Experimental Analysis of Human Behavior Bulletin

Volume 7 **Fall 1989** **Number 2**

Announcements

EAHB SIG
Department of Psychology
University of North Carolina at Wilmington
601 South College Road
Wilmington, North Carolina 28403-3297

THE EXPERIMENTAL ANALYSIS OF HUMAN BEHAVIOR BULLETIN

The EAHB Bulletin is published twice yearly, in the Spring and Fall, by the Experimental Analysis of Human Behavior Special Interest Group (EAHB SIG), a group organized under the auspices of the Association for Behavior Analysis (ABA). Articles in the Bulletin represent the views of the authors. They are not intended to represent the approved policies of the SIG or ABA, or the opinions of the membership of the SIG or ABA. The inside back cover has information about joining the SIG and contributing to the Bulletin. Publication costs are paid by the dues of the SIG members and by the Department of Psychology of the University of North Carolina at Wilmington.

Editors: Carol Pilgrim and Mark Galizio, University of North Carolina at Wilmington

Editorial Assistants: Martha Jo Clemmons and Lydia R. Woodard

DEADLINE FOR STUDENT PAPER CONTEST IS JUNE 30

The deadline for submitting manuscripts to the SIG's sixth annual awards contest for student authors has been extended to June 30, 1990. The purpose of the contest is to foster student thinking and scholarly writing in the area of the experimental analysis of human behavior. Both undergraduate and graduate students are eligible.

Papers may be either an integrative review of some area of operant research involving the use of human subjects (although it is acceptable to include discussions of other kinds of organisms), or data-based presentations of the same. They may be written from historical, conceptual, theoretical, or empirical perspectives.

Entries will be judged according to their clarity, scholarship, conceptual rigor, and thoroughness by a panel of judges who are active in the experimental analysis of human behavior. Names and affiliations of authors will not be revealed to the judges (i.e., reviews will be "blind.")

There is no set number of awards. Authors of outstanding papers will be given a handsome plaque certifying their accomplishment and invited to present their papers at the 1991 ABA convention. All authors, whether or not they are selected for an award, will receive at least two written reviews of their papers.

Submissions or inquiries from graduate students should be sent to Barbara Wanchisen, Department of Psychology, Baldwin-Wallace College, Berea, Ohio 44017. Submissions or inquiries from undergraduates should be sent to Anna D. Hatten, Department of Psychology, Averett College, Danville, Virginia 24541.

Papers should (a) be less than 35 double-spaced pages of text (not counting references, tables, or figures; (b) include a 100-200 word abstract suitable for publication in the Bulletin, and (c) be submitted in triplicate.

In addition, submissions must include a letter from the student's major advisor stating: (a) that the paper has been written primarily by the student (although the major professor may have helped the student organize the paper or have made some conceptual or literary contributions); (b) whether the author is a graduate or undergraduate student; and (c) in the case of graduate students, that the student has not completed the requirements for the doctoral degree.

Invitation to Gatlinburg Conference on Research and Theory in Mental Retardation

Travis Thompson
Institute for Disabilities Studies and
Department of Psychology
University of Minnesota

The annual Gatlinburg Conference on Research and Theory in Mental Retardation is a forum for presenting basic and applied behavioral science research on mental retardation and related developmental disabilities. For over 20 years, the Gatlinburg Conference has been held in Eastern Tennessee in late March. For the first time, the meeting has moved north, and will be held in a beautiful resort area in northern Minnesota on April 19-21, 1990. The theme of the conference is **Biobehavioral Research in Mental Retardation**, and will feature presentations by Henryk Wisniewski of the New York State Basic Research Institute on Mental Retardation, who will speak on issues related to aging, Alzheimer's disease, and Down syndrome; Michael Aman of the Ohio State University, who will speak on pharmacological treatment of behavior problems in developmental disabilities; Ann Streissguth of the University of Washington, who will speak on fetal alcohol syndrome; and Eric Courchesne of Children's Hospital, San Diego, who will speak on neurological issues related to Down syndrome and autism.

This will be an opportunity for those of you who have attended the Gatlinburg Conference in the past to experience the intellectual stimulation of the meeting in a new setting. For those of you who have not participated in the Gatlinburg conference, I urge you to consider submitting a proposal for the December 15, 1989 deadline. It is an opportunity to exchange ideas with colleagues working on related problems in an informal atmosphere. It is also a good way for advanced graduate students and postdoctoral trainees to become acquainted with colleagues in the field in a less formal atmosphere than that at most national professional meetings. Topics relevant to this audience featured at last year's meeting included symposia on language development, symbols and meaning classes, learning and remembering, and applied behavioral pharmacology, to name just a few. Topics addressing basic behavioral issues are especially encouraged, such as learning, stimulus equivalence, verbal behavior, choice and self-control, concept formation, and instructional control.

The meeting will be at Cragun's Resort near Brainerd, Minnesota, 130 miles north of Minneapolis. There are literally thousands of lakes in northern Minnesota, and Brainerd is in the center of the lake district. The region is heavily populated by coniferous and birch forests. The conference site, on Gull Lake, is 12 miles from Brainerd. It is a very well equipped resort with tennis, golf, hiking trials, indoor swimming, and other recreational facilities, as well as excellent meeting rooms. The building has a modern main lodge as well as suites and cabins. The Brainerd airport is 10 miles away from the resort, and Northwest Airlines flies to Brainerd from Minneapolis four times each day. Cragun's will pick up passengers at the airport and transport them to the resort by van, or visitors can make arrangements to pick up a rental car at the Brainerd Airport on arrival.

Gersh Berkson (University of Illinois, Chicago Circle Campus) is the overall meeting coordinator, and Susan Hupp (Special Education, University of Minnesota) is in charge of local arrangements. If you have questions about the appropriateness of a

potential submission, please give Susan Hupp (612) 627-4517, Gersh Berkson (312) 328-9527 or me (612) 627-4500 a call. If you would like to discuss accommodations, air or automobile travel or other logistics, Susan Hupp can be of assistance.

I hope you will give some serious thought to joining us at Gatlinburg North. It's going to be an enjoyable as well as a stimulating occasion.

EAHB ABSTRACTS FROM THE GATLINBURG CONFERENCE, 1989

NEUROLEPTIC TREATMENT AND MENTAL RETARDATION: RELATIONS BETWEEN LEARNING, CLINICAL RESPONSE AND LEVEL OF HALOPERIDOL

T. D. Hackenberg, M. W. Dysken, B. L. Bakke, G. T. Vatassery, A. Zaiser, & T.Thompson
Institute for Disabilities Studies, Department of Psychiatry, VA Medical Center & Department of Psychology University of Minnesota

The present study examined the relationship of dose and plasma level of haloperidol to learning and maladaptive behavior in four young adults with mental retardation. The primary objective was to develop a method of identifying a dosage level of the neuroleptic medication that maximally reduces problem behavior while minimally altering one's ability to learn new skills. Three dosage levels of haloperidol and placebo were studied in a quasi-random order, and were determined individually for each subject, all of whom had previous histories of neuroleptic treatment. Each dosage level was gradually introduced over a one week period and was maintained at the target dose for three weeks thereafter. Learning ability was measured with a repeated acquisition of behavioral chains task in which a new, but similar, sequence of responses was learned each session. Maladaptive behavior was assessed through daily ratings of target classes of problem behavior on a Maladaptive Behavior Scale and through direct frequency recordings. A Dyskinesia Identification System was administered monthly to assess adverse side effects, particularly extrapyramidal movement disorders (e.g., tardive dyskenesia). In addition, blood samples were taken twice during the final week at each dosage level as a means of correlating plasma levels of haloperidol with the target dose and with the learning and behavioral data. Blood level of haloperidol varied linearly with dose in all subjects. In two subjects, lower rates of maladaptive behavior and fewer errors on the learning task occurred under placebo than under active drug. In the other two subjects, maladaptive behavior was best controlled under the highest dose of haloperidol, but the function relating errors to dose varied directly for one and inversely for the other. Scores on the Dyskenesia Identification System improved as dose increased for three subjects, suggesting the presence of movement disorders that were masked by chronic neuroleptic treatment. The between-subject variability in responsiveness to haloperidol treatment may reflect differences in the circumstances giving rise to, and the functions served by, each individual's maladaptive behavior. Future research in this domain may profit from functional assessment procedures that isolate environmental controlling variables, from which it may be possible to specify the behavioral characteristics of individuals who are likely to benefit from neuroleptic treatment.

