and feedback in order to capture the effects, possibly differential, of utilitarian and informational reinforcement. There seems little doubt that psychometric scaling that elicits present verbal reports of learning history is feasible. The extent to which such reports are valid and reliable in any specific instance is an empirical matter.

### THE ROLE OF EVIDENCE

By facilitating the interpretation of consumer behavior as a situationally influenced activity, the BPM complements the social cognitive interpretations of consumption that currently dominate consumer research (Kardes, 1994; cf. Foxall, 1997b). The BPM research program is also concerned with establishing the epistemological status of its behavioral interpretation of consumer choice as environmentally controlled (Foxall, 1994). The extent to which an interpretation can be publicly corroborated varies with its methodological nature and the extent to which it is amenable to measurement and comparison. Interpretation takes numerous forms, from that which relies entirely upon the introspective constructions of an individual to that which strives for consistency with social scientific canons of procedure and judgment. Lee (1988, p. 130) argues that such interpretations are always "fallible and always open to improvement . . . [no more] than hypotheses." Herein lies the key to their plausibility. The interpretive status of the BPM cannot be assessed by establishing the sort of empirical generalizations that are summarized, for example, in equations that describe the matching law. An interpretation necessarily relies upon unobservable phenomena, but not in the sense in which cognitive consumer research infers the existence or usefulness of entities like attitudes and intentions that remain at all times on a non-

observable level; the unobservable phenomena on which it depends—principally learning history and the constructs to which it contributes, consumer behavior setting scope, the consumer situation—are simply not empirically available to us even though their influence on behavior is demonstrable in laboratory settings involving both animal and human participants. Because the interpretation's explicatory elements cannot be directly measured, its appraisal must proceed more subtly; predictions must be made with respect to the behavior probable in the circumstances, or each set of circumstances, identified by the interpretation on the basis of the logic by which it argues for a particular view of the world it interprets. The use of the hypothetico-deductive method is essential to the evaluation of these predictions, because the epistemological status of an interpretation based on inductive method alone is highly suspect. Two "rules of thumb" extensively acclaimed as indispensable to a scientific approach are *falsifiability*, indicating that there must conceivably be empirical data that could refute or limit or weaken the theoretical propositions from which a hypothesis is derived, and *corroboration*, limiting the credibility of a theory to the extent to which it has not yet been refuted (Flanagan, 1991; Ziman, 1978). Moreover, given the radical behaviorist provenance of the BPM, the capacity of its analyses to lead to prediction must be demonstrated.

This section explicates the stages in the BPM interpretation of consumer behavior and reports several empirical studies that apply the epistemological requirements that derive from these interpretive and scientific ambitions to that model. That is, they are concerned with the consensual availability of the interpretive variables incorporated in the BPM and the capacities of the model to predict aspects of consumer behavior in its situational context, and to comprehend the control of consumer behavior in its various environments. The methodology of the studies in-

cludes both hypothetico-deductive research and the inductive exploration of the findings. Before proceeding to the experimental studies themselves, however, some ontological and methodological problems of radical behaviorist interpretation must be addressed.

### *Induction and Beyond*

*Inductive logic.* A fundamental tenet of Skinner's approach to the psychology of science is that the conditions under which investigation takes place should be so arranged as to provide frequent reinforcement of the researcher's efforts (Skinner, 1956). Reese (1986) notes Skinner's (1980) recollection that "in the early years of behavior analysis seldom a week went by without some new and startling discovery, but in recent years the rate of such discoveries has fallen drastically and people often seem to pick up threads that do not lead anywhere" (Reese, 1986, p. 2). One reason for this is that behavior analysis remains entrenched in the methodology appropriate to an earlier stage of discovery when the object was to demonstrate simple functional relationships with nonhuman subjects rather than to extrapolate to the complex activities of humans (Skinner, 1938). That methodology entwines the imperative that explanation must not resort to unobservable phenomena and that, although the inductive method of scientific procedure guarantees this, the incorporation of hypothetico-deductivism would scupper the attempt. At a time of rapid discovery, when the need was to demonstrate the ways and assess the extent to which the environment could be shown to shape and maintain behavior, this made sense. But radical behaviorists' insistence on the exclusive use of the inductive method has become a significant impediment to the development of operant interpretation. Some of their arguments contain helpful rejoinders to behavioral scientists besotted with the use of hypothetico-deductivism in the apparent belief that this is the sole

route to reliable knowledge. The reminder that there are other legitimate approaches to science can be salutary (Chiesa, 1994). Even Popper's (1972) contention that science progresses by the *logic* of falsifiable hypotheses does not necessarily rule out the procedure of inductive method. But the sheer extremism of the formal radical behaviorist position (to which not all operant researchers adhere) frustrates the extension of experimental findings to the science-based analysis of complex behaviors.

