

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. Publication costs are paid by the dues of the SIG members and by the Parsons Research Center of the University of Kansas.

Editors: John Crosbie, West Virginia University
Dean C. Williams, University of Kansas, Parsons Research Center

Student Paper Competition Coordinator: Michael Markham, Florida International University

Editorial Assistant: Pat White

Board of Editors:

Dermot Barnes, University College Cork (1998)
William Buskist, Auburn University (1998)
Philip Chase, West Virginia University (1996)
William Dube, E. K. Shriver Center (1996)
Timothy Hackenberg, University of Florida (1998)
Cloyd Hyten, University of North Texas (1998)
Michael Markham, Florida International University (1998)
William McIlvane, E. K. Shriver Center (1996)
Michael Perone, West Virginia University (1996)
Carol Pilgrim, University of NC/Wilmington (1996)
Mark Galizio, University of NC/Wilmington (1996)
Kathryn Saunders, University of Kansas (1996)
Richard Serna, E. K. Shriver Center (1998)

(Appointments end with the Fall issue in the year shown in parentheses.)

Student Reviewer:

Jennifer O'Donnell, West Virginia University

Guidelines for Submissions

Please send three copