

## The Basic-Applied Continuum and the Possible Evolution of Human Operant Social and Verbal Research

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Human operant research is typically viewed as fitting somewhere between the end points of a basic-to-applied continuum. Viewed in this way, the major role of human operant research is to determine the conditions under which principles discovered with animals also hold with humans. Relative to the basic and applied end points, which have defined the major journals and graduate training programs in Behavior Analysis, the human operant area has not been strong since the late 1950's when a scientifically based application was only an exciting possibility. However, application quickly became a reality and to some extent it replaced the major role of human operant research. After about 15 years of focusing on the basic and applied end points, an increasing number of behavior analysts are concerned about the large content of psychology (e.g., social and verbal behavior) between the end points and the continued growth of Behavior Analysis. Basic research in social and verbal behavior should ordinarily begin with the human instead of a lower animal, because the human is the most qualified and prepared subject in the sense that most complex social and verbal behaviors are more accessible in humans. This new role for basic human research of initiating rather than only replicating, could result in a rebuilding of the "bridge" between basic and applied, and contribute to the growth of Behavior Analysis in terms of extensions to new content areas, methods, and the followers it would reach in these areas.

For the past 15 years, basic human research has been viewed from the two end points of the basic-applied continuum. The basic research end point has been called operant conditioning or the experimental analysis of behavior, while the applied end point has been called applied behavior analysis. Basic human research has been viewed as fitting somewhere in between and has been called human operant research. The two end points have defined the content of the two major journals in Behavior Analysis—*Journal of the Experimental Analysis of Behavior* (JEAB) and *Journal of Applied Behavior Analysis* (JABA)—as well as the content of training in most behaviorally oriented graduate programs, where some students are in experimental and some students are in applied or clinical. No one is in human operant. What happened to human operant research in the past 15 years? That question may be particularly important now, because of the current concern

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over the lack of communication between the basic and applied end points (e.g., Birnbrauer, 1979; Branch & Malagodi, 1980; Deitz, 1978; Michael, 1980; Pierce & Epling, 1980; Hayes, Note 1; Poppen, Note 2) and because human operant research has been viewed as a transition and possibly even as a "bridge" between basic and applied (e.g., Hake, Note 3).

### THE TRANSITION FROM THE SIMPLE-TO-COMPLEX DIMENSION OF THE NATURAL SCIENCES TO THE PRESENT BASIC-TO-APPLIED DIMENSION

An assumption of Behavior Analysis is that it is a natural science: lawful relations will result, the relations will be consistent with those of other natural sciences, and its methods will be consistent with other natural sciences. One aspect of being consistent with other natural sciences is to start at the beginning with the study of simpler stimulus-response relations and, after replicable relations have been observed, to proceed gradually to more complex stimulus-response relations (e.g., study discriminations in which S+ and S- are consistent before studying conditional discriminations). As Skinner (1966) stated in his article "What is the Experimental Analysis of Behavior," "He [the behavior analyst] must therefore

more explicitly resolve to put first things first, moving on to more difficult things only when the power of his analysis permits" (p. 218). Following this strategy, we should proceed from lower animals to normal human adults with higher primates and young children being possible intermediate points. The major issue in proceeding from simple to complex is control of contingencies and what have historically been called independent, dependent, and extraneous variables. Accordingly, with respect to the setting, we should proceed from the experimental chamber to controlled but natural environments such as the classroom, and finally to the uncontrolled setting. Another obvious dimension is number of subjects: we should start with the behavior of an individual before moving to social behavior and the behavior of group or community members. And, of course, we should proceed from basic to applied. Behavior Analysis did seem to develop that way: for example, Skinner (1938) put the rat in the box, Lindsley (1956) put the human in the box, then Azrin and Lindsley (1956) put two in the box. Next came application in controlled but natural environments such as institutions (e.g., in chronological order, Ayllon & Michael, 1959; Isaacs, Thomas, & Goldiamond, 1960; DeMyer & Ferster, 1962; Barrett, 1962; Wolf, Risley, & Mees, 1964; Ayllon & Azrin, 1965) and classrooms (e.g., Zimmerman & Zimmerman, 1962; Birnbrauer, Bijou, Wolf, & Kidder, Note 4). Now we have moved to uncontrolled natural environments and even communities (e.g., see edited books, Martin & Osborne, 1980; Nietzel, Winett, MacDonald, & Davidson, 1977).