THE FORMATION OF EQUIVALENCE RELATIONS BY PERSONS WITH PRADER-WILLI AND DOWN SYNDROMES

Beth Joseph and Travis Thompson
Institute for Disabilities Studies
and Department of Psychology
University of Minnesota

It has been suggested that the meaning of an arbitrary symbol is determined by the nature of its relations to other symbols. Central to an understanding of meaning is the notion of equivalence. The size of the stimulus classes may also determine the richness of meaning attached to a given stimulus. In persons with mental retardation, the number of such equivalence relations that can be established appears to be more restricted than in non-disabled individuals. Young adults with Prader-Willi and Down Syndrome participated in a three phase study designed to teach and test the formation of four equivalence classes using arbitrary visual symbols. Down Syndrome is associated with an aberration of chromosome 21 and Prader-Willi Syndrome is associated with a chromosome 15 aberration (in approximately one-half of the cases). Six subjects with Prader-Willi syndrome and three subjects with Down syndrome matched for mental and chronological ages were trained and tested for emergent learning of equivalence relationships. Participants function in the mild range of mental retardation. Conditional relations were trained using the multiple-sample, single comparison method. In Phase 1 the relations necessary for the formation of two three-member classes were trained and tested. The performance of four of the six subjects with Prader-Willi syndrome and one of the three subjects with Down syndrome tested demonstrated equivalence relations in Phase 1. Two additional training procedures were used with the two subjects with Down syndrome who did not exhibit control by equivalence relations. In the first procedure, the subjects were taught to name both the sample and comparison stimuli during training trials of the Phase 1 conditional relationships. The performance of the subjects did not improve during testing following this procedure. The second procedure involved a continuation of the naming procedure in addition to an increase in reinforcement magnitude during test sessions. The performance of one subject demonstrated equivalence relations following the second additional procedure; the performance of the other subject did not. In Phase 2, two seven-member classes were trained and tested. The five subjects with Prader-Willi syndrome and the one subject with Down syndrome who completed Phase 2 have demonstrated symmetrical and transitive responding for the seven-member classes. In Phase 3, the subjects were taught to choose one of four stimuli (one from each established class) in response to four novel stimuli. Each subject was then tested to determine whether the novel stimuli controlled responses to the remaining members of each class. Control of responses to probes for either the three- or the seven-member classes was not exhibited by the four subjects with Prader-Willi syndrome who completed Phase 3. The one subject with Down Syndrome who completed Phase 3 responded correctly to 100% of the trials involving members of the three-member classes and to 25% of the trials involving members of the seven-member classes (chance responding). Because of Sidman's observation that emergence sometimes occurs with repeated testing, repeated testing was done to evaluate the possibility of delayed emergence of stimulus equivalence relations.

Differential propensity to display emergent learning of equivalence relations by persons with Prader-Willi and Down Syndromes could have

implications, not only for choice among teaching methods, but also for understanding possible underlying mechanisms in language development. This may also shed light on the relationship between genetic variations and language development in these populations.

SYMBOLS AND MEANING CLASSES: MULTIPLE SEQUENCE PRODUCTION AND THE EMERGENCE OF ORDINAL STIMULUS CLASSES

Harry A. MacKay, Lawrence T. Stoddard,
Behavior Analysis Department
Waltham, Massachusetts

Thomas J. Spencer
Department of Psychology
West Virginia University

This research is relevant to the analysis and development of generative language, syntax in particular, in mentally retarded individuals. The chief purpose was to examine whether training to produce multiple sequences might yield stimulus classes based on the ordinal properties (first, second, etc.) acquired by stimuli during the training. For example, the studies outlined here used two training methods and examined (a) the ordinal relations among stimuli within trained sequences and (b) the relations between stimuli that occupied corresponding ordinal positions in different sequences.

Initially, one subject was taught by a prompting/chaining method to touch four simultaneously presented, different colored circles (H1, H2, H3, H4) in that order. Then ordinal properties that the colors could have acquired were assessed by probe trials involving subsets of serially adjacent and non-adjacent colors (e.g., H2-H3, H1-H3-H4). This phase of the study then was replicated using a different set of stimuli, forms A1, A2, A3, and A4. The subject demonstrated highly accurate performance on all probe trials with each set of stimuli.

Next, trials that combined stimuli from the two trained sequences were given. These mixed trials assessed whether color and form stimuli that occupied the same ordinal position in the trained sequences were functionally equivalent (i. e., mutually substitutable). No evidence of such functional equivalence was obtained. Instead, the subject's response pattern suggested that she had acquired two independent sequences. She frequently grouped the stimuli into separate, homogeneous sequences, first color then form, or vice versa.

The next study then sought to establish the functional classes "first," "second," "third" and "fourth" in another way. The original form sequence (A1-A2-A3-A4) served as baseline behavior in an exclusion procedure used to establish four new sequences. Each included three stimuli from set A and one from another set (B). Each B stimulus substituted for a different one of the original Set A forms. After this AB training, the subject successfully produced (a) the sequence comprised of all B forms and (b) the sequences involving all combinations of the A and B stimuli that had not appeared in training. Apparently each A form and each B form that occupied the same ordinal position formed two-member classes of functionally equivalent stimuli. Next the same procedures were used in BC training. The emergent sequence (B1-B2-B3-B4) provided the baseline for establishing four sequences consisting of three stimuli from set B and one from another set (C). After the BC training, the subject successfully produced (a) the sequence comprised of all C forms and (b) the sequences involving all combinations of the B and C stimuli that had not appeared in training. Without further training, she also performed without error on all AC sequences, thus demonstrating emergent transitive relations between the A and C stimuli. In addition, all

ABC sequences were perfect. Thus, each functional class now included three stimuli, rather than two.

Two methods of training multiple sequences to a mentally retarded individual yielded divergent results. Exposure to only one of these methods yielded emergent, novel behavior based on the formation of classes of stimuli with functionally equivalent,ordinal properties. The differences between the methods indicate a need for analysis of the conditions that may promote, retard, or prevent the formation of classes of functionally equivalent stimuli.

The characteristics of the stimuli used may be one factor that could be related to the different outcomes of the studies described here. In one study, the functional equivalence of color and form stimuli was not obtained; in the other study, the functional equivalence of different forms emerged. However, there is a difference with respect to the training history of the stimuli in the two studies that may have contributed significantly to the two results. This prompts the suggestion that what is learned during sequence training may depend on how new sequences are established. A prompting/chaining method was used to train the color and the form sequences separately in the first study. This method may engender control by serial properties of these stimuli within each sequence rather than by the common ordinal position occupied by stimuli in different sequences. In contrast, the exclusion training method used with the form stimuli established ordinal classes effectively and efficiently. Only 9 sequences were trained and 72 emerged. The stimuli that occupied the same ordinal position in different sequences were mutually interchangeable. They could substitute for each other to control serial behavior that had not occurred previously in the subject's history. This mutual substitutability of stimuli may be relevant to our understanding of rudimentary syntactic behavior. For example, suppose that a child learns to utter "The bus is red" in the presence of a red bus. Later, in the presence of a blue bus, a child who already had learned the name of the color blue might say "The bus is blue." Similarly, when a red or a blue car appeared, the child could utter "The car is red" or "The car is blue," thus demonstrating conditional control by the object and its color. This form of conditional control was not included in the present study. However, the grammatical classes that we call, article, noun, verb, and adjective may represent functional classes of stimuli that have ordinal properties like the forms used in the present study.

Note: This research has been supported primarily by the National Institute of Child Health and Human Development (Grants HD17445, HD24317, and HD25995). We also acknowledge the support of the Massachusetts' Department of Mental Retardation (Contract No. 3403-8403-306).

Correspondence can be addressed to Harry A. MacKay, Behavior Analysis Department, E. K. Shriver Center, 200 Trapelo Rd., Waltham, MA 02254.

STIMULUS-CONSEQUENCE RELATIONS AND STIMULUS CLASSES IN MENTAL RETARDATION

W. J. McIlvane, W. V. Dube,
J. B. Kledaras, F. M. Iennaco,
& L. T. Stoddard
E. K. Shriver Center and
Northeastern University

Other presentations in this symposium focus on **Symbols and Meaning Classes** that can result when initially unrelated stimuli are used in conditional-discrimination procedures. Our paper discusses the meanings that such stimuli may have. The discussion stems from research we've done to examine arbitrarily defined stimulus relations that involve reinforcing

stimuli. Some diagrams of conditional-discrimination procedures will help to put that research in context.

Reinforcing Outcome Nonspecific	Reinforcing Outcome Specific
A1->B1->R->SR+	A1->B1->R->SR1+
A1->B2->R->X	A1->B2->R->X
A2->B1->R->X	A2->B1->R->X
A2->B2->R->SR+	A2->B2->R->SR2+

Figure 1

These diagrams show that conditional discrimination entails three stimulus terms and one response term. That is, a reinforcing stimulus is contingent upon a response to comparison stimulus B1 if and only if sample stimulus A1 is present. Any other response -- or the same response to any other stimulus -- is not followed by a reinforcer (X). When conditional relations are shown also to be equivalence relations, we may be led to say that the equivalent stimuli have the same meanings. But what is it that they mean?

