

K&S: THEN AND NOW

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K&S stands, of course, for Keller (Fred S.) and Schoenfeld (William N.). But I hope the title of this foreword does not lead you, the reader, to expect a biography that tells you intimate secrets about their lives *Then and Now*. You perhaps know that *K&S* referred not only to Professors Keller and Schoenfeld themselves but to their pioneering undergraduate text, which was first published officially in 1950. I have a few things to say about that book. But of course, in writing about their book I am also writing about them. Indeed, I shall sometimes refer to *K&S* as *it* and sometimes as *they*. Many of the book's characteristics are theirs also. They are master teachers, in person and in print. They are also first-rate human beings and this, too, comes through in their writing. I was fortunate enough to know them both ways, to receive inspiration from them in their classes, in their offices, in the corridors, and in the putting together of the book. It was quite evident to all of us who were in that position that it was not possible to separate the book, *K&S*, from the people, *K&S*.

The importance of *K&S* in establishing what are now called the experimental and applied sciences of *Behavior Analysis* is well recognized. What is often not appreciated, however, is its current relevance. It tells us much not only about where we come from but also about where we are going—or should be going. When I reread the book in preparation for this foreword, I discovered two things about myself.

First, I found that much of my own behavior that I had assumed was the outcome of interactions with my own data, assisted by my own creative thought processes, came actually from *K&S*; the behavior had become part of my repertoire, but I had forgotten its source. Second, I found that *K&S* still had much to teach me; having reread it, I am wiser than I was before. I feel quite comfortable referring to it in the present tense. I recommend it even to the most sophisticated. It will repay a careful reading.

Simply to classify *K&S* as an elementary text is to assume an equivalence relation that no longer exists. Introductory textbooks characteristically confine themselves to presenting what is known or is presumed to be known. How can a book be called an *elementary* text when, like *K&S*, it does not just present what is known but points out what we do not know, what we need to know, and suggests how we might find out?

Elementary psychology textbooks these days are required to be eclectic. (A friend of mine once said, only half in jest, that to be eclectic is to stand with one's feet planted firmly in midair.) It is feared that the presentation of a consistent point of view might narrow the vision of pupils and prospective students. By contrast, *K&S* did something that had never been done before in psychology and has rarely been done since; they adopted a systematic approach to their subject matter. Early in the book, they tell students that (a) they will have trouble with later chapters if they do not understand and make use of the facts and principles that are presented earlier, and (b) their everyday language about psychology is imprecise and riddled with useless preconceptions, and so they are going to have to learn a new language and use it consistently.

Modern publishers and most teachers of the introductory psychology course would be terrified by a text that asked students not only to think systematically but also to learn a new language. But *K&S* respects its readers. Taking it for granted that students are capable of understanding complex matters, *K&S* point out in a clear, precise, and readable fashion why it is worth one's trouble to learn this subject matter. Their style does not condescend.

K&S also point out that they will be taking into account facts and principles that have arisen in the context of other theoretical viewpoints: “Good data are good data, regardless of theory.” What critics have forgotten is that within their behavioral system, K&S discuss most of the matters contained in the traditional general psychology course. Wherever possible, they systematize what is known, but they also discuss questions they do not yet have answers for. Some of those questions still await answers; some have been answered but, like most good questions, lead us further into uncharted territory. K&S present what is interesting and useful, no matter what its source, and students are left not only with a practical way of looking at their own and others’ behavior but also with a set of methods for looking into interesting puzzles that are waiting to be solved. Rather than constraining students, *K&S* gives them space, room to grow.

This approach makes *K&S* rich in content and inspiration. There is much in *K&S* that is worth being reminded of—descriptions of interesting experiments in many areas, methodological details, problems that arise in considering why we see what we see, why neuroses develop, how the self-concept arises—in general, what makes us say what we say and do what we do. I am going to point out just a few examples. Let us look first at a small part of their discussion of Pavlovian conditioning.

Pavlovian and Operant Conditioning

Many of us have been tempted in recent years to downplay Pavlovian research but *K&S*, upon being reread, makes many aspects of that research interesting again. It is no longer clear that Pavlovian and operant conditioning take place independently of each other. K&S describe “intrinsically interesting” experiments in which physiological changes were brought about by *words* that were spoken either by an experimenter or *by the subject*. Subjects in these experiments became able, for example, to command their own skin temperature to change. Although the experiments were done long before the field of biofeedback had arisen, K&S valued them because of “their relation to the

problem of ‘controlling’ bodily changes.” Was it just a coincidence that Ralph Hefferline, whose work helped to initiate modern developments in biofeedback (e.g. Hefferline, 1958; Hefferline & Bruno, 1971), had done his doctoral dissertation with Keller and Schoenfeld (Hefferline, 1950) during the period when *K&S* was being written?