Skinner (1988) commends the hypothetico-deductive method for its achievements in realms of investigation whose phenomena are very small (e.g., subparticle physics) or very large (astronomy) or otherwise inaccessible to the observer. The method is, therefore, inappropriate to the analysis of behavior when both the subject matter and the environmental events to which it can be functionally related are conspicuous. This applies to the experimental analysis of the behaviors of both humans and other animals: All of the necessary variables are not only present but are amenable to rigorous control. But the environmental elements of which complex human behavior is a function are far from conspicuous. They are partially embodied in a learning history that determines the individual's response to current discriminative stimuli. This history is not directly accessible to the researcher and may not be familiar even to the actor. It is feasible to employ qualitative methods in such circumstances, to ask respondents to recollect their behavior as consumers, and to reconstruct the consequences of their purchase and consumption responses. But this is to deal with their verbal behavior rather than to offer a scientific interpretation of their contingency-shaped consumer choices. Although the experimental analysis of behavior appeals to a warrant of assertibility based on the canons of scientific procedure, such interpretation requires a warrant that relies equally on the availability of its pro-

nouncements to public corroboration. So do less extreme interpretations founded upon the "plausible" extension of behavior principles gleaned in the laboratory to observable human activities like verbal behavior (Skinner, 1957). An acceptable means, not of "proving," "establishing," or "confirming" the truth or general accuracy of a theory, but of demonstrating its usefulness and fitness to be retained *pro tem*, is the hypothetico-deductive method. Even this it cannot do alone, but neither can any other method. Nor do experimental results in isolation supply the warrant for asserting the accuracy or usefulness of such interpretations. The faith in environmental continuity that this would demand must have some demonstrable support before interpretations based on the analogue of behavior under experimental conditions can be adjudged plausible. Operant interpretations will otherwise owe more to uncertified extrapolation than to systematic observation and theoretical reasoning. The employment of the hypothetico-deductive procedure does not substantiate the underlying theory. What it accomplishes is the accumulation of evidence that is consistent or inconsistent with the hypotheses drawn from the theory. It also permits the comparison of rival hypotheses, surely a *sine qua non* of a pragmatic science.

*Hypotheses and unobservable phenomena.* Skinner's (1988) second objection to the use of the hypothetico-deductive method is that it is a sign that the researcher has adopted fictitious or irrelevant inaccessible events as a source of explanations for behavior. "Speculative theories" may indeed rely upon the method of hypothesis (Chiesa, 1994, p. 67), but it does not follow that uses of this method are of necessity founded upon an attempt to support mental, neural, or hypothetical explanatory fictions as the causes of observed behavior (Parrott, 1986, pp. 39-42). The reliance on an inductivism that is believed by behavior analysts to be indispensable to their theo-



retical position is understandable. What is inexplicable is their concomitant rejection of another method that is capable of corroborating that position. Surely, a science that aims at the prediction and control of behavior should welcome any means of checking the validity and reliability of its predictions. The insistence of radical behaviorists on interpretation by plausible but uncheckable induction has actually hindered the expansion of operant explanation beyond the experimental setting. Naive, highly limited, and uninformed interpretations of complex behavioral institutions have come from behaviorists intent on using the hammer they have forged in the laboratory as though the entire world were a nail.

Much of what Skinner (1953) wrote about economic behavior fits this trend, as do the warnings of radical behaviorists about the power of advertising and other commercial forces that allegedly exert unprecedented influence on the behavior of consumers. The piecemeal, unsystematic nature of pronouncements such as these is unworthy of an analysis that purports to be based on natural science foundations. It ill behooves a science of behavior to generate such dogmatic generalizations in lieu of evidence or coherent theory. This is not the careful use of inductive method as would befit a rigorous laboratory science; it is interpretation by means of "vague analogic guesses," of which Chomsky (1959) accused Skinner in his review of *Verbal Behavior* (Skinner, 1957). Doubtless Chomsky's view was an unfair assessment of a landmark analysis, but for some decades the authority uncritically accorded this volume by many radical behaviorists arrested the development of an empirical analysis of verbal behavior and deflected attention from the verbal behavior of the listener by emphasizing that of the speaker (Hayes, 1989). These are the very obstacles to scientific explanation that, according to Skinner (1950, 1963), inhere in the theoretical approaches to

the study of behavior of which he disapproves.

*Complementarity of inductive and deductive methods.* Several additional considerations apply specifically to the use of hypothetico-deductive method in the BPM research program. First is the observation that the practice of science is not in fact guided by hypothetico-deductive, or for that matter any other, logic (Chiesa, 1994). Chiesa cites an introductory statistics text (Green & D'Oliveira, 1982) to illustrate the reliance of psychological science on hypothetico-deductive method. We may quote from an equally rudimentary text to show that, even at this level, there is often great caution about the use of statistics (for a more sophisticated treatment, see Chow, 1996). Martin and Bateson (1986, p. 116) prudently instruct beginning students:

Our general advice is not to become obsessed by statistical techniques, nor too cavalier in their use. Statistical analysis is a tool to help answer questions, and should be the servant rather than the master of science. The physicist Lord Rutherford was over-stating this point when he wrote: "If your experiment needs statistics, you ought to have done a better experiment"; biological systems can be extremely complex and statistical analysis is often essential for understanding what is going on. Nonetheless, excessively complicated statistics are sometimes used as a poor substitute for clarity of thought or good research design.

A belief in the final authority of this or any other method as the ultimate arbiter of scientific advance would indeed distort one's account of the working practices of scientists. The history of science indicates that many methods are permissible. As Wolpert (1992, p. xiii) puts it, "There are many 'styles' for doing science: the only constraint is the need to measure one's ideas against the real world." The Feysabendian spirit of the BPM program has been repeatedly underscored (e.g., Foxall, 1990, 1996). The validity and reliability of the results produced by some methods are easier to demonstrate in some circumstances (albeit within the framework of assumption on which those methods rest) than is the

case for other methods (which inevitably carry with them their peculiar limitations too).

