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# The Analysis of Human Operant Behavior: A Brief Census of the Literature: 1958-1981

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A census involving several major journals was conducted to survey the content and scope of the experimental analysis of human behavior. While the percentage of reports involving human subjects published each year in *JEAB* has lacked consistency, it was shown that *JEAB* has been the primary outlet for human work among the journals surveyed. Few areas of interest within the study of human behavior have received extensive scrutiny. The normal adult (typically undergraduate students) has been the preferred subject for human research. The results of a citation analysis of *JEAB* reports featuring human research are also presented.

Since the publication of *The Behavior of Organisms* in 1938, Skinner has consistently championed the application of experimental science to the study of human affairs. In that early work, he stressed that the importance of the experimental analysis of animal behavior rested squarely on its being generalized to human action. In subsequent writings, Skinner (1953, 1971, 1974) has averred the need for a thorough-going functional analysis of human behavior and human culture. Indeed, a reading of Skinner's more recent work might reasonably prompt the conclusion that the study of human behavior is the major desideratum of the experimental analysis of behavior. The following quotation is exemplary of his position:

> By turning from man *qua* man to external conditions of which man's behavior is a function, it has been possible to design better practices in the care of psychotics and retardates, in child care, in education (in both contingency management in the classroom and the design of instructional material), in incentive systems in industry, and in penal institutions. In these and many other areas we can now work more effectively for the good of the individual, for the greatest good of the greatest number, and for the good of the culture or of mankind as a whole . . . Men and women have never faced a greater threat to the future of their species. There is much to be done and done quickly, and nothing less than the active prosecution of a science of behavior will suffice. (Skinner, 1978, p. 55)

It is clear that applied behavior analysts have taken Skinner at his word. The past two decades have witnessed an ever-burgeoning literature which evidences the successful application of behavioral technology to the analysis and modification of human behavior (e.g., Catania and Brigham, 1978; Hersen and Barlow, 1976; Craighead, Kazdin, and Mahoney, 1981; Ullman and Krasner, 1975; Ulrich, Stachnik, and Mabry, 1966, 1970, 1974). In 1968, the *Journal of Applied Behavior Analysis (JABA)* was established to serve as a major outlet for research reports involving the application of operant methodology to the study of socially relevant behaviors in generally non-laboratory settings.

Despite the urgings of Skinner, and in contrast to the extensive applied literature, there appears to be a paucity of articles published each year which deal with the "basic" analysis of human behavior. This observation leads one to question the seriousness of interest among

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laboratory researchers in pursuing a science of behavior. It also prompts attention to the substance and scope of previous experimental work in human operant behavior (HOB).

To address these issues, we conducted a census of the HOB articles published in the *Journal of the Experimental Analysis of Behavior (JEAB)* since its inception in 1958. We also conducted a more limited census of HOB articles from related journals. However, before looking at the census data, it is appropriate to call attention to the difficulty of adequately categorizing human operant research as "basic" versus "applied." A real question exists as to what actually distinguishes the two types of research, since both obviously involve the same type of subject and frequently appear to address similar issues. One answer to this question stipulates that basic research is conducted in the laboratory while applied research is conducted in a natural or real-life setting. This is deceptive, however, since the defining characteristics of the laboratory are oftentimes indistinguishable from those of a natural setting. For example, if one is interested in studying the basic processes of stimulus control in children, does it matter whether the children are brought into an officially designated laboratory or whether the necessary experimental equipment is simply taken to a school where the children are more readily accessible?

A potentially more acceptable solution involves the emphasis of the research itself. It can be asked whether the investigator employed operant methodology to elucidate some aspect of behavior per se or whether the central focus was the application of operant methods in the effort to modify behavior which was considered personally or socially undesirable, such as enuresis, overeating, disruptive behavior, etc. For purposes of the census, research reports were categorized as *basic* if the apparent object of the study was the functional analysis of one or more aspects of behavior per se by operant methods (reinforcement effects, aversive control, verbal behavior, etc.), and if it typically made reference to earlier and related work involving nonhuman subjects. If a study appeared to place more emphasis on the analysis and modification of personally or socially problematic behavior the study was designated as *applied* research. (We do not imply that conditioning of human subjects is the only behavioral process that may be considered basic research, nor do we contend that the criteria described above are without problems or otherwise subject to debate.)

To gauge the reliability of our criteria for defining research as either basic or applied, we first categorized all HOB articles in *JEAB* as either basic or applied using the definitions given above. Next, three graduate students, two in special education and one in guidance and counseling, were given copies of each article and instructed to classify the articles according to the same criteria. Each of the three students showed perfect or near perfect agreement with the designations we had made (100%, 100%, and 98% respectively).

Figure 1 depicts the annual percentage of studies published in *JEAB* which dealt with basic human research (cf. Nevin, 1982). Each point was derived by dividing the total number of HOB studies by the total number of data-oriented articles regardless of subject type published in *JEAB* for a given year. Articles which reanalyzed previously published data were excluded from this total. Special theoretical or methodological articles were also eliminated.