A functional account might define "meaning" with respect to the consequences of behavior. However, considering the procedure in the left portion of Figure 1, it is difficult to agree or disagree with that suggestion. All stimuli can mean SR+. The outcome-specific procedure (Figure 1, right) provides a needed contrast. Correct selections of different stimuli are followed by different reinforcers, SR1+ and SR2+. Thus, A1 and B1 can mean SR1 and A2 and B2 can mean SR2. But do they?

We've been asking questions like this of mentally retarded subjects for some years now. That work, reported in the **Journal of the Experimental Analysis of Behavior** showed that reinforcing stimuli could be members of equivalence classes along with the samples and comparisons in a conditional-discrimination procedure (Dube, et al., 1987; Dube, et al., 1989). Given the opportunity to do so, retarded subjects matched samples and comparisons with their corresponding reinforcers. Those studies reported another noteworthy finding. When initially unrelated forms were given the same meaning (i.e., when they were related to the same reinforcer), subjects tended to relate those forms with each other. Together, the findings are clearly consistent with a definition of "meaning" in terms of consequences. But does this relationship hold only with the outcome-specific procedures? Research we've conducted to answer that question also bears on another issue that concerns us -- what it means to say one stimulus is equivalent to another.

Condition 1	Condition 2
A1 -> R -> SR+	A1 -> R -> X
A2 -> R -> X	A2 -> R -> SR+
B1 -> R -> SR+	B1 -> R -> X
B2 -> R -> X	B2 -> R -> SR+

Figure 2

Class membership based on positive and negative discriminative functions. Here, "meaning" is defined in terms of two opposite consequences -- reinforcement and extinction. During Condition 1 (Figure 2 left), stimuli A1 and B1 are S+ and A2 and B2 are S-. By our definition, A1 and B1 have the same meaning (SR+). So do A2 and B2 (X). Can we demonstrate these relationships, as we did with outcome-specific reinforcement procedures? One way is to use what we term a "yoked repeated reversal" procedure. Such procedures have been receiving considerable attention of late (Vaughan, 1988; Sidman, et al., in press; McIlvane, et al., in press). In our case, the two conditions shown in Figure 2 are alternated repeatedly. At

first, A1 and B1 are the positive stimuli and A2 and B2 are the negative stimuli. After that discrimination is acquired, the stimulus-consequence relations are reversed. A2 and B2 together are positive stimuli and A1 and B1 are the negative. After the reversed discrimination is mastered, the contingencies are re-reversed. With many such reversals, one can produce an interesting phenomenon: Reversal of either discrimination leads to immediate reversal of the other without explicit training. That is, if the subject is taught to select A2 and to reject A2, then he or she will immediately select B1 and reject B2 -- even if B1 functioned most recently as S- and B2 as S+. Such untrained reversals indicate the formation of two functional classes -- one comprised of A1 and B1 and the other comprised of A2 and B2. Viewing these findings, we might be led to say that members of each class have the same meaning (i.e, they are functionally equivalent), and that meaning changes depending upon the current contingencies. But are the members of the functional classes also members of equivalence classes as defined by Sidman and Tailby (1982)?

The answer to that question is not clear right now. However, Sidman and colleagues (1989) have reported data that seem to show that functional and equivalence class membership need not be simultaneously evident. We've recently conducted an experiment that supports those findings. With a mentally retarded subject, we first established two three-member stimulus equivalence classes with standard procedures. Then, in a simple-discrimination context, we gave one member of the equivalence class an S+ function. Would the other class members also function as S+? Throughout repeated testing, our subject showed no evidence of functional equivalence. However, we should note that one can also obtain different findings. Earlier research has provided instances in which functional and equivalence class membership were simultaneously evident (cf. de Rose et al., 1988).

Together, the cumulative data make a point that we must consider when we speak of stimuli as being equivalent: When stimuli are members of an equivalence class, that equivalence may be restricted to the conditional-discrimination context in which it was established. We cannot assume that these stimuli will have equivalent functions in other contexts. Apparently, the behavior involved in equivalence class formation does not have exactly the same behavioral prerequisites as that involved in the formation of functional classes. How does this observation square with our suggested definition of stimulus meaning? We don't think our research so far compromises that definition. It merely showed that context was an important variable that determined meaning. In this regard, it is consistent with every other definition of meaning that we know about.

NOTE: This research program has been supported primarily by the National Institute of Child Health and Human Development (Grants HD17445, HD22218, HD24317, and HD 25995). We also acknowledge the support of the Massachusetts Department of Mental Retardation (Contract NO. 3404-8403-306). Correspondence can be addressed to William J. McIlvance, Behavior Analysis Department, E. K. Shriver Center, 200 Trapelo Road, Waltham MA 02254.

References

deRose, J. C., McIlvane, W. J., Dube, W. V., Galpin, V., & Stoddard, L. T. (1988). Emergent simple discrimination established by indirect relation to differential consequences. Journal of

Experimental Analysis of Behavior, 50, 1-20.

Dube, W. V., McIlvane, W. J., Mackay, H. A., & Stoddard, L. T. (1987). Stimulus class membership established via stimulus-reinforcer relations. **Journal of the Experimental Analysis of Behavior**, 47, 159-175.

Dube, W. V., McIlvane, W. J., Maguire, R., Mackay, H. A., & Stoddard, L. T. (1989). Stimulus class formation and stimulus-reinforcer relations. **Journal of the Experimental Analysis of Behavior**, 51, 65-76.

McIlvane, W. J., Dube, W. V., Kledaras, J. B., & Stoddard, L. T. (in press). Teaching relational discriminations to mentally retarded individuals: Some problems and possible solutions. American Journal of Mental Retardation.

Sidman, M. & Tailby, W. (1982). Conditional discrimination vs. matching to sample: An expansion of the testing paradigm. **Journal of the Experimental Analysis of Behavior**, 37, 5-22.

Sidman, M., Wynne, C. K., Maguire, R. W., & Barnes, T. (in press). Functional classes and equivalence relations. **Journal of the Experimental Analysis of Behavior.**

Vaughan, W. (1988). Formation of equivalence sets in pigeons. **Journal of Experimental Psychology: Animal Behavior Processes**,14,36-42.

ASSESSING THE PREREQUISITES FOR MERGER OF EQUIVALENCE CLASSES

Kathryn J. Saunders, Joseph E. Spradlin, & Richard R. Saunders
Bureau of Child Research
University of Kansas

Human subjects who learn conditional discriminations in a matching-to-sample procedure may perform untrained conditional discriminations based on the learned relations. A subject who has learned to select B in the presence of A (AB) is likely to select A in the presence of B (BA) indicating the symmetry of AB; adding BC training is likely to produce AC, indicating the transitivity of AB and BC. The stimuli thus related are members of an equivalence class. Once the derived relations that indicate equivalence are demonstrated, however, using procedures to alter performance on the prerequisite trained relations (AB and BC) may not affect performance on the derived relations (e.g., AC and BA).

Saunders, Saunders, Kirby, and Spradlin (1988) demonstrated the emergence of four small (four member) equivalence classes in three subjects with mild retardation. Next, a new two-choice conditional discrimination involving one stimulus from each class was presented without programmed consequences. The subjects selected a Class-1 comparison in the presence of a Class-3 sample and selected a Class-2 comparison in the presence of a Class-4 sample. Subsequently, test performances showed the merger of the small classes. That is, any Class-1 stimulus controlled the selection of any Class-3 stimulus, and vice versa. Next, reinforcement and punishment contingencies were used to reverse the selections made on the relation that originally merged the small classes. Performances on new tests for equivalence (i.e., a new merger of classes such as Class 1 with 4) showed the originally merged classes to be intact for two subjects, and partially intact for the third. Thus, class merger based on a single relation that was established without reinforcement was highly resistant to change. The authors questioned whether classes would merge in accordance with the reversed merging relation if tests for the original merger had been omitted.

The present study addressed this question. Two subjects with mild

retardation were exposed to a procedure that was identical to that described above, except that tests for class merger were not conducted until after the unreinforced selections (of the merging relation) were reversed. Nevertheless, responses on most test trials showed class merger in accordance with the original unreinforced selection, and not in the direction expected following the training of selections that were the reverse of those occurring when no consequences followed selection. Extended testing showed an increased number of responses in accordance with the reversed merging relation, but only on test trials that included stimuli directly involved in the reversed merging relation. Thus, despite the omission of tests for class merger prior to the reversal, performance on the class merger tests did not reflect the reversed merging relation. It remains to be determined however, whether this effect would occur if the merging relation were not initially established by unreinforced selection, but rather by typical reinforcement procedures.

Reference

Saunders, R. R., Saunders, K. J., Kirby, K. C., & Spradlin, J. E. (1988). The merger and development of equivalence classes by unreinforced conditional selection of comparison stimuli. **Journal of the Experimental Analysis of Behavior**, 50, 145-162.