The contention of this brief example is that what began as the simple-to-complex dimension of the natural science approach, early on became what we now call the basic-to-applied dimension. This should not come as any surprise, because even the early human operant studies (e.g., Azrin, 1958; Baer, 1960; Bijou, 1957; Flanagan, Goldiamond, & Azrin, 1958; Gewirtz & Baer, 1958; Hefferline, Kennan, & Harford, 1959; Holland, 1957; Laties & Weiss, 1960; Lindsley, 1956;

Long, Hammack, May, & Campbell, 1958) raised the exciting possibility of a scientifically based applied psychology. Applied behavior analysis quickly became a reality and, with the rapid growth in the number of applications and applied behavior analysts (e.g., see early edited books by Ullman & Krasner, 1965; Ulrich, Stachnik, & Mabry, 1966), the simple-to-complex dimension was soon to become the basic-to-applied dimension. The basic-applied dimension was formalized by Baer, Wolf and Risley (1968) in their now classic article "Some Current Dimensions of Applied Behavior Analysis" published in the first volume of *JABA* in 1968. They stated, "In behavioral application, the behavior, stimuli and/or organism under study are chosen because of their importance to man and society, rather than their importance to theory" (p. 92). They conclude that to be applied, research results should be immediately applicable as opposed to having only implications for future use. In their words, "Thus, a primary question in the evaluation of applied research is: How immediately important is this behavior or these stimuli to this subject?" (p. 93). Hence, the basic-applied dimension refers to the primary function of the research, with the function of basic research being to add new principles to theory and the primary function of applied research being immediate usefulness to society.

The other dimensions that initially concerned the degree of control possible along the simple-to-complex dimension have become correlated dimensions. For example, with respect to the non-human animal-to-human-adult dimension, the non-human animal is correlated with basic and tyhe human is more highly correlated with applied, although animal analogues and human operant studies fall into intermediate categories. With respect to the setting, the experimental chamber is correlated with basic and the natural setting is correlated with applied. There are also intermediate points such as classrooms and institutional wards which are less controlled than an experimental chamber but more controlled than the

varied settings of the freely-roaming normal adult. The major point is that the overwhelming consideration now is theory vs. immediate application, not the simple to complex dimension of the natural sciences or the degree of control that is possible.

### **THE EFFECTS OF THE BASIC-APPLIED CONTINUUM ON HUMAN OPERANT RESEARCH**

Given the perspective of the basic end point of the basic-applied continuum, the function of human operant research was an applied one of determining if animal research would hold with humans. The important work of discovering new principles could be done much easier and better with animals, because of the ease in obtaining animal subjects and the greater control that was possible with them. Although human operant research was given an applied role by basic researchers, it has not been viewed that way from the applied end of the continuum where immediate use is the major criterion. To make matters worse for the human operant area, applied research can to some extent fulfill the assigned role of human operant research. Applied research can be a stringent test of basic principles, because in the uncontrolled applied setting the basic principle must compete with and be stronger than other variables (Baer, 1978). As Baer (1978) stated,

It is in exactly the loose, largely uncontrolled settings in which social problems are analyzed that screening for generality should occur. Generality will determine the basic importance of any variable, reinforcement-based or otherwise, for theory. To put it differently, what works on the social problems is what deserves to be counted among the most fundamental variables of a unified behavior theory. (p. 15).

As if that were not bad enough for the human operant field, applied research may not be any more difficult to do. In both cases, researchers must arrange settings and procedures that are appropriate to humans, but access to humans may be easier with applied research, because of the more easily recognizable importance of the research. In fact, basic researchers

ordinarily pay subjects for their participation. Such financial contingencies have made human operant research especially difficult.

This has left human operant research in a relatively weak position which is more often described as the "crack" between basic and applied instead of the "bridge." The human operant area has never been large enough to have its own journal and this has meant that the research had to be published in either basic, largely animal research journals or applied journals (e.g., Johnston, LeBlanc, Hake, Zeiler, Twardosz, & Reese, Note 5). A common lament is that the basic journals consider human operant research too applied and suggest an applied journal as a more appropriate outlet. Similarly, applied journals consider such work as not applied enough and suggest a basic journal. Some human operant researchers have moved on to applied research where there are more publication outlets and probably more positions. The human operant area consists of a small number of researchers without a clear outlet for their work and with their major function being fulfilled in part by the applied researchers.

### **RADICAL BEHAVIORISM AS AN EVOLVING PERSPECTIVE THAT COULD CHANGE THE MAJOR ROLE OF BASIC HUMAN RESEARCH**

As Skinner (1974) indicated, radical behaviorism is not the science of behavior; rather, it is a philosophy of the science of behavior in the sense that it considers what behavior analysts should study, the methods to be used, and why. It views methodological behaviorism as too restrictive in terms of both content and methods. For example, one assumption of the radical behaviorist is that private events such as thinking, although not publicly observable, are observable to one person, are behaviors, and are controlled by the same stimulus-response relations as other behaviors (e.g., Skinner, 1974). Publicly observable interactions between behavior and environment are preferable, because (1) they are usually the origin of what thinking and feeling

are about (e.g., Skinner, 1974), (2) they are the most reliably confirmed observations, and (3) they are more useful from a pragmatic point of view in the sense that they will result in greater consensus in the scientific community. However, the major issue here for radical behaviorism is that private events should not be ignored, because to do so would restrict the content of Behavior Analysis and discourage innovation of method.