Concerning the separation of Pavlovian and operant conditioning, K&S have this to say about the nature of “voluntary control”: “This type of conditioning fails to tell us *how the controlling word itself comes to be strengthened*” (italics added). As K&S emphasize throughout, all behavior is related to environmental determinants. When, as with words, those determinants are self-produced, we must still face the problem of explaining how the words themselves come to be spoken. A proper understanding of biofeedback—voluntary control—and related phenomena requires an understanding of how respondent and operant conditioning interact. *K&S* brings this problem alive.

Concept Formation

The chapter, *Generalization and Discrimination*, contains a long section on concept formation. At the beginning of this section, K&S ask about the definition of a concept. Starting with the question, “What is a ‘concept,’” they go on to point out, “One does not *have* a concept... rather, one demonstrates conceptual behavior, by acting in a certain way.” Then, after asking what type of behavior that is, they come up with: “When a group of objects get the same response, when they form a class the members of which are reacted to similarly, we speak of a concept.” In their final sentence, they give us the definition that has come to be generally accepted even by many who do not know the source of that definition: “Generalization *within* classes and discrimination *between* classes—this is the essence of concepts.”

More basic than the definition itself is their method of arriving at it: not asking “What is a concept?” but instead, asking, “What makes us say the word?” This tactic illustrates what Willard Day (1992) cited as the core of radical behaviorism: “Skinner’s account of the heart of radical behaviorism... rests fundamentally upon a viable conception of the functional analysis of verbal behavior” (p. 69). This conception

must include the verbal behavior of scientists themselves: “The more [the radical behaviorist] can bring his own verbal behavior under the control of what he has actually observed, the more productive and useful it is likely to be” (p. 83). And so, instead of looking for a *thing* called a *concept*, K&S asked a question about *our own verbal behavior*. They changed the definitional problem from *What is a concept?* to *What are the contingencies that determine when we say the word “concept”?*

Sadly, most of today’s students remain unaware of an approach to behavioral science that takes the verbal behavior of the scientist as its central datum. Radical behaviorists do not stand outside the behavioral stream, wisely commenting on psychological processes or states that the behavior is supposed to reveal. Instead, they ask, “Why am I saying what I am saying? Where is *my* verbal behavior coming from?” This is why radical behaviorists, contrary to the charge that is often brought against them, are able to consider *concepts, ideas, meanings, consciousness*, and other kinds of matters that are supposed to represent private events—events that are directly observable only by the person experiencing them. The question they ask is, *What are the contingencies that determine when people say what they say?* As Skinner (1957) pointed out, the meaning of such terms consists of a description of the conditions under which we use them.

Equivalence Relations

Because of my own current research interests, I had already gone back to K&S to see what they had to say about the topic of stimulus equivalence. I found that, too, under *concepts and mediated generalization*. The authors begin with a definition of mediated generalization: “Generalizations are said to be mediated when they are based upon a stimulus equivalence which results from training (Cofer & Foley, 1942).” They go on to summarize an illustrative experiment by Riess (1940). Riess first conditioned a response (change in electrical skin resistance) to each of a set of visual words (*style, freeze, surf, and urn*), and then tested for generalization of the skin response to a group of synonyms (*fashion, chill, wave,*

and vase) and to a group of homonyms (*stile, frieze, serf, and earn*). He found great generalization to synonyms of the original words, even more than to homonyms. "Whereas the generalization to the homonym[s] illustrates simply stimulus generalization [via auditory similarity], that to the synonym[s] illustrates mediated generalization based upon the previous training which produced the 'meaning' equivalence of these two words" (Keller & Schoenfeld, p. 160).

And then, among the notes at the end of the *Generalization and Discrimination* Chapter, I found this: "The problem [of mediated generalization] has not yet been investigated, however, *to the degree that its importance would seem to justify*" [italics added]. Prophetically, in the book's final pages, where K&S have more to say about verbal behavior, they indicate the road along which a behavioral analysis of equivalence relations is to take us: "The fact that adult speech bears relation to the environment in a more or less lawful manner is something to be scientifically explained, rather than taken for granted. *How* such a correspondence arises is a central problem for analysis...."

K&S let the matter rest there. I was a graduate student while *K&S* was being written and tested and for a time after it was published, and I remember being excited about the work on mediated generalization that K&S summarized. But I was deeply involved in other work at the time (Sidman, 1989) and one could only do so much. Not too long afterward, however, the problem did become the subject of intensive experimental investigation and sophisticated theoretical analysis, largely in the context of the paired-associates technique rather than Pavlovian conditioning (*see, for example, Jenkins, 1963*). By the time we began our studies in this area, a considerable literature had come into existence. Nevertheless, the subsequent effort had advanced the topic little beyond the summary that K&S offered their undergraduate readers, and this work eventually ground to a halt. It fell victim to limitations that are inherent in the experimental practices and theoretical orientation of methodological behaviorism (*see Day, 1992, pp. 61-70*) and that still characterize much of experimental psychology.