Authors' Note

These data were originally presented under the title "Detecting Equivalence Relations that Develop Prior to Testing." Astute comments made in an ABA talk by Bill McIlvane and Bill Dube resulted in revision of our interpretation.

* + * + * + * + * + * + * + *

The editors wish to thank **Kathryn Saunders** for her help in organizing submissions from the Gatlinburg Conference. We encourage submissions from other regional conferences that would be of interest to EAHB SIG Members.

* * * * * * * * * * * * * * * * *

Hurricane Check for SEABA

Due to Hurricane Hugo, the sixth annual meeting of the Southeastern Association for Behavior Analysis has been changed to February 15-17. The conference will be held at the Sheraton Savannah Resort & Country Club, Savannah, GA.

* * * * * * * * * * * * * * * * *

* * * * * * * * * * * * * * * * *

Phil's Fun Facts

1. What well-known human operant researcher can frequently be seen wearing a sweater made from the hair of his beloved former dog, Rocky?
Answer: noraB nalA

* * * * * * * * * * * * * * * * *

MYTHING THE POINT ABOUT RULE-GOVERNED BEHAVIOR: A REPLY TO BUSKIST AND DEGRANDPRE

A. Charles Catania, Byron A. Matthews, & Eliot Shimoff
University of Maryland Baltimore County

Buskist and DeGrandpre (1989) argue that rule-governed behavior is a myth, on the grounds that it has never been demonstrated in a pure form. This sort of argument is quite different from one that shows that a concept leads to logical or empirical inconsistencies (e.g, Catania, 1975). We illustrate that point here by substituting a different but familiar behavior analytic concept for rule-governed behavior in a paraphrase of Buskist and DeGrandpre's test. In the interests of space, we have condensed some passages and have omitted references. The interested reader can fill in the former by referring to their original text and the latter by examining the literature on biological constraints on learning (e.g., Bolles, 1970; Breland & Breland, 1961; Seligman, 1970; Williams & Williams, 1969).

This article is in response to the burgeoning number of reports that have claimed to study reinforced behavior, behavior thought to be predominantly under the control of its consequences. Our main objection to these studies is that the phenomenon that they purport to investigate does not exist, at least not in any pure form. Our point is a simple one: Control of behavior only by consequences has not and probably cannot be demonstrated; consequences by themselves are unlikely to exert total control of behavior.

Reinforcers, or rewards as they are sometimes called, cannot be manipulated independently of the responses for which they are arranged as consequences. These responses sometimes occur as a product of phylogenic (evolutionary) contingencies, as when they are produced by releasers or by eliciting stimuli. Thus, we cannot be certain whether behavior is under the control of phylogeny only, or consequences only, or a blend of phylogeny and consequences. Rather, behavior, whether it be of the laboratory or real-life variety, is likely a product of the joint influence of phylogeny and consequences.

All studies of "reinforced behavior" adopt the following general procedural protocol. The reinforcer is determined by an establishing operation at the outset of the experiment: deprivation of the reinforcing stimulus that will be a consequence of the response, or presentation of an aversive stimulus, the removal of which will be the consequence. Subjects are asked to emit a response that, in turn, produces that consequence. Relative to the consequence, the response may be consistent with phylogenically determined behavior (as when a rat's jumping that removes or avoids shock is also the response elicited by shock), it may be incompatible with phylogenically determined behavior (as when a rat's jumping elicited by shock competes with lever pressing that removes or avoids shock), or it may be inconsistent with phylogenically determined behavior but not incompatible with it (as when a pigeon's autoshaped key pecks are also the responses that produce food as a consequence).

Depending on the stimuli, responses and reinforcers in the experiment, phylogenic behavior may be masked by behavior that is maintained by its consequences, or vice versa. So far, studies of "reinforced behavior" have exaggerated the role of consequences and virtually ignored the role of

phylogeny in controlling behavior. Until we know how consequences conjoin with phylogeny to affect behavior, our understanding of such will necessarily remain limited.

Consequences are not things that exist in a vacuum; they do not exert their influence on behavior independently of evolutionary contingencies. Evolutionary contingencies strengthen, maintain, or weaken control by consequences, which is precisely why reinforced behavior, in any pure form, cannot exist.

The essence of behavior analysis is to decompose complex behavior into its component processes. These components make up our behavioral taxonomy, and their "impurities" are as inevitable in our field as they are in others (in the chemistry laboratory, a compound may be described in terms of how close it comes to a pure form, but no chemist would deny the existence of a compound simply because it could not be produced with absolute purity). The properties of rule-governed behavior will be explicated through a consideration of its relation to other processes (such as stimulus control: e.g., Cerutti, 1989) and through research in the laboratory (e.g., Catania, Shimoff & Matthews, in press). We recommend these courses of action as effective antidotes to the perpetuation of myth-understandings.

References

Bolles, R. C. (1970). Species-specific defense reactions and avoidance learning. **Psychological Review, 77**, 32-48.

Breland, K., & Breland, M. (1961). The misbehavior of organisms. **American Psychologist, 16**, 681-684.

Buskist, W., & DeGrandpre, R. J. (1989). The myth of rule-governed behavior. **Experimental Analysis of Human Behavior Bulletin, 7**, 4-6.

Catania, A. C. (1975). The myth of self-reinforcement. **Behaviorism, 3**, 192-199.

Catania, A. C., Shimoff, E. H., & Matthews, B. A. (in press). An experimental analysis of rule-governed behavior. In S. C. Hayes (Ed.), **Rule-governed behavior: Cognition, contingencies and instructional control.** New York: Plenum.

Cerutti, D. T. (1989). Discrimination theory of rule-governed behavior. **Journal of the Experimental Analysis of Behavior, 51**, 259-276.

Seligman, M. E. (1970). On the generality of the laws of learning. **Psychological Review, 77**, 406-418.

Williams, D. R., & Williams, H. (1969). Auto-maintenance in the pigeon: Sustained pecking despite contingent non-reinforcement. **Journal of the Experimental Analysis of Behavior, 12**, 511-520.

* $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ *

The next issue of the Bulletin will include recent EAHB publications and grants to SIG members. If you have contributions for either of these features, please forward them by **April 1, 1990**. We'll also be happy to accept 1990 dues at any time.

* $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ * $ *

RULE-GOVERNED BEHAVIOR IS NOT WHOLLY RULE-GOVERNED BEHAVIOR: A REPLY TO THE THREE MYTHOPOEISTS

William Buskist & Richard J. DeGrandpre
Auburn University

The argument fabricated by Catania, Matthews, and Shimoff (1989) is an aside; who would argue with the idea that operant behavior is a product of natural selection? For convenience, we study operant behavior as phenomena independent of natural selection just as biopsychologists study physiology and reproduction independently from evolutionary considerations. Behavior analysis has shown that three operations determine the nature of any given bit of operant behavior: reinforcement, punishment and extinction. The inescapable conclusion to be drawn from Catania et al's argument is that there are two separate classes of operant behavior: That which is rule-governed and that which is contingency-shaped, where these three operations exert control over each class differently. We believe Catania et al's reasoning to be wrong.

Our point (Buskist & DeGrandpre, 1989), which Catania et al., myth-teriously overlooked, is that rules control behavior only to the extent that they are related to consequences of that behavior. When following a rule produces reinforcers (whether programmed or not) it generally will be followed; when following a rule produces other consequences, it generally is not followed. The effects of rules and therefore the "rule-governed" behavior is dependent on the consequences of following or not following rules. Stimuli, rules or otherwise, acquire their control over behavior through their relation to consequences of behavior.

A myth is "a belief or a subject of a belief whose truth or reality is accepted uncritically" (Random House College Dictionary, 1988). The general message of our previous article is that behavior analysts tend to accept rather uncritically the notion that rules control human behavior. Very little research, particularly with reinforcement contingencies, has been conducted that attempts to address rule-governed behavior "through a consideration of its relation to other processes" (p. 23, Catania et al., 1989). Our paper was intended to be a call for more research in that direction. We did not "myth the point"; rather, Catania et al. "myth-interpreted" our comments. In fact, Catania et al's remarks only serve to perpetuate further the myth of "rule-governed" behavior.

References

Buskist, W., & DeGrandpre, R. J. (1989). The myth of rule-governed behavior. **Experimental Analysis of Human Behavior Bulletin**, 7, 4-6.

Catania, A. C., Matthews, B. A., & Shimoff, E. (1989). Mything the point about rule-governed behavior. **Experimental Analysis of Human Behavior Bulletin**, 7, 22-23.

Random House College Dictionary. (1988). New York: Random House.

Footnote

Thanks to Dave Rider, whose comments on Catania et al's article stimulated the present note.