Interpretation, for which radical behaviorists have proposed scant direction, relies on having its validity and reliability gauged in as many ways (each, of itself, inconclusive) as is feasible. The evaluative principle of triangulated research applies here, not the monistic methodology of the quintessentially unidimensional laboratory experiment. The subject matter of a behavioral interpretation is rendered complex by its multifaceted topography and the multiple causality that must be unraveled by a scientific account. The pursuit of multidimensionality of this kind by a researcher equipped with a single methodology is not likely easily to engender "plausible" interpretations. Plausibility in this context cannot rest upon a simple faith in the continuity of nature, even from the human operant laboratory to the real world. Human nature encountered outside the laboratory needs a more sophisticated approach than the hopeful extension of inductive method in order to cope with the speciation and situational discontinuities that are present. No wonder that in scientific practice induction and deduction complement one another. Neither is, in reality, feasible alone (Wright Mills, 1960, p. 127). Chiesa (1994) claims that induction is justified on the behavioral grounds that it is a commonplace component of everyday experience as well as of laboratory practice. So is hypothetico-deductivism, which has the additional benefit of a logical basis. Moreover, the observation that induction is a part of the everyday discourse of folk psychologists hardly justifies its use in the scientific sphere any more than the astronomer's "explanation" to his children that the sun is rising or setting justifies the use of such terminology and conceptualization in scientific analysis of the solar system (Skinner, 1969).

Induction is a legitimate method for the interpretation of complex behavior beyond the laboratory. But, on its own,

it is likely to be inductive method of a particular kind, that which proceeds as an act of faith, extrapolating explanations from the demonstrable domain of the operant laboratory to a world that permits observation but not control. It is correct to point out that hypothetico-deductivism has severe limitations that often mislead researchers into a false sense of certainty. An hypothesis that proves insensitive to falsification at an arbitrarily arrived at level of statistical significance is not thereby shown to be true: Many other hypotheses might account for the observed results. Findings arrived at by a process of hypothetico-deduction must therefore be treated with circumspection. But at least such results indicate that the tested hypothesis is not inconsistent with observation, that it deserves therefore to stand among the other hypotheses that might account for the observed data, and that it presents a useful basis for further theorization and empirical testing. Conclusions arrived at by induction alone cannot even claim that. They are indeed plausible interpretations based on something that has been found credible elsewhere, usually in the laboratory. It is no part of science, especially science based on pragmatism, to reject methods that can elucidate the usefulness of such interpretations. Induction, which generalizes its predictions in order to test them, requires, at least in the realm of complexity, to alternate with the hypothetico-deductive method. This process has, since the time of Peirce (1968), been known as *retroduction*. In practice, scientists do not assemble theories from collections of facts, but fit the observations into a system (O'Shaughnessy, 1992). More than one system might be used as a template for a set of observed facts. This augmented retroductive methodology resembles the hypothetico-deductive method to some extent (Mowen, 1979). O'Shaughnessy (1992, p. 275) points out that retroduction is initiated by the observation of a surprising event, whereas the source of conjectural hypotheses cen-

tral to Popper's account of hypothetico-deductivism is obscure. Nevertheless, the process of retrodution is descriptive of much "classic" social science, which relies on the juxtapositioning of aspects of induction and deduction. Moreover, it ensures the required emphasis of science on discovery of new facts, rather than the extrapolation of what is already known, which is characteristic of inductivism. At the same time, it helps to distinguish science-based interpretation from mere guesswork by identifying which elements of the complex environment function as discriminative or reinforcing or punishing stimuli rather than being mere neutral stimuli.

*Use and abuse of data.* It is also claimed by radical behaviorists that the hypothetico-deductive method is wasteful of data because those that fail to support the predicted relationships are discarded. The investigator, it is alleged, is less interested in what has actually occurred and its significance than in testing hypotheses. This may happen on occasion, but its prospect need not discourage the use of the hypothetico-deductive logic, especially within a research program dedicated to the spirit of methodological pluralism. There is no reason why a careful scientist should not engage in both a priori hypothesizing and a posteriori checking out of what actually happened in the course of an investigation and what it means. When, as is frequent, empirical research is undertaken by groups of investigators, the individual scientist may have no chance to restrict an investigation to the data that support the research team's original plan. To assert, moreover, that scientific curiosity is necessarily put in abeyance by the adoption of any particular method is naive to say the least; the corollary, that genuine scientific curiosity belongs entirely to one scientific community, smacks more of religious zeal than an objective psychology of science. Scientific inquiry that incorporates hypothetico-deductive methodology to the prohibition of other

methods would indeed result in a sterile approach to the observation and explanation of behavior, but the sterility would originate in the restrictive use of one method rather than in the particular nature of the method uniquely selected. Any interpretation of complex human behavior is fortunate to have the warrant of assertibility contributed by an experimental science, especially if that empirical basis indicates that the behavior of human as well as animal participants can be brought under operant control. That is the case with radical behaviorist interpretation and for any interpretive system, such as the BPM, broadly derived within its framework of analysis. But the interpretation of complexity requires procedures for relating experimentally generated knowledge of behavior to the field activity that lies beyond the operant space, the real world. The necessary procedures must show how behaviors that occur in different settings, the continuity of which cannot be taken for granted, can be connected by a single set of behavioral principles generated in just one of those settings. Why should behavior in the complex environment be capable of interpretation by principles derived in the simpler one? They must also indicate how major discontinuities are to be taken account of and how they will fit harmoniously into the interpretation.