The period from 1960 to 1964 represents the highest level of published activity by human operant researchers, with a peak of 19% in 1964. While the mid-to-late 1960s witnessed a general decline in the percentage of articles devoted to human research, there was a slightly increasing trend during the 1970s. The overall lowest percentage was reached in 1980, when only four percent of the published articles in *JEAB* constituted basic research. However, the latest year included in the census, 1981, saw a percentage on a par with that in the early 1960s. One other aspect of these data which was noteworthy is the fact that the

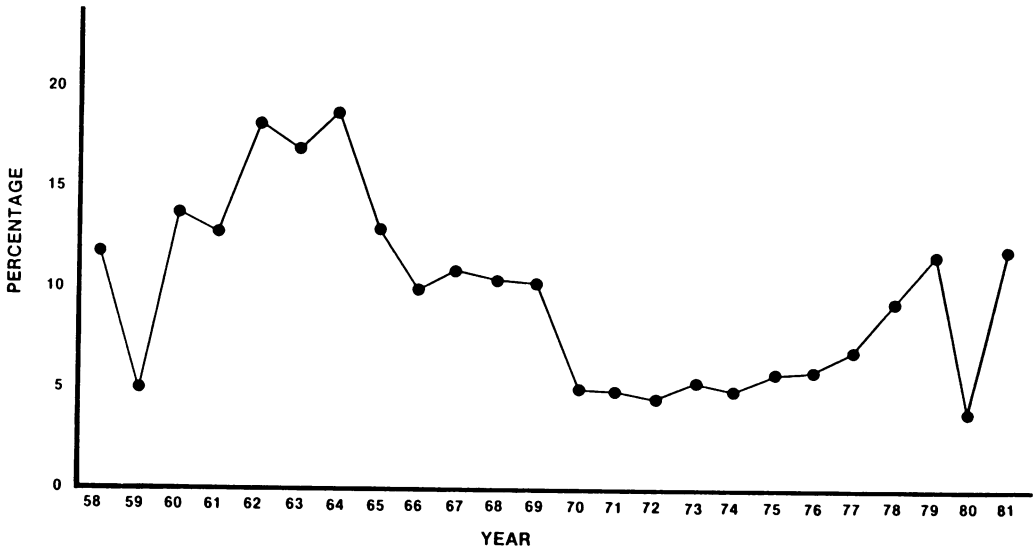


FIGURE 1. The percentage of reports dealing with human operant behavior which were published in *JEAB* for the period 1958-1981. See text for further description.

*JEAB* articles which have featured HOB were authored by a relatively small number of researchers. In fact, over half of the articles were the product of approximately 10 percent of those who have published human research.

Compared to the amount of applied work published in the last twenty years, these figures paint a rather cheerless picture of experimental activity in the study of HOB. However, data from a second census revealed that *JEAB* has published more basic human operant research than three other major referred journals which devote space to reports involving human subjects. The census involved the number of HOB studies published by *JEAB, The Psychological Record, Animal Learning & Behavior,* and *Learning and Motivation* during the ten year period ending in 1981. During this period, *JEAB* published 60 HOB reports (or 7.4% of all data-oriented reports involved human subjects) while *The Psychological Record* published 27 (or 6.1%). The other two journals, *Animal Learning and Behavior* and *Learning and Motivation* published two (or less than 1%) and four (or 1.1%) reports, respectively.

Since JEAB exists as the primary publisher of basic operant research in general, it may be the case that some HOB studies published in the three other journals were originally submitted to *JEAB,* subsequently rejected, and then submitted elsewhere. It is also possible that the census data presented thus far do not accurately reflect the annual volume of HOB studies performed during the years indicated, since many authors who may have had their manuscripts rejected by these journals may have failed to submit them elsewhere or may have submitted them to journals which were not included in the census.

While *JEAB* publishes animal research primarily, *JABA*'s policy is to publish human research exclusively. Though *JABA* is considered to be devoted to research with therapeutic and social application, there is the possibility that reports of basic behavioral research may have found their way into *JABA* since its appearance in 1968. Of the 609 reports that we surveyed in *JABA* from 1968 to 1981, 30 (or 5%) we judged to represent basic research. Technical and review articles, as well as abstracts and brief reports did not figure in the total number of reports. The majority of reports we

treated as basic research dealt with verbal behavior, reinforcement parameters, imitation, etc.

We also classified the 161 basic HOB studies published in *JEAB* during the period 1958-1981 into nine distinct areas of research activity.[2] The definitions of nine categories and the number of reports we classified in each are as follows: (i) Aversive Control of Behavior—studies concerning the effects of response cost, punishment, etc., and also studies which examined escape and avoidance behaviors, 36; (ii) Choice and Preference—reports dealing with the manipulation of reinforcer frequency, reinforcer magnitude, or, in general, reinforcer value in concurrent operants procedures, 9; (iii) Continuously Programmed Environments—reports of behavior in situations in which subjects are exposed to operant contingencies for prolonged periods of time, 3; (iv) Cooperative Behavior—studies of cooperation, competition, or trusting behaviors involving two or more subjects, 15; (v) General Schedule Performance—parametric investigations of human performance on various schedules of reinforcement, 57; (vi) Instructions—reports of the role of instructions in controlling subjects' performances, 8; (vii) Reinforcement—studies which report the unique aspects of the effects of reinforcement and extinction on behavior, 45; (viii) Stimulus Control—studies dealing with the aspects of generalization and discrimination, 39; (ix) Verbal Behavior—studies which involve the acquisition and maintenance of conversation and vocalization, 10. A given study was assigned to more than one category if the data presented had implications for more than one general area of inquiry. For example, Bradshaw, Szabadi, and Bevan published an article in 1978 entitled "Effects of variable-interval punishment on the behavior of humans in variable-interval schedules of monetary reinforcement" which we classified under the categories "Aversive Control of Behavior" and "General Schedule Performance." The types of human performance most frequently represented in the literature involved reinforcement and general schedule performance and, to a lesser extent, stimulus control and aversive control of behavior.