IS BEHAVIOR ANALYSIS JUMPING ON THE COGNITIVE BANDWAGON?: A REVIEW OF DAVEY & CULLEN'S HUMAN OPERANT CONDITIONING AND BEHAVIOR MODIFICATION1

Barbara A. Wanchisen
Baldwin-Wallace College

Davey and Cullen's (1988) book includes recent issues in operant conditioning and behavior modification. If this book is a representative sample of the work now underway, and the theories researchers now embrace, it is pretty clear that some are heavily influenced by the cognitive "revolution."

The editors separately wrote the first two chapters of the book, and here a decidedly cognitive stance is adopted, more strongly in the first chapter (Davey) than in the second (Cullen). In chapter 1, Davey discusses underlying "mechanisms which mediate conditioning in different species" (p. 2) and finally concludes that these mechanisms are clearly discontinuous across species. The mediational approach and an adherence to discontinuity theory are clearly "anti-behavioral" at least in terms of traditional behavior analytic theory. Further, he laments the fact that early operant research with humans was too faithful to replicating nonhuman research (note that a more conservative approach offered by Perone, Galizio, & Baron in Chapter 5 laments just the opposite). He concludes this introductory chapter with this summary of what needs to be done in human operant research:

> There are at least two issues we need to approach here. First, what factors determine an individual's perception of an association between his or her behavior and the effects of that behavior? Secondly, what mechanisms act to generate an increase in the occurrence of a particular response once it has been reinforced? (my italics) (p. 10).

These questions certainly indicate a strong bias towards cognitive and/or mediational approaches to behavior. What does Davey mean by "perception of an association?" Associationism went out of vogue long ago with the power of contingency analyses, and "perception" harkens back to early cognitive theory (e.g., Gestalt). His second issue concerning "mechanisms" was deemed irrelevant by Skinner years ago. Reinforcement is a process that need not be tied to a "mechanism" or any other "underlying" process.

Cullen (Chapter 2) then attacks the practice of studying nonhumans in order to understand human behavior:

> Quite a lot of bar presses, key pecks, switch closings, alley runs, and barrier leaps have already been analyzed and found amenable to reinforcement variables. A good deal of red and green, squares and triangles and other odd shapes, and myriad tones and buzzes have been discriminated under the press of a reinforcement contingency. Hardly anything else seems worth trying reinforcement on but language and social problems. (my italics) (p. 19)

This is an odd statement for a behavior analyst to make, but perhaps Cullen is more applied in orientation, and perhaps this reflects how some applied researchers look at work with nonhumans these days. He does end his chapter on a more conservative note, stating that common mentalistic notions will not help in a scientific approach to behavior.

These first two chapters, written by the editors, set an unexpected tone for a book covering operant conditioning in basic and applied settings. Some of the chapters are clearly sympathetic to

a cognitive approach, but none, save perhaps one (Wearden, Chapter 10) is as strong as the editors'.

The editors state in the Preface that contributors were asked to include a discussion of the usefulness of nonhuman data in understanding human behavior. Chapters 5 and 10 provide a clear juxtaposition of these issues. Perone, et al., (Chapter 5) point out that discrepancies in human and nonhuman laboratory behavior may be due to experimental procedural differences, whereas Wearden (Chapter 10) adheres to the cognitive notion that humans are fundamentally different from nonhumans, and, in fact, that reinforcement itself may only be applicable to nonhumans! He proposes that instructions (information) is what affects human behavior. In the conclusion, Wearden refers to "the greater cognitive complexity of humans" (p. 222) and says that "to provide rigorous accounts of human learning, experimental analysis may need to disencumber itself of much baggage picked up over many years in the animal laboratory" (p. 222). The dichotomy of these two views needs to be addressed objectively in the editors' remarks, at the very least.

Schwartz and Lacey (Chapter 3) and Epling and Pierce (Chapter 4) agree that human research could benefit (and has) from work done with nonhumans, except that for Schwartz and Lacey, this is only true in constrained environments. Wood (Chapter 6) suggests through most of his chapter that while "clinical observations of patients involved in behavior modification often produces an irresistible urge to interpret behavioral change in humans as something which is largely cognitive in nature" (p. 88) he is careful to consider other interpretations, including organic causes. However, at the very end, Wood surprisingly suggests that cognitive and other internal forces can avert efforts to properly condition clients.

Baron, Myerson, and Hale (Chapter 8) provide a nice interplay of nonhuman and human research done vis a vis age and attention. They note that these issues are more typically found in the cognitive domain but can be studied behavior analytically as well. In fact, they suggest that the behavior analytic area of response competition neatly fits in with an analysis of what cognitive psychologists would call "divided attention."

Other chapters consider the token economy (Kazdin, Chapter 7), human competition (Buskist & Morgan, Chapter 9) and quantitative issues with human behavior (Bradshaw & Szabadi, Chapter 11). Little is seen here on the human-nonhuman debate, but these authors do consider new directions for human research and seem to adhere to more traditional behavior analytic theory.

In a different vein, it would have been valuable had the editors summarized the chapters in this book and provided a cohesive theme in their introductory remarks. Instead, the book appears to be a kind of mixed bag of research done on human behavior and it is not readily apparent that there is any order to chapter placement. For example, it would have been useful if the basic research was put under one heading and the applied work under another; doing this would have offered some cohesion. Further, as already noted, the editors promise us that the authors were charged with the task of discussing the relevance of human and nonhuman findings, yet many of the contributors did not provide such a discussion or else not a very in-depth one. In that case, Davey and Cullen could have asked them to do so in a revision or could simply have eliminated this promise from the Preface. In any case, this oversight adds to the confusion of the purpose of this book.

Even more useful would have been if the editors had pointed out the

inconsistencies in theoretical approach that the authors espoused and organized the chapters to enhance the presentation of those arguments. Considering again the chapters written by Perone, et al (Chapter 5) and Wearden (chapter 10), it would have been helpful first, if these chapters were positioned next to each other and, second, if the editors had pointed out that two should be read together to give the reader a balanced account. The reader should not have to read all of the chapters in a book to discover where chapters of interest lie.

Aside from stylistic concerns, this book provides insight into how behavior analysts currently operate their laboratories and clinics. Whether or not one agrees with the cognitive flavor found in a number of the articles, it is certainly an issue that needs more careful examination by the behavior analytic community. It is doubtful that such theoretical discrepancy was seen in the early days of behavior analysis, and if a cognitive trend is developing, it should be analyzed on its own terms and not be allowed to "sneak" into otherwise behavioral accounts of human behavior. If deemed appropriate, cognitive approaches should clearly become part of the behavior analytic tradition; if not, they should be dismissed and not included in books on this topic, at least not as theoretical "givens." Unfortunately, Davey and Cullen have produced a book that sometimes is only nominally in the behavior analytic tradition (barring, of course, the useful behavior analytic chapters). Their own biases (particularly Davey's) take some of the wind out of the otherwise strong sails of this book.

Footnotes

[1]Davey, G., & Cullen, C., (Eds.) (1988). Human operant conditioning and behavior modification. Chichester: John Wiley & Sons.

* *

PROCEEDINGS OF THE 1989 EAHB SIG GROUP POSTER SESSION

The SIG's sixth annual group poster session was held at the Association for Behavior Analysis Convention in Milwaukee on May 25 from 9:30 to 11:00 am. Richard DeGrandpre (Auburn University) was chair. Thirty posters were displayed, representing a wide range of research interests within the experimental analysis of human behavior.

Awards for outstanding posters were given for eight presentations:

F. C. Capovilla, & P. N. Hineline
Temple University

Compliance: Effects of Instruction Source (Instructor vs. Non-Instructor), Instruction Format (Comand vs. Advice), and Instruction-Schedule Relations (Correspondence vs. Opposition) Upon Frequency and Magnitude of Instruction Following, Instruction-Disregarding and Instruction Counterreacting on the Part of Undergraduate Students Serving as Subjects

D. T. Cerutti, & P. N. Hineline
Temple University
Effects of Payment on Saying and Doing.

T. S. Critchfield, & M. Perone
West Virginia University
A Procedure for the Experimental Analysis of Verbal Self-Reports.

S. T. Higgins, W. K. Bickel, J. R. Hughes, C. R. Rush, S. Pepper, & M. Lynn
University of Vermont
Effects of Ethanol on Response Sequence Acquisition and Performance with Response Rates Equated in the Two Conditions.

T. G. Mattke, A. M. Wylie, W. S. Woods, L. Tuma, & M. P. Laying
Mankato State University
Signal Detection Analysis of Human Sensitivity to Fixed-Ratio Reinforcement Schedules: Methodological Issues.

R. Michael, & D. J. Bernstein
University of Nebraska
Imitative Acquisition of Equivalence in Children.

D. Polson
University of Victoria
Precurrent Operants: A Beginning Analysis.

K. J. Saunders, R. R. Saunders, & J. E. Spradlin
Bureau of Child Research
The Apparent Facilitation of Classification via Stimulus Naming.

The following posters were among those presented. To encourage correspondence, the name of a contact person is included at the end of each abstract.