The theoretical framework required for interpretation of this kind apparently eludes behavior analysts, and its development is admittedly a tall order. But in its absence radical behaviorists are not excused for making nontestable interpretive projections into the domain of complex human behavior, accounting for the behavior of thousands of millions of individuals on the unqualified basis of a comparatively simple experimental analysis. Experimentation is not enough. The techniques required for such testing are supplied by the other half of psychology, which comprises both an experimental psychology and a correlational psychology or psychometrics (Cronbach, 1957; Kimble, 1996). The statistical survey

does not establish the final veridicality of a theory; neither does it offer proof that a hypothesis is correct; nor yet does it show which hypotheses and theories must be decisively rejected. Yesterday's rejects have a habit of returning when novel techniques or interpretative devices emerge. The hypothetico-deductive methodology implicated in the statistical survey simply proffers a further strand of the warrant of assertibility for one scientist's tentative conclusions about the nature of behavioral complexity. This process is an inescapable part of even operant investigation. All experimental scientists forecast what the outcomes of their work will be. Skinner (1969, pp. 82–83) dismisses these projections as "simply tentative statements" and claims that they are "not the formal hypotheses of scientific method." At best, the distinction is a matter of degree. More probably, the advocates and opponents of the method of hypotheses are simply playing with words here. The question is, Should not the rigorous scientist record tentative statements, transforming them into useful hypotheses the accuracy of which can be ascertained by experimentation or survey research? Surely not to take this step is to waste data, to be diverted from the genuine intellectual curiosity inherent in asking, "I wonder what would happen if . . .?"

Wright Mills (1960) argues that practitioners of the two most prevalent styles of social science, the abstracted empiricists and the grand theorists, pursue antithetical approaches to the growth of knowledge. Abstracted empiricists seek to aggregate the results of numerous microscopic studies in order to "build up the science." Grand theorists, by contrast, seek conceptual refinement at so high a level that the day when empirical method is allowed to impinge on its theoretical structures is perpetually delayed. But, he claims, "classical social science" advocates neither position: "Its practitioners seek to build and deduce at the same time" (Wright Mills, 1960, p. 128). This

meshing of induction and deduction is crucial to the formulation of a theoretical model that guides the explication of complex behavior in terms of laboratory studies. Skinner argued against what Wright Mills called abstracted empiricism, the "mere collection of facts . . . with no basis for selecting one fact as against another" (Skinner, 1947; quoted by Parrott, 1986). Skinner argues, as Parrott points out, that the collection of facts must lead to theories that organize the facts. But he failed to suggest how organization of this kind might take place. Analyses of the contingencies that control consumer choice derived from the BPM are such a means of organizing empirical observations.

#### *Empirical Research*

The BPM propositions may be evaluated if testable operational statements or hypotheses can be derived from them. We seek, therefore, a psychometrically established means of measuring the behaviors that can be predicted on the basis of the levels of utilitarian and informational reinforcement and the behavior setting scope that characterize a consumer situation. This is Mehrabian and Russell's (1974) measure of the pleasure, arousal, and dominance reported by individuals in specified physical and social environments. We are actually testing the hypothesis that consumers' verbal behavior with respect to a described consumer situation is a function of these three variables. What is being tested is the hypothesis that behavior is a function of pleasure, arousal, and dominance, where pleasure indicates utilitarian reinforcement, arousal indicates informational reinforcement, and dominance indicates a relatively open consumer behavior setting. Such empirical appraisal therefore resembles more the testing of models of attitude-intentions-behavior (e.g., Fishbein & Ajzen, 1975) than the establishment of behavioral regularities through direct observation unaided by the explicit hy-

pothesizing that is the hallmark of laboratory science. The theories of reasoned action, planned behavior, and trying rely, however, on a level of abstraction different from that proposed here. By their nature, their unobservable phenomena cannot be observed and the verbal statements of attitude or intention that serve as their proxies have to be interpreted as inferring the existence, usefulness, and strength of the hypothetical constructs in terms of which the explanation takes place. The unobservable phenomena inherent in radical behaviorist interpretation are, by contrast, simply difficult to observe; their existence and influence are not doubted. They are based directly upon behavioral regularities observed in experimental studies.

That part of the BPM research program based on empirical investigation has concentrated until now on the prediction of consumers' verbal behavior when presented with written descriptions of consumer situations. These consumer situations follow the range suggested by the BPM contingency matrix. A pilot study of students (Foxall, 1997c) and four studies of consumer respondents (Foxall, 1997a) indicate support for the view that verbal behavior differs predictably depending upon the discriminative stimulus or learning history (consumer situation) that precedes it. That approach employs the verbal measures of individuals' responses developed by Mehrabian and Russell (1974) which are expected to describe their affective responses to environments. The gamut of these emotional reactions is believed to be captured by three variables: pleasure, arousal, and dominance. Pleasure is measured by respondents' verbal reports of environments as happy as opposed to unhappy; pleased as opposed to annoyed; satisfied as opposed to unsatisfied; contented as opposed to melancholic; hopeful as opposed to despairing; and relaxed as opposed to bored. Arousal is measured as respondents report feelings of being stimulated as opposed to relaxed; excited as

opposed to calm; frenzied as opposed to sluggish; jittery as opposed to dull; wide awake as opposed to sleepy; and aroused as opposed to unaroused. Finally, dominance is indicated by respondents' reported feelings of being controlling as opposed to controlled; influential as opposed to influenced; in control as opposed to cared for; important as opposed to awed; dominant as opposed to submissive; and autonomous as opposed to guided.