A second assumption of radical behaviorism is that scientists are behaving organisms embedded in a social context. Hence, their own behavior, scientific and otherwise, will be affected by their history of reinforcement and current contingencies. This will be evident in areas and topics they select for study as well as in the way they describe their observations. The issue here is what the radical behaviorist believes the reinforcement contingencies for the scientist should be. The most common view and that of the methodological behaviorist is that inclusion of a finding in the body of knowledge or theory is based on acceptability to the scientific community in the terms of (1) the research procedures used (e.g., agreement among observers, replicable individual data, precise measurement and control) and (2) the relation of the content to the existing theory (e.g., related to a productive content area but an extension of it). The radical behaviorist would not believe those contingencies alone to be totally desirable, because they include insufficient reinforcement for innovative content and procedures, and thereby delimit the growth of a science. Concerns about the need for innovations of content and method in Behavior Analysis have been increasingly common (e.g., Cullen, 1981; Harzem, Note 6; Marr, Note 7), and the growth of Behavior Analysis was the major concern in Skinner's (Note 8) recent paper, entitled "We Happy Few, But Why So Few?" The radical behaviorist would suggest workability, stimulation, and contribution to society as additional worthwhile contingencies that would encourage innovation of content and method. The major contention is that scientists should recognize that all

aspects of their scientific behavior are shaped by the reinforcers of some scientific community and that this control and its effects can lead to a problem that has been suspected in several areas of psychology. The problem occurs when the scientific community controls the major reinforcers of the scientist but that community reinforces only the current scientific community and that this control of their behavior affects the science. Not to recognize this control and its effects can lead to a problem that has been suspected in several areas of psychology. The problem occurs when the scientific community controls the major reinforcers of the scientist but that community reinforces only the current scientific topics and practices. Under these conditions little innovation is expected, because trying a new area or method would require the scientist to abandon his/her major source of reinforcement. Solutions might consist of the scientific community recognizing the problem and providing reinforcement for innovation, or for some group within or outside the conventional scientific community to reinforce innovative content and methods.

#### **THERE IS A RELATIVELY NEW AND GROWING REINFORCING COMMUNITY FOR BASIC HUMAN RESEARCH**

The individuals that make up this community view Behavior Analysis as a natural science and they frequently view it from the perspective of a radical behaviorist. With respect to the basic-applied continuum, they see the entire continuum instead of only the end points. Accordingly, these individuals would simply call themselves behavior analysts without the adjective "experimental" or "applied." In fact, they might prefer a return to the natural science continuum of simple to complex. They see the highly controlled laboratory as best for the discovery of new principles and uncontrolled or applied settings as limited to testing the robustness of stimulus-response relations and not ideal for discovery. However, they also recognize that the animal laboratory is not the only controlled setting suitable for discovery.

Most important, they currently view research on common types of social and verbal behavior as the most critical research areas for society, the scientific community, and Behavior Analysis (e.g., Cullen, 1981), because (1) they are the most common types of human behavior, (2) they comprise much of the vast middle area of psychology between basic and applied that has been neglected by the endpoint focus, and (3) these new areas may lead to the innovative methods, content areas, and followers that will be necessary to sustain adequate development and expansion of Behavior Analysis. Much of this social and verbal research will begin with humans or high primates who engage in these social and verbal behaviors in their natural habitats. The bottom line is that for these types of behavior basic animal laboratory research may not be the best place to begin (see also Hake & Olvera, 1978). If an animal is simply not observed to engage in cooperation, trust, or certain grammatical autoclitics in its natural habitat and only with extreme difficulty in an experiment arranged to produce these behaviors, then that animal is not the specie to use. For example, in the early 1960's, John Mabry and I tried to build an artificial language in the mynah. We selected the mynah because we believed imitation was the key to verbal and social learning. But the research of the Gardners (1969) and the Premacks (1970) showed us that we should have selected a species which had been observed to learn and use more complex repertoires with respect to gestures and symbols.