SIXTH-TERM CONTROL OF STIMULUS CLASSES

Michael B. Gatch & J. Grayson Osborne
Utah State University

This experiment demonstrates that sixth-term control of hierarchical classes, which would correspond to third-order stimulus-stimulus conditioning, is possible within an operant procedure. The experiment also examines whether equivalence procedures may be used to establish a sixth-term contextual class. Two of three subjects learned the task, and demonstrated symmetrical and transitive responding. One of those two subjects was taught a contextual class, and demonstrated control of the sixth-term relations by the new contextual stimuli. The results support and extend Sidman's (1986) analysis of the hierarchy of stimulus relations involved in contextual control.
CONTACT: J. Grayson Osborn, Department of Psychology, Utah State University, Logan, Utah, 84322-2810.

EFFECTS OF PAYMENT ON SAYING AND DOING.

Daniel T. Cerutti & Philip N. Hineline
Temple University

College students were requested to prevent loss of points by pressing left and right panels on a two-component multiple schedule (with identical Sidman-type schedules whereby presses postponed brief tones), and then to guess about the best way to press. Using multiple-choice questions presented by a computer, guesses about pressing rapidly on the left and slowly on the right (or vice-versa) were shaped with points, and reversals were arranged within a single session. Payment contingencies were manipulated between subjects. In general, payment contingent upon avoidance, or upon avoidance and guessing, produced the greatest correspondence between guessing and pressing, the highest avoidance rates, and the most points per guess. The lowest rates and points per guess were seen when there was no pay, payment at a flat rate, or pay only for guessing.
CONTACT: Daniel T. Cerutti, Ph.D., Institute for Disability Studies, 2221

University Avenue, S.E., Suite 145, Minneapolis, Minnesota 55414.

COMPLIANCE: EFFECTS OF INSTRUCTION SOURCE (INSTRUCTOR VS. NON-INSTRUCTOR), INSTRUCTION FORMAT (COMMAND VS. ADVICE), AND INSTRUCTION-SCHEDULE RELATIONS (CORRESPONDENCE VS. OPPOSITION) UPON FREQUENCY AND MAGNITUDE OF INSTRUCTION FOLLOWING, INSTRUCTION-DISREGARDING AND INSTRUCTION COUNTERREACTING ON THE PART OF UNDERGRADUATE STUDENTS SERVING AS SUBJECTS.

Fernando C. Capovilla &
Philip N. Hineline
Temple University

Students from the experimenter's classes and from other sections of the same course were given a task in which panel-presses could produce points exchangeable for money. The task involved repeated choices between a constant schedule and a progressive-ratio schedule, which produced systematic switching from the latter to the former. During intermissions, videotaped instructions showed either the course instructor or a stranger advising or commanding earlier or later switching. These variables were counterbalanced within subjects and/or across groups. Instructions presented by the instructors were initially followed, but to a decreasing degree across three sessions. The stranger's instructions were only minimally followed, with countercompliance occurring in later sessions. Commands produced greater compliance than advice did, and correspondence between instructions and schedule-changes enhanced subsequent compliance. These various influences on compliance were additive in their effects, with no statistical interactions.
CONTACT: Fernando C. Capovilla, Ph.D., Universidade de Sao Paulo, Instituto de Psicologia, Av. Prof. Mello Moraes, 1721 - CEP 05508, Caixa Postal 66.261 - - Sao Paulo - BRAZIL.

EFFECTS OF ORIENTING INSTRUCTIONS ON HUMAN RESPONDING UNDER MULTIPLE FIXED-INTERVAL, FIXED-RATIO SCHEDULES OF REINFORCEMENT

Richard J. DeGrandpre
Auburn University

Orienting instructions are those that acquaint subjects with the experimental task and apparatus. Although orienting instructions are a common feature of operant research, their behavioral effects have not been extensively investigated. In the present study, each of four groups received a different set of orienting instructions prior to responding on a multiple fixed-interval, fixed-ratio schedule of reinforcement. Instructions affected: a) the variability in response rate across subjects in each group, and b) the subjects' sensitivity to the scheduled contingencies. Although orienting instructions may be required for subjects to contact the experimental contingencies, some orienting instructions influence subjects' sensitivity to the experimental contingencies more than others.
CONTACT: Richard J. DeGrandpre, Department of Psychology, Auburn University, Auburn, Alabama 36849-5214.

THE APPARENT FACILITATION OF CLASSIFICATION VIA STIMULUS NAMING

Kathryn J. Saunders, Richard R. Saunders, & Joseph E. Spradlin
Bureau of Child Research

Ten mildly retarded subjects learned several two-choice conditional discriminations that had the same comparison stimuli. Instructions for the first conditional discrimination were of the form: "When the (sample name) comes up, press the button under

the (comparison name)." Nine subjects demonstrated emergent equivalence relations among the sample stimuli, showing classification. Of four additional subjects not receiving instructions, three did not demonstrate emergent equivalence relations. Then, two of the latter subjects learned new sets of conditional discriminations with instructions and demonstrated equivalence relations in either the first or second set presented, and then in sets presented subsequently without instructions.
CONTACT: Kathryn J. Saunders, Bureau of Child Research, University of Kansas, P. O. Box 738, Parsons, Kansas 67357.

IMITATIVE ACQUISITION OF EQUIVALENCE IN CHILDREN

Renee Michael & Daniel J. Bernstein

The current study examined the effects of a history of imitation on matching-to-sample performance and on sensitivity to changes in matching-to-sample contingencies. Pre-school children learned an arbitrary matching-to-sample task by watching a model demonstrate correct matches. Once each child learned four equivalence classes, some of the matching-to-sample contingencies were changed to see how quickly performance adapted to the new stimulus relations. The results of a previous study investigating differences between rule-governed and shaped behavior suggested a difference in sensitivity to changes in contingencies depending upon the type of learning history. Imitation produced performance resembling that of the instructed children. Children given instructions or a model for behavior took slightly longer to figure out the new rules than did those children whose performance was shaped but all subjects reached criterion levels on the new contingencies. A rule-governed or imitative history may delay adaptation, but in this context it did not completely block a change in behavior.
CONTACT: Renee Michael, Department of Nebraska-Lincoln, University of Nebraska-Lincoln, 209 Burnett Hall, Lincoln, Nebraska 68588-0308.

CHOICE IN A SELF-CONTROL PARADIGM WITH HUMANS: INDIVIDUAL DIFFERENCES WHEN FOOD IS THE REINFORCER

L. J. Bonvino, J. R. King,
& A. W. Logue
State University of New York
- Stony Brook

Self-control can be defined as the choice of a larger, more delayed reinforcer over a smaller, less delayed reinforcer. This study explores some possible sources of individual variation found in the choice behaviors exhibited in the self-control paradigm through the correlation of these behaviors with measures of various subject characteristics. This study was conducted with food- and water-deprived humans using juice as the reinforcer. The results suggest that, among males, overall intellectual ability as measured by the SAT is related to self-control, and that dieters (those showing a great deal of eating restraint) may be less likely to demonstrate self-control than nondieters.
CONTACT: Lori-Ann Bonvino, Department of Psychology, SUNY at Stony Brook, Stony Brook, New York 11794-2500.

CHOICE IN A SELF-CONTROL PARADIGM WITH HUMAN SUBJECTS: EFFECTS OF INTERRUPTION PROBABILITY AND INTERRUPTION DURATION

George R. King & A. W. Logue
State University of New York
at Stony Brook

Three experiments examined humans' choice behavior as a function of interruption (i.e., blackout) probability and interruption duration. Subjects chose between schedules varying in terms of amount and delay of reinforcement. The reinforcer was points exchangeable for money. In some conditions the interruptions affected reinforcement rate, but in others they did not. In all experiments the subjects' behavior was consistent with a maximization strategy. Interruptions seem to have an effect by changing relative reinforcement rate, and thereby changing the optimal strategy.
CONTACT: A. W. Logue, Department of Psychology, State University of New York at Stony Brook, Stony Brook, New York 11794-2500.

PRECURRENT OPERANTS: A BEGINNING ANALYSIS

David A. D. Polson
University of Victoria

This study examined the development and maintenance of a precurrent operant, which can briefly be defined as an operant that indirectly affects the environment through another operant. Two undergraduates served as subjects. During Baseline, subjects were run under CONC RR (current response) EXT (precurrent response), and precurrent responding quickly dropped to near zero levels while current responding occurred at a high constant rate. During Induction, a precurrent response functioned to increase the reinforcement probability for current responding for a short period of time. Only when this effect was large and immediate did the precurrent response rate significantly increase over Baseline levels. During Maintenance, precurrent responding was maintained with parameters that were previously ineffective in raising the precurrent response rate during Induction. For S1, a return to Baseline resulted in a decrease in the precurrent response rate, and a subsequent return to Maintenance parameters produced an elevated but unstable rate of precurrent responding. For S2, imposing COD reduced the precurrent response rate, and this COD effect was reversed with a change back to Maintenance parameters. Throughout the course of the experiment, current response rate remained relatively stable.
CONTACT: David Polson, Department of Psychology, University of Victoria, Victoria, BC, CANADA V8W 2Y2.