These responses are believed to mediate overt motor behaviors including affiliation with others in the setting, staying in or escaping from the setting, spending money and engaging in consumption (see Foxall & Greenley, in press-a, in press-b, for a summary of the literature). The empirical research described does not attempt to demonstrate this but concentrates on verbal responding alone. Whether this verbal behavior is indicative of other or self-rules that are likely to lead, in the appropriate circumstances, to more overt purchasing or consumption responses has been considered in greater detail elsewhere (Foxall, 1997a). The research assumes that pleasure, arousal, and dominance can be employed as proxy variables for the kinds of verbal behavior likely to be emitted, privately or publicly, by consumers in specific situations (Foxall, 1997c, 1997d) and the following is a summary. Pleasure was presumed to increase with the utilitarian reinforcement of consumer situations. Given the way in which utilitarian reinforcement has been portrayed as consisting in economic, instrumental benefits, what verbal behavior would we expect such behavioral consequences to give rise to? The verbal responses that Mehrabian and Russell (1974, p. 216) describe as indicative of pleasure seem appropriate. The factor that they label *pleasure* could as well be nominated *satisfaction*, which accords entirely with the nature of utilitarian reinforcement. Second, arousal, as an indirect measure of the information rate of the environment, would be a predictable emotion-

al response to informational reinforcement. The verbal responses that Mehrabian and Russell claim to be indicative of arousal thus appear to be those likely to result from consumers' experience of informational reinforcement, at least inasmuch as it relates to the physical environment. Third, dominance would increase with the openness of consumer behavior settings, that is, the extent to which behavior in the setting is under the control of the consumer rather than some other agent such as marketing managers. Hence, the verbal behavior characteristics of experiencing open versus closed consumer behavior settings are plausibly those associated with dominance, as operationally defined and measured by Mehrabian and Russell.

The findings indicate that, as predicted, reported pleasure is significantly higher for consumer situations maintained, according to the BPM, by high levels of utilitarian reinforcement than for those maintained by relatively low levels of utilitarian reinforcement (for Contingency Categories 1-4 compared with Contingency Categories 5-8; see Figure 2). Reported arousal is higher in those operant classes of consumer behavior that are theoretically characterized by relatively high levels of informational reinforcement, namely accomplishment and accumulation, than in hedonism and maintenance (Categories 1, 2, 5, and 6 as opposed to Categories 3, 4, 7, and 8). Reported dominance is higher in consumer behavior settings that according to the theory are relatively open than in those that are relatively closed (Categories 1, 3, 5, and 7 compared with Categories 2, 4, 6, and 8). In addition, discriminant analysis has indicated the exclusive role of each of the operant classes in influencing consumer choice, whereas factorial analysis of variance indicates the interactions among the independent variables that are associated with approach and avoidance (Foxall & Greenley, in press-a, in press-b). The point of these statistical analyses is not to "prove" an hypothesis but to dem-

onstrate the limits within which the propositions to which the hypotheses point can be reliably held. It must be stressed that the responses under investigation are verbal: They must not be mistaken for the emotional responses that in the case of pleasure, arousal, and dominance they purport to describe, nor for the actual consumer behaviors which in the case of approach and avoidance they profess to delineate. Whether these verbal responses are predictive of corresponding consumer behaviors in actual behavior settings of the kind assumed for the study remains to be empirically demonstrated. Nevertheless, the findings are as yet consistent with the view that such verbal behaviors may function as discriminative stimuli for overt responding (Foxall, 1990). Moreover, the spirit of the BPM program is that empirical evidence cannot ultimately establish one hypothesis or theory to the expense of another; it simply identifies evidence that can be interpreted as being consistent or inconsistent with the theoretical predictions gained from one or another source. The evidence generated by this inquiry, nevertheless, suggests that the BPM interpretation of consumer behavior is generally credible and worthy of further theoretical development and empirical evaluation. That is, the empirical evidence, which now extends over a wide range of consumer situations, provides a warrant of assertibility for the BPM.

## CONCLUSION

This article has attempted to show how an operant interpretation of consumer behavior might proceed and how its conclusions might be appraised. The hypothetico-deductive method it embraces does not sit comfortably with traditional behavior-analytic epistemology, but it is a necessary means of checking the status of interpretations arrived at by induction. Whatever the shortcoming of statistical method, the approach taken here permits the limits within which the inter-

pretation can be deemed plausible to be ascertained more clearly than a purely inductive approach would allow. Nor is the classification of consumer behaviors on the basis of the environmental control likely to be maintaining them a matter of "botanizing." The arbitrary nature of the labels given to the classes and categories used here has been freely admitted. The ultimate question for behaviorists is whether these labels are useful in the prediction of their subject matter, and the empirical work has endeavored to show within what bounds this can be achieved. If they are not, they can be changed or omitted. Each level of interpretive analysis leads naturally to the next, as the behavior in question is explicated in greater detail by its more precise location. Nested within each operant class of consumer behavior are two contingency categories, formed by taking into account the scope of the consumer behavior setting under scrutiny. Each contingency category defines the structure of an array of consumer situations, but the full capacity of a consumer situation to influence behavior does not emerge until a consumer brings a relevant learning history to the current contingencies delineated by the current behavior setting.