We also surveyed the type of human subject employed in HOB studies found in JEAB for the period 1958-1982. Subjects were categorized according to descriptions given under the "Subjects" heading of each published report. Occasionally, more than one type of subject was employed in the same study and thus entries were made in more than one category. The most common type of subject has been the normal adult, typically undergraduate students, figuring in 95 reports, while the normal child has been used in 35 studies. Institutionalized adults and retarded children have been employed in 18 studies each.

To identify HOB reports published in *JEAB* which have been most influential in other HOB research published in *JEAB* over the last decade, a citation analysis was conducted by simply counting the number of times a given study was cited in subsequent HOB reports over the period 1970 (Volume 13) to 1982 (Volume 37). Any article which was cited four or more times was included in the citation list below. Articles are listed in order of decreasing frequency. After each reference, the number of citations is listed together with the topic area it was associated with.

Baron, A., Kaufman, A., & Stauber, K. A. Effects of instructions and reinforcement-feedback on human operant behavior maintained by fixed-interval reinforcement. 1969, *12*, 701-712. (11, general schedule performance, reinforcement, instructions).

Weiner, H. Controlling human fixed-interval performance. 1969, *12*, 349-373. (10, general schedule performance).

Matthews, B. A., Shimoff, E., Catania, A. C., & Sagvolden, T. Uninstructed human responding: Sensitivity to ratio and interval contingencies. 1977, *27*, 453-467. (9, general schedule performance, instructions).

Weiner, H. Some effects of response cost upon human operant behavior. 1962, *5*, 201-208. (9, aversive control of behavior, general schedule performance).

[1] A comprehensive bibliography of the entire set of articles is found in Buskist and Miller (1982).

Hake, D., & Vukelich, R. A classification and review of cooperation procedures. 1972, *18,* 333-343. (8, cooperative behavior review).

Weiner, H. Conditioning history and human fixed-interval performance. 1964, *7,* 383-385. (8, general schedule performance).

Laties, V. G., & Weiss, B. Effects of a concurrent task on fixed-interval responding in humans. 1963, *6,* 431-436. (7, general schedule performance).

Hake, D., Vukelich, R., & Kaplan, S. J. Audit responses: Responses maintained by access to existing self or coactor scores during non-social, parallel work, and cooperation procedures. 1973, *19,* 409-423. (6, cooperative behavior).

Hake, D., Vukelich, R., & Olvera, D. The measurement of sharing and cooperation as equity effects and some relationships between them. 1975, *23,* 63-79. (6, cooperative behavior).

Azrin, N. H. Some effects of noise on human behavior. 1958, *1,* 183-200. (5, aversive control of behavior, general schedule performance, stimulus control).

Sidman, M., & Stoddard, L. T. The effectiveness of fading in programming a simultaneous form discrimination in retarded children. 1967, *10,* 3-15. (5, stimulus control).

Bradshaw, C. M., Szabadi, E., Bevan, P. Behavior of humans in variable-interval schedules of reinforcement. 1976, *26,* 135-141. (4, general schedule performance).

Bradshaw, C. M., Szabadi, E., & Bevan, P. Effect of punishment on human variable-interval performance. 1977, *27,* 275-279. (4, aversive control of behavior, general schedule performance).

Hake, D., & Vukelich, R. Analysis of the control exerted by a complex cooperation procedure. 1973, *19,* 3-16. (4, cooperative behavior).

Schroeder, S. R., & Holland, J. G. Reinforcement of eye movement with concurrent schedules. 1969, *12,* 897-903. (4, choice and preference).

Shimoff, E., & Matthews, B. A. Unequal reinforcer magnitudes and relative preference for cooperation in the dyad. 1975, *24,* 1-16. (4, reinforcement, cooperative behavior).

Sidman, M., Cresson, O., & Willson-Morris, M. Acquisition of matching to sample via mediated transfer. 1974, *22,* 261-273. (4, stimulus control).

In conclusion, it has been shown that among the journals surveyed, *JEAB* has been the primary publisher of HOB reports in the last decade. The actual percentage of reports devoted to HOB research published each year in *JEAB,* however, has lacked uniformity. Moreover, only a few areas of interest within the analysis of human behavior have been the subject of extensive inquiry. It would appear from the present census that the experimental analysis of human behavior has thus far fallen short of Skinner's "active prosecution of a science of behavior."

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