CONDITIONED REINFORCEMENT BY "HISTORY-LADEN" VS. ARBITRARY VERBAL STIMULI

Barbara J. Kaminski & Michael Perone
West Virginia University

An observing response procedure was used to investigate the reinforcing properties of verbal stimuli correlated with the absence of reinforcement. College students produced monetary reinforcement according to a compound schedule, with variable-interval (VI) and extinction (EXT) components. The students first were given multiple schedule training using one of two sets of verbal stimuli. The "history-laden" stimuli were descriptions of the stimulus-reinforcer relations. The other stimuli were letters of the alphabet, and thus bore an arbitrary relation to the reinforcement conditions. Following multiple schedule training, the reinforcing properties of the stimulus correlated with extinction were assessed. Two observing keys were made available that

produced, according to independent VI 20-s schedules, either the stimulus correlated with EXT or a stimulus uncorrelated with the schedule component. When the stimuli were descriptions of the stimulus-reinforcer relations, some students preferred the uncorrelated stimulus, while others preferred the stimulus correlated with EXT. When the stimuli bore an arbitrary relation to reinforcement, all students preferred the stimulus correlated with EXT. These results support previous findings that human subjects will respond to produce a stimulus correlated with EXT, and they present a challenge to current theories of conditioned reinforcement.
CONTACT: Barbara J. Kaminski or Michael Perone, Department of Psychology, P. O. Box 6040, West Virginia University, Morgantown, West Virginia 26506-6040.

A PROCEDURE FOR THE LABORATORY ANALYSIS OF VERBAL SELF-REPORTS

Thomas S. Critchfield & Michael Perone
West Virginia University

The poster describes a procedure for the analysis of verbal self-reports as the behavioral component of a three-term operant contingency. An important antecedent event (the reported behavior) occurs when subjects perform a delayed matching to sample (DMTS) task under a conjunctive (accuracy plus speed) contingency of monetary reinforcement. The self-reporting response occurs prior to or in lieu of experimenter-provided feedback about consequences of the DMTS response, and consists of a yes-no button press response to a computer-displayed query. A report is required to advance the session but may also produce differential consequences. Finally, both the consequences for DMTS responding and the content of feedback describing those consequences can be manipulated. Preliminary data, collected in the absence of differential consequences for reporting, show orderly relations between reports and their behavioral antecedents and suggest that the procedure may be useful in extending an operant analysis of verbal self-reports.
CONTACT: Thomas S. Critchfield, Behavioral Pharmacology Research Unit, Psychiatry D-5-West, John Hopkins/ FSKMC, 4940 Eastern Avenue, Baltimore, Maryland 21224.

SIGNAL DETECTION ANALYSIS OF HUMAN SENSITIVITY TO FIXED-RATIO REINFORCEMENT SCHEDULES: METHODOLOGICAL ISSUES

Thomas G. Mattke, A. Michael Wylie, Williams S. Woods, Lisa Tuma, & Michael P. Layng
Mankato State University

This report extends the investigators' earlier research examining human schedule sensitivity using the explicit discrimination measures of sensitivity suggested by signal detection theory (Wylie, Mattke, Tuma, Woods, & Layng, 1988). A randomly alternating mixed fixed-ratio fixed-ratio schedule of reinforcement, one component of which was designated the "signal" schedule, was presented on the center key of a three-key apparatus. Experimental conditions were defined by the parameter of the second fixed-ratio. After subjects completed the fixed-ratio requirement, they "reported" the presence or absence of the signal via a response on one of the remaining two keys. When ratio requirements were disparate between the two alternating FR schedules, subject sensitivity, defined by accuracy of discrimination, was high. Sensitivity decreased when the disparity between FRs decreased, yet sensitive performance was observed even under similar mixed fixed-ratio conditions. The present research agrees with the

that humans may be sensitive to schedules of reinforcement even when the requirements of a particular FR schedule are only subtly different from the requirements of a second FR schedule. A number of procedural refinements in the present research, including the use of probes and a rapidly alternating experimental design, permit a clear demonstration of this finding.
CONTACT: Thomas G. Mattke, Department of Psychology, Box 35, Mankato State University, Mankato, MN 56001.

SIGNAL DETECTION ANALYSIS OF HUMAN SENSITIVITY TO VARIABLE-RATIO REINFORCEMENT SCHEDULES: EFFECTS OF VARYING SIGNAL STRENGTH

William S. Woods, A. Michael Wylie, Thomas G. Mattke, Lisa Tuma, & Michael P. Layng

Human schedule sensitivity was investigated using the explicit discrimination measures of sensitivity suggested by the theory of signal detection. A randomly alternating mixed variable-ratio variable-ratio schedule of reinforcement, the larger VR component designated the "signal" schedule, was presented on the center key of a three-key apparatus. After subjects completed the variable-ratio requirement, they "reported" the presence or absence of the signal schedule via a response on one of the remaining two keys. When ratio requirements were disparate between the two alternating VR schedules subject sensitivity, defined by accuracy of discrimination, was high. Sensitivity decreased when the disparity between VRs decreased. No systematic response bias effects were seen in four of the five subjects. The present research suggests that humans are sensitive to reinforcement contingencies even when similar response patterns are required and ambiguous stimulus conditions present.
CONTACT: Thomas G. Mattke, Department of Psychology, Box 35, Mankato State University, Mankato, MN 56001.

SIGNAL DETECTION ANALYSIS OF HUMAN SENSITIVITY TO VARIABLE-RATIO REINFORCEMENT SCHEDULES: RESPONSE BIAS EFFECTS OF MANIPULATING A PRIORI PROBABILITY OF SCHEDULE PRESENTATION

Lisa Tuma, A. Michael Wylie, Thomas G. Mattke, William S. Woods, & Michael P. Layng

Human schedule sensitivity was investigated using the explicit discrimination measures of response bias and sensitivity suggested by the theory of signal detection. A randomly alternating mixed variable-ratio 45 variable-ratio 25 schedule of reinforcement, the larger component of which was designated as the "signal" schedule, was presented on the center key of a three-key apparatus. After subjects completed the variable-ratio requirement, they "reported" the presence or absence of the signal schedule via a response on one of the remaining two keys. When schedule probability was manipulated, systematic changes were observed in nonparametric response bias measures but not in sensitivity measures in all five subjects. The present research suggests that response bias develops in human subjects when the probability of schedule presentation is manipulated.
CONTACT: Thomas G. Mattke, Department of Psychology, Box 35, Mankato State University, Mankato, MN 56001.

IS OVERT RESPONDING NECESSARY TO FORM EQUIVALENCE CLASSES?

Cathy L. Watkins, Clyde W. Hodge, & James M. Johnston
Auburn University

Three subjects were first exposed to a condition in which arbitrary stimuli were presented on a computer screen in

a simultaneous matching-to-sample format. No overt response was required and no programmed reinforcers were delivered. All subjects responded with 100% accuracy on 40 test trials indicating the formation of two three-member stimulus equivalence classes. Response latency decreased as a function of test trials. These results suggest that equivalence relations may emerge in the absence of overt responding during training in verbally sophisticated subjects.
CONTACT: Cathy L. Watkins, Educational Foundations, Leadership and Technology, HC 2084, Auburn University, Auburn, Alabama 36849-5214.

DISCRETE-TRIAL CHOICE OF SOCIAL INTERACTION VERSUS MONETARY REINFORCEMENT: EFFECTS OF SECOBARBITAL

S. T. Higgins, W. K. Bickel, J. R. Hughes, & I. Benedict
University of Vermont-Burlington

Two mutually exclusive options were concurrently available to four volunteers during 60-min experimental sessions. Subjects made exclusive choices every 3-min between conversing with another same-sex volunteer and providing speech monologues maintained by monetary reinforcement. Secobarbital (100 & 200 mg/70 kg) increased choice of social over monetary reinforcement, and increased social conversation. These results suggest that secobarbital can increase the relative reinforcing effects of social interaction, which is consistent with effects observed with d-amphetamine and ethanol in prior studies.
CONTACT: Stephen Higgins, Department of Psychiatry - UHC, 1 S. Prospect Street, University of Vermont, Burlington, Vermont 05401.