The empirical studies described have been concerned with an aggregate pattern of consumer situations; respondents have provided verbal reactions to the descriptions of openness and closedness and relative levels of utilitarian and informational reinforcement that have described each behavior setting; they have used their own learning histories to add meaning to those descriptions and to provide verbal responses. Responses have varied as have those learning histories: Part of the variation in the results stems from differences in those learning histories. A single-subject inductive approach would scarcely have identified the variation due to this source. However, a fourth level of interpretive analysis is nested within that of the consumer situation. It is the qualitative analysis of

an individual consumer's behavior in a given situation. That consumer's behavior setting can be described and his or her learning history investigated by means suggested by the theories of reasoned action, planned behavior, and trying. In this process, the molecular contingencies described as the behavior setting are transformed into an account that is relevant to the molar pattern of consumer behavior shown by the individual. The validity and reliability of such an analysis remain problematical, as they always are for any qualitative study, but this level of analysis presents the next challenge for the BPM research program.

Operant interpretation of consumer behavior clearly entails the entire apparatus of thought, observation, and translation found in any other interpretive system. It presents us with all the problems of establishing the relevance and validity of our interpretations established within any other system of interpretation. It does not leave operant psychology where it found it: Interpretation of this kind does not belong to the same deterministic system of explanation identified with operant experimentation. Whatever the experimental analysis of nonhuman operant behavior may be, this is not positivistic science. But it recognizes a fact that consumer psychology has not grasped—that explanation requires location—and one that has too long eluded behavior analysts—that interpretation requires depth and flexibility.

## REFERENCES

- Ainslie, G. (1992). *Picoeconomics: The strategic interaction of successive motivational states within the person*. Cambridge: Cambridge University Press.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action control: From cognition to behavior* (pp. 11–39). Berlin: Springer-Verlag.
- Alhadeff, D. A. (1982). *Microeconomics and human behavior: Toward a new synthesis of economics and psychology*. Berkeley, CA: University of California Press.
- Bagozzi, R. P. (1992). The self-regulation of at-

- titudes, intentions, and behavior. *Social Psychology Quarterly*, 55, 178-204.
- Barker, R. G. (1968). *Ecological psychology: Concepts and methods for studying the environment of human behavior*. Stanford, CA: Stanford University Press.
- Barker, R. G. (1987). Prospecting in environmental psychology: Oskaloosa revisited. In D. Stokols & I. Altmann (Eds.), *Handbook of environmental psychology* (pp. 1413-1432). New York: John Wiley.
- Battalio, R. C., Kagel, J. H., Winkler, R. C., Fisher, E. B., Basmann, R. L., & Krasner, L. (1974). An experimental investigation of consumer behavior in a controlled environment. *Journal of Consumer Research*, 1, 52-60.
- Bettman, J. R. (1986). Consumer psychology. *Annual Review of Psychology*, 37, 257-289.
- Black, R. D. (1987). Utility. In J. Eatwell, M. Milgate, & P. Newman (Eds.), *The new Palgrave: A dictionary of economics*. London: Macmillan.
- Chiesa, M. (1994). *Radical behaviorism: The philosophy and the science*. Boston: Authors' Cooperative.
- Chomsky, N. (1959). Review of B. F. Skinner, *Verbal behavior*. *Language*, 35.
- Chow, S. L. (1996). *Statistical significance*. London: Sage.
- Cohen, J. B., & Chakravarti, D. (1990). Consumer psychology. *Annual Review of Psychology*, 41, 243-288.
- Cone, J. D., & Hayes, S. C. (1980). *Environmental problems/behavioral solutions*. Monterey, CA: Brooks/Cole.
- Cronbach, L. J. (1957). The two disciplines of scientific psychology. *American Psychologist*, 12, 671-684.
- Davison, M., & McCarthy, D. (1986). *The matching law: A research review*. Hillsdale, NJ: Erlbaum.
- Dewey, J. (1966). *Democracy and education*. New York: Free Press.
- Dulany, D. E. (1968). Awareness, rules and propositional control. In D. Horton & T. Dixon (Eds.), *Verbal behavior and S-R behavior theory* (pp. 340-387). Englewood Cliffs, NJ: Prentice Hall.
- Earl, P. E. (1990). Economics and psychology: A survey. *Economic Journal*, 100, 718-755.
- Feyerabend, P. (1970). Consolations for the specialist. In I. Lakatos & A. Musgrave (Eds.), *Criticism and the growth of knowledge* (pp. 197-230). Cambridge: Cambridge University.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior*. Reading, MA: Addison-Wesley.
- Flanagan, O. J. (1991). *The science of the mind* (2nd ed.). Cambridge, MA: MIT Press.
- Foxall, G. R. (1979). On the management of "commons." *Journal of Agricultural Economics*, 30, 55-58.
- Foxall, G. R. (1990). *Consumer psychology in behavioral perspective*. New York: Routledge.
- Foxall, G. R. (1994). Behavior analysis and consumer psychology. *Journal of Economic Psychology*, 15, 5-91.
- Foxall, G. R. (1996). *Consumers in context: The BPM research program*. New York: International Thompson Press.
- Foxall, G. R. (1997a). Affective responses to consumer situations. *International Review of Retail, Distribution and Consumer Research*, 7, 191-225.
- Foxall, G. R. (1997b). Consumer behavior and organizational response: From social cognition to environmental control. In C. L. Cooper & I. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 12, pp. 229-288). Chichester, England: Wiley.
- Foxall, G. R. (1997c). The contextual stance. *Proceedings of the Society for Consumer Psychology/APA Conference*. Chicago.
- Foxall, G. R. (1997d). *Marketing psychology: The paradigm in the wings*. London: Macmillan.
- Foxall, G. R. (in press). The marketing firm. *Journal of Economic Psychology*.
- Foxall, G. R., Goldsmith, R. E., & Brown, S. (1994). *Consumer psychology for marketing* (2nd ed.). London: International Thompson Business Press.
- Foxall, G. R., & Greenley, G. E. (in press-a). The affective structure of consumer environments. *Environment and Behavior*.
- Foxall, G. R., & Greenley, G. E. (in press-b). Consumers' emotional responses to service environments. *Journal of Business Research*.
- Geertz, C. (1973). *The interpretation of cultures*. New York: Basic Books.
- Geller, E. S., Winett, R. A., & Everett, P. (1982). *Preserving the environment: New strategies for behavior change*. New York: Pergamon.
- Gould, J., & Kolb, W. L. (Eds.). (1964). *A dictionary of the social sciences*. London: Tavistock.
- Green, J., & D'Oliveira, M. (1982). *Learning to use statistical tests in psychology: A student's guide*. Milton Keynes, Buckinghamshire, England: The Open University.
- Griffin, J., & Parfitt, D. (1987). Hedonism. In J. Eatwell, M. Milgate, & P. Newman (Eds.), *The new Palgrave: A dictionary of economics*. London: Macmillan.
- Guerin, B. (1994). *Analyzing social behavior*. Reno, NV: Context Press.
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243-1248.
- Hayes, S. C. (Ed.). (1989). *Rule-governed behavior: Cognition, contingencies, and instructional control*. New York: Plenum.
- Herrnstein, R. J. (1997). *The matching law: Papers in psychology and economics*. H. Rachlin & D. I. Laibson (Eds.). New York: Russell Sage Foundation.
- Horne, P. J., & Lowe, C. F. (1993). Determinants of human performance on concurrent schedules. *Journal of the Experimental Analysis of Behavior*, 59, 29-60.