One might argue that basic human research on social and verbal behavior does not follow the natural science strategy of proceeding from simple to complex. There are three replies to this. First, the strategy does not change, the researcher begins with what appears to be the simplest verbal or social behavior that is possible and he/she becomes increasingly under the control of the subject matter. The latter is important, because frequently what at first appears simple turns out to be complex anyway. Second, it is probably also the case that now is a better time for this type of research than 20

years ago in the sense that Behavior Analysis now has a solid foundation of replicable stimulus-response relations that have fit together to form a well-organized body of knowledge or theory. Third, the behavior analyst assumes that social and verbal behaviors are controlled by the same stimulus-response relations as individual behaviors. No special laws are necessary. Hence, moving to the more complex social and verbal behaviors is consistent with the assumption of gradually proceeding to the complex from the less complex and a solid foundation, because discoveries or findings for the behavior analyst will be the ways that the known stimulus-response relations for individual organisms combine to produce complex social and verbal behaviors.

In addition to discovering how learning principles combine to produce social and verbal behaviors, innovations will consist of new content areas for Behavior Analysis (e.g., verbal communication, self-editing of verbal behavior, rule governed behavior, group processes such as leadership and social comparison, attribution, etc.) and the innovative methods that will be necessary to make investigations in these areas acceptable to the scientific community.

Researchers will have to discover innovative ways around the cost of paying human subjects, an old and serious obstacle for human research. One recent solution has been to depend on the natural environment for reinforcers. In studies of social comparisons, scores on school work (Vukelich & Hake, 1980) or token economy performances (Hake & Vukelich, 1980) were earned in the natural setting but auditing or social comparison responses, the dependent measure, were button presses in an experimental chamber. This strategy of making greater use of natural reinforcers may become increasingly useful, because of the effectiveness of natural reinforcers, the control that investigators have recently achieved in semi-natural settings (e.g., Bernstein & Ebbesen, 1978; Emurian, Emurian, Bigelow, & Brady, 1976; Vukelich & Hake, 1980), as well as the increasingly serious financial obstacle of paying subjects.

### CONCLUSIONS

This paper has described a different and possibly evolving role for the basic human researcher that is more than determining the conditions under which findings with animals generalize to human subjects. It involves basic research into those areas where the human is the most qualified and prepared subject in the sense that many complex social and verbal behaviors are more accessible in humans. It remains to be seen whether or not this new role for basic human research will rebuild the "bridge" between the basic and applied end points and remedy the often discussed lack of interaction and influence between basic and applied. The new role for basic human research could have an effect in the sense that it changes the perspective from the end points of a basic-applied dimension to the original natural science continuum of simple to complex and thereby promotes acknowledgement of the large amount of psychology that has been neglected between the end points. While a bidirectional "bridge" of communication between the scientific base and application is important, perhaps equally important is the evolution of a Behavior Analysis that contributes to the analysis of social and verbal behaviors, and thereby continues to grow in terms of extension to new content areas, methods, and followers it would reach in these areas.

There are several ways we can facilitate the development of basic human research areas and methods. One obvious step is for reinforcing communities (e.g., journals, scientific organizations, granting agencies, academic departments) to "relax" their definitions of what is considered "applied" and what is considered "basic." However, the most important step must occur at the level of the individual behavior analyst who is willing to take the risks of trying new areas and methods, and in doing so to stray away from conventional basic and applied topics into the vast area between them. Of course, the risk to the individual behavior analyst is straying from the conventional, known and stable reinforcing community

to one of unknown size and stability. Not to take the risk, however, would seem to have some longer term consequences for the growth of Behavior Analysis and all of the reinforcing communities associated with it.

Unfortunately, the paper will end on a cautionary note concerning what is and is not meant by the natural science strategy of proceeding from simple to complex. The first step in moving into new areas such as verbal and social behavior is to begin research in one of the areas at the simplest level where it is possible to enter and where a contribution can be made. The first step at innovation is not to "loosen" methodological requirements. Stated more strongly, the first step toward innovative content and/or methodology is not to study private events instead of publicly observable ones, to describe events in the metaphors of cognitive psychology instead of describing what actually happened, or to study mathematical models instead of behavior. No change from the philosophy of methodological behaviorism may be necessary when actually doing the research. For example, a number of areas of social psychology that are new to the behavioral approach such as trust (Hake & Schmid, 1981; Matthews, 1977), altruism (Weiner, 1977), risk (Schmitt & Marwell, 1971) and social comparisons (Vukelich & Hake, 1974) have been studied without departing from the requirements of methodological behaviorism. After all, methodological behaviorism has been responsible for most of our current body of knowledge (e.g., Baer, 1978) and in all likelihood it will contribute much of the basic human research in any new areas. If there are equally reliable methods to be discovered, they will most likely be discovered after behavior analysts face the challenge of new and elusive content areas.

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