My coworkers and I came into this field from entirely different methodological and conceptual directions. For one thing, our original interest was in reading comprehension (Sidman, 1971), not mediated generalization, and we therefore did not feel compelled to continue with the mediation model. Second, we asked about the behavior of individuals rather than the averaged behavior of groups. In studies that preceded ours, the grouping of data had prevented investigators from actually observing instances of mediated generalization in the behavior of any individual. Evaluation of their data against the null hypothesis guaranteed that experimenters could never experience the thrill of seeing an individual relate stimuli in new ways, seemingly without ever having been taught to do so. Also, the grouping of data had caused positive and negative instances of mediated transfer to cancel each other out in the averages, thereby yielding massive negative results in critical experiments (Jenkins, 1963). There was not much reinforcement here for experimenters.

Our own data led us to talk about *equivalence relations* rather than *mediated generalization*. Instead of assuming that stimulus equivalence required response mediation, we asked ourselves, “Under what conditions do we say things like *urn means vase*, or *the word dog represents a dog*, or *this shopping list tells us what to buy*? I think we now know something we did not know before about why we say such things. The reinforcement that comes from seeing these “concepts” in the very process of being formed by individual subjects—and pupils—has kept us going in this research for more than 20 years. And we are only just now in the process of realizing that the formation of equivalence relations is one of the functions of reinforcement, with what used to be called *mediating responses*, simply joining discriminative stimuli, conditional stimuli, and reinforcing stimuli as members of the equivalence class that reinforcement establishes (Sidman, 1994). But clearly, K&S had seen something that few others recognized in this research area. When I eventually found myself involved, I also found that K&S had prepared me to investigate it, as they had pointed out, *to the degree that its importance would seem to justify*.

K&S's Role Today

We should not lose sight, however, of the authors' introductory statement: "This book is a new kind of introduction to psychology." Unfortunately, this statement remains true today; it is still a new kind of introduction. Its basic lesson has never been absorbed into psychology. To use Skinner's apt term, "autonomous man" remains the conceptual foundation of modern psychology, and students in the typical elementary course remain unaware of the role of organism-environment contingencies as determiners of human conduct.

Richard M. Elliott, in his Editor's introduction to the book, recognized quite clearly what the authors had done: "I am sorry for the psychologist who misses this out-of-the-ordinary textbook... it would enhance his vision and build his morale to know that it has been possible already to demonstrate... so much lawfulness of behavior..."

What is involved here is a new conception of human nature. Although the authors do not explicitly discuss the philosophical underpinnings of their approach, *K&S* is in fact an example of radical behaviorism in practice. Willard Day (1992), in his role as a philosopher, made the case as follows:

The three propositions in terms of which I define the [radical] behaviorist outlook are these: First, behaviorism is at heart a concern with the *contingencies* involved in behavioral control. Second, behaviorism... is opposed to something called *mentalism*... Skinner's opposition to what he calls "autonomous man." Third, behaviorism involves at heart a particular conviction with respect to social planning, namely that if we are to survive as a species we should begin at once to restructure our social environment... so that it acts to produce people who have the behavioral equipment necessary for us all to survive (p. 179).

Psychology has not only not accepted this conception but has opposed it, often misrepresenting it and frequently distorting it into something it never was (*see* Chiesa, 1994, for a keen analysis of the relations between psychology and radical behaviorism). Partly because the radical behaviorist conception of human nature is rarely presented even for

discussion to the thousands of students who go through the elementary psychology course each year, that conception has not reached the awareness of the general public. *K&S*, in its original form, is still capable of providing students with what Richard M. Elliott called "... insights... [that] will be of use to you whether you become a psychologist, teacher, lawyer, salesman, philosopher, doctor, or just a person who feels the need to see beneath the seeming chanciness of human behavior."

What I am suggesting here is that today's students do not so much need all the new facts we have learned about behavior but rather, just enough to arouse their interest in a viewpoint of human nature that can provide them with hope. Once again, Willard Day (1992) has said best what has to be said: "With knowledge of contingencies one can see all too clearly the incalculable damage we continually do to ourselves, to those we love, and to those others for whom we want to assume some responsibility when we base our social decisions on the model of autonomous man" (p. 191).

We have to be taught to see contingencies. Once we have learned to see them, the road is open to changing them. *K&S* teaches students that behavioral contingencies are real, and have to be taken into account if behavior is to be understood and if something is to be done about current practices. I am suggesting that any revision of *K&S* would need to add only the new facts that will help make that lesson more effective. We do not need more psychologists, or even more behavior analysts. As *K&S* told us in "A Last Word": "We need to hasten and train a generation of men of good will. How this is to be done may be mankind's last desperate question of all."

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