- Howard, J. A., & Sheth, J. N. (1969). *The theory of buyer behavior*. New York: Wiley.
- Kagel, J. (1988). Economics according to the rats (and pigeons too): What have we learned and what can we hope to learn? In A. E. Roth (Ed.), *Laboratory experimentation in economics* (pp. 155–198). Cambridge: Cambridge University Press.
- Kagel, J. H., Battalio, R. C., & Green, L. (1995). *Economic choice theory: An experimental analysis of animal behavior*. Cambridge: Cambridge University Press.
- Kardes, F. R. (1994). Consumer judgment and decision processes. In R. S. Wyer & T. K. Srull (Eds.), *Handbook of social cognition: Vol. 2: Application* (2nd ed., pp. 399–466). Hillsdale, NJ: Erlbaum.
- Kassarjian, H. H. (1982). Consumer psychology. *Annual Review of Psychology*, 33, 619–649.
- Katona, G. (1975). *Psychological economics*. New York: Elsevier.
- Kazdin, A. E. (1977). *The token economy: A review and evaluation*. New York: Plenum.
- Kazdin, A. E. (1981). The token economy. In G. C. L. Davey (Ed.), *Applications of conditioning theory* (pp. 59–80). London: Methuen.
- Kimble, G. A. (1996). *Psychology: The hope of a science*. Cambridge, MA: MIT Press.
- Krasner, L., & Krasner, M. (1973). Token economies and other planned environments. In C. E. Thoresen (Ed.), *Behavior modification in education* (pp. 351–381). Chicago: Chicago University Press.
- Lacey, H. M., & Schwartz, B. (1987). The explanatory power of radical behaviorism. In S. Modgil & C. Modgil (Eds.), *B. F. Skinner: Consensus and controversy* (pp. 165–176). New York: Falmer.
- Lee, V. L. (1988). *Beyond behaviorism*. London: Erlbaum.
- Lowe, C. F. (1979). Determinants of human operant behavior. *Advances in Analysis of Behavior*, 1, 159–192.
- Lowe, C. F. (1983). Radical behaviorism and human choice. In G. C. L. Davey (Ed.), *Animal models of human behavior* (pp. 71–93). Chichester, England: Wiley.
- Lowe, C. F., Harzem, P., & Bagshaw, M. (1978). Species differences in the temporal control of behavior: II. Human performance. *Journal of the Experimental Analysis of Behavior*, 29, 351–361.
- Lynch, J. J. (1992). *The psychology of customer care*. London: Macmillan.
- MacCorquodale, K. (1969). B. F. Skinner's *Verbal behavior*: A retrospective appreciation. *Journal of the Experimental Analysis of Behavior*, 12, 831–841.
- MacCorquodale, K. (1970). On Chomsky's review of Skinner's *Verbal Behavior*. *Journal of the Experimental Analysis of Behavior*, 13, 85–99.
- Martin, P., & Bateson, P. (1986). *Measuring behaviour*. Cambridge: Cambridge University Press.
- Mason, R. (1988). The psychological economics of conspicuous consumption. In P. E. Earl (Ed.), *Psychological economics* (pp. 147–162). Boston: Kluwer.
- Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. Cambridge, MA: MIT Press.
- Menger, C. (1956). *Gruendste der Volkwirtschaftslehre* (J. Dingwall & B. F. Hoselitz, trans.). Glencoe, IL: Free Press.
- Mowen, J. (1979). Retroduction and the research process in consumer behavior. In O. C. Ferrell, S. W. Brown, & C. W. Lamb (Eds.), *Conceptual and theoretical developments in marketing* (pp. 590–604). Chicago: American Marketing Association.
- Nicosia, F. M. (1966). *Consumer decision processes*. Englewood Cliffs, NJ: Prentice Hall.
- O'Shaughnessy, J. (1992). *Explaining buyer behavior: Central concepts and philosophy of science issues*. New York: Oxford University Press.
- Owen, N., Borland, R., & Hill, D. (1991). Regulatory influences on health-related behaviors: The case of workplace smoking bans. *Australian Psychologist*, 26, 188–91.
- Parrott, L. J. (1986). The role of postulation in the analysis of inapparent events. In H. W. Reese & L. J. Parrott (Eds.), *Behavior science* (pp. 35–60). Hillsdale, NJ: Erlbaum.
- Peirce, C. (1968). Retroduction and genius. In B. Brody & C. Nicholas (Eds.), *Science: Men, methods, goals* (pp. 133–146). New York: Benjamin.
- Popper, K. (1972). *Conjectures and refutations: The growth of scientific knowledge* (4th ed.). London: Routledge and Kegan Paul.
- Rachlin, H. (1987). The explanatory power of Skinner's radical behaviorism. In S. Modgil & C. Modgil (Eds.), *B. F. Skinner: Consensus and controversy* (pp. 155–164). New York: Falmer.
- Reese, H. W. (1986). On the theory and practice of behavior analysis. In H. W. Reese & L. J. Parrott (Eds.), *Behavior science* (pp. 1–34). Hillsdale, NJ: Erlbaum.
- Schwartz, B., & Lacey, H. (1982). *Behaviorism, science, and human nature*. New York: Norton.
- Schwartz, B., & Lacey, H. (1988). What applied studies of human operant conditioning tell us about humans and about operant conditioning. In G. C. L. Davey & C. Cullen (Eds.), *Human operant conditioning and behavior modification* (pp. 27–42). Chichester, England: Wiley.
- Scitovsky, T. (1992). *The joyless economy: The psychology of human satisfaction* (rev. ed.). New York: Oxford University Press.
- Skinner, B. F. (1938). *The behavior of organisms*. New York: Century.
- Skinner, B. F. (1947). *Current trends in experimental psychology*. Pittsburgh: Pittsburgh University Press.
- Skinner, B. F. (1950). Are theories of learning