COMPARABLE RATES OF RESPONDING AND REINFORCEMENT DO NOT ELIMINATE THE DIFFERENTIAL EFFECTS OF ETHANOL ON RESPONSE CHAIN ACQUISITION AND PERFORMANCE

S. T. Higgins, W. K. Bickel, C. R. Rush, J. R Hughes, S. Pepper, & M. Lynn
University of Vermont-Burlington

Ethanol and other drugs commonly disrupt responding under repeated acquisition and performance baselines, with responding in the former condition being more sensitive to such disruption than the latter. The present study was conducted to determine whether differential drug effects would occur when baseline rates of responding were comparable in the two baseline conditions. The acute effects of ethanol (0, 0.4 and 0.8g/kg) were examined in healthy adult volunteers responding under a multiple schedule of repeated acquisition and performance of 10-response sequences. A 1-sec delay occurred after each response to keep rates of responding comparable in the acquisition and performance conditions. This delay also reduced differences in reinforcement rates between the two components. Nevertheless, responding in the acquisition condition was still more sensitive to the disruptive effects of ethanol than responding in the performance component. This differential sensitivity to ethanol was most evident in measures of accuracy of responding (e.g., percent errors). These findings suggest that differences in overall rates of responding in the repeated acquisition and performance conditions contributes little, if anything, to the differential drug effects observed on those baselines.
CONTACT: Stephen Higgins, Department of Psychiatry - UHC, 1 S. Prospect Street, University of Vermont, Burlington, Vermont 05401.

EFFECTS OF TRIAZOLAM ON THE ACQUISITION OF RESPONSE SEQUENCES IN HUMANS

C. R. Rush, S. T. Higgins, W. K. Bickel, & J. R. Hughes
University of Vermont - Burlington

Temporal delays have previously been shown to modulate the behavioral effects of benzodiazepines in nonhumans and humans. The present experiment used a modified version of the repeated-acquisition procedure to test whether the effects of triazolam (0, 0.375 and 0.75 mg/70kg) on the acquisition of response chains would be modulated via the presence of a temporal delay (5 seconds) in four healthy, adult volunteers. Overall percent errors and quarter life increased as an orderly function of dose in both the no-delay and delay conditions. Triazolam decreased rates of responding as an orderly function of dose in both conditions. Subject ratings of drug strength were comparable in both conditions. Thus, in the present experimental paradigm, the addition of a brief temporal delay failed to modulate the effects of triazolam on human operant behavior. Future studies will evaluate the effects of temporal delays on drug effects in the repeated-acquisition procedure using longer delays and a multiple schedule of delay and non-delay conditions.

CONTACT: Stephen Higgins, Department of Psychology - UHC, 1 S. Prospect Street, University of Vermont, Burlington, Vermont 05401.

VARIABLES INFLUENCING LOSS OF STIMULUS EQUIVALENCE

C. Pilgrim, D. R. Barnes, C. R. Kenney & M. Galizio
University of North Carolina at Wilmington

Few experiments have analyzed the maintenance, loss, or modification of equivalence relations after they have emerged. In a single subject design with four college student subjects, a series of manipulations were made in baseline conditional discriminations following the emergence of two three-member equivalence classes (A1B1C1, A2B2C2). AC relations were either reversed (i.e., C2 was reinforced when A1 was the sample and C1 was reinforced when A2 was the sample), or arranged randomly (i.e., C1 and C2 were reinforced equally often in the presence of A1 and A2). In a third condition, a complete reversal (i.e., AB and AC relations) of the original discriminations was arranged. Results showed that baseline conditional discrimination performances were sensitive to changes in the contingencies under all the conditions. A surprising finding was that performances on transitivity probes remained consistent with the initial equivalence class, despite changes in baseline responding. Performances on symmetry trials were somewhat more likely to vary with baseline responding, although even this effect was not consistent across subjects. Because conditional discriminations are thought to be the determinants of equivalence class performance, a significant feature of the present results was the striking contrast between probe and baseline performances when new conditions were introduced.

Contact: Carol Pilgrim, Department of Psychology, UNCW, Wilmington, North Carolina 28403.

* * * * * * * * * * *

PATRONS OF THE EAHB SIG

The following SIG members added a contribution to their 1989 dues. Their support is greatly appreciated.

Baer, D. M.
Barnes, T. C.
Baron, A.
Barrett, B. H.
Bernstein, D. J.
Bihm, E. M.
Bjarnadottir, G. S.
Bonvino, L. J.
Brown, B. L.
Catania, A. C.
Coleman, D. A.
Critchfield, T. S.
Day, H.
Deitz, S.
DeMey, H.
Donahoe, J. W.
Dougher, M. J.
Dube, W. V.
Etzel, B. C.
Fedorko, S.
Flora, S. R.
Fujita, T.
Galizio, M.
Glenn, S. S.
Guerin, B.
Hackenberg, T.
Hastjaro, T.
Hatten, J. L.
Hatten, A. D.
Hayes, L. J.
Hemmes, N. S.
Higgins, S. T.
Hineline, P. N.
Holland, J. G.
Hughes, J.**
Hyten, C.
Johnston, J. M.
Joyce, J. H.
Kaminski, B. J.
Kelly, T. H.
Lattal, K. A.
LeBlanc, J. M.
Lee, V. L.
Lewis, P.
Lipkens, R.
Logeman, P.
Logue, A. W.
Lowe, C. F.
Lowenkron, B.
Matthys, W.
McIlvane, W. J.**
Metzger, B.
Morris, E. K.
O'Neill, R.
Oliveira-castro, J. M.
Osborne, J. G.
Parsons, H. M.
Peden, B. F.
Perone, M.
Pilgrim, C.
Poling, A.
Polson, D.
Robb, W.
Rossi, M. J.
Samson, H. H.
Saunders, K.
Sidman, M.
Skinner, B. F.**
Spiga, R.
Starin, S.
Stoddard, L.
Sulzer-Azaroff, B.
Terrell, D. J.
Thomas, B.
Wanchisen, B.
Williams, D. C.
Wraikat, R. M.
Wylie, A. M.
Zettle, R. D.

**Exceptional contributions are gratefully acknowledged

* * * * * * * * * * * * * * * * *

Special thanks to **John T. Williams**, Chairman of Psychology and **Daniel B. Plyler**, Dean of Arts and Sciences at **University of North Carolina at Wilmington** for providing funds that made this special issue possible.

ABOUT THE EAHB SIG

The Experimental Analysis of Human Behavior Special Interest Group (EAHB SIG) consists of over 100 members of the Association for Behavior Analysis (ABA). The group is organized to facilitate the growth of a multi-faceted experimental literature using human subjects to analyze the relations between behavior and the variables influencing it. The EAHB Bulletin serves the SIG by disseminating information that customarily is not published in the archival journals of behavior analysis.

CONTRIBUTORS are encouraged to submit materials such as articles about EAHB as a specialty area; research notes, e.g., information about specific procedures, anomalous findings, etc.; annotated bibliographies; research profiles; convention and conference notices; course materials; and job announcements and other news of interest to SIG members (see recent issues for examples). Submissions should be sent to the EAHB Bulletin at the address given below.

NEW MEMBERS may join the EAHB SIG by completing the membership form and sending it, along with a check for dues (see below), to the Bulletin.

CONTINUING MEMBERS may renew their membership for 1990 by sending their name and a check for dues (see below) to the Bulletin. Please write "Renewal" in the memo section of your check. Send the membership form only if you wish to report a change of address or interests.

DUES for 1990 are $6 U.S. funds. Despite rising costs, the SIG has been able to hold dues at a low level because (a) administrative costs have been subsidized by UNC-Wilmington, and (b) most of our members have generously added a voluntary contribution of $2 or more to their dues. Unless this support continues, the SIG may have to cut back on its activities. If you can afford an extra $2, please send it--the SIG will put it to good use in promoting the experimental analysis of human behavior.

ADDRESS all correspondence to: EAHB Bulletin, Department of Psychology, University of North Carolina at Wilmington, 601 South College Road, Wilmington, North Carolina 28403-3297.

Circle one: New Member New Address New Interests

Amount enclosed (U.S. funds, payable to EAHB SIG): $6 $8 $10 $12 $____

Name _____

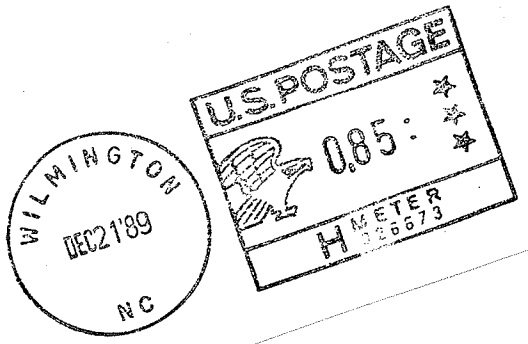
Department/Institution _____

Box or Street _____

City _____ State _____ Zip _____

Phone ( ) _____ Interests _____

EAHB SIG
Department of Psychology
University of North Carolina
at Wilmington
601 South College Road
Wilmington, North Carolina 28403-3297



Cloyd Hyten
Center for Behavioral Studies
University of North Texas
P. O. Box 13438
Denton TX 76203