- necessary? *Psychological Review*, 57, 193–216.
- Skinner, B. F. (1953). *Science and human behavior*. New York: Macmillan.
- Skinner, B. F. (1956). A case study in scientific method. *American Psychologist*, 11, 221–233.
- Skinner, B. F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts.
- Skinner, B. F. (1963). Behaviorism at fifty. *Science*, 140, 951–958.
- Skinner, B. F. (1969). *Contingencies of reinforcement: A theoretical analysis*. Englewood Cliffs, NJ: Prentice Hall.
- Skinner, B. F. (1974). *About behaviorism*. New York: Knopf.
- Skinner, B. F. (1980, May). Discussion. In D. F. Hake & S. Kendall (Chairs), *Some reflections on the development of behavior analysis*. Symposium conducted at the meeting of the Association for Behavior Analysis, Dearborn, MI.
- Skinner, B. F. (1983). Can the experimental analysis of behavior rescue psychology? *The Behavior Analyst*, 6, 9–17.
- Skinner, B. F. (1988). Comment on “Is Behaviorism Vacuous?” In A. C. Catania & S. Harnad (Eds.), *The selection of behavior. The operant behaviorism of B. F. Skinner: Comments and consequences* (pp. 364–365). New York: Cambridge University Press.
- Tarr, D. G. (1976). Experiments in token economies: A review of the evidence relating to assumptions and implications of economic theory. *Southern Economic Journal*, 43, 1136–1143.
- Tybout, A. M., & Artz, N. (1994). Consumer psychology. *Annual Review of Psychology*, 45, 131–169.
- Viner, J. (1925). The utility concept in value theory and its critics. *Journal of Political Economy*, 33, 369–387.
- Wearden, J. (1988). Some neglected problems in the analysis of human operant behavior. In G. C. L. Davey & C. Cullen (Eds.), *Human operant conditioning and behavior modification* (pp. 197–224). Chichester, England: Wiley.
- Wearden, J. H., & Shimp, C. P. (1985). Local temporal patterning of operant behavior in humans. *Journal of the Experimental Analysis of Behavior*, 44, 315–324.
- Wicker, A. W. (1987). Behavior settings reconsidered: Temporal stages, resources, internal dynamics, context. In D. Stokols & I. Altmann (Eds.), *Handbook of environmental psychology* (pp. 613–653). New York: John Wiley.
- Wicker, A. W., & Kirmeyer, S. (1977). From church to laboratory to national park: A program of research on excess and insufficient populations in behavior settings. In D. Stokols (Ed.), *Perspectives on environment and behavior: Theory, research and applications* (pp. 69–96). New York: Plenum.
- Winkler, R. C. (1980). Behavioral economics, token economies, and applied behavior analysis. In J. E. R. Staddon (Ed.), *Limits to action: The allocation of individual behavior* (pp. 269–297). New York: Academic Press.
- Wolpert, L. (1992). *The unnatural nature of science*. London: Faber and Faber.
- Wright Mills, C. (1960). *The sociological imagination*. New York: Oxford University.
- Zettle, R. D., & Hayes, S. C. (1982). Rule-governed behavior: A potential framework for cognitive-behavioral therapy. In P. C. Kendall (Ed.), *Advances in cognitive-behavioral research and therapy* (pp. 73–117). New York: Academic Press.
- Ziman, J. M. (1978). *Reliable knowledge*. Cambridge: Cambridge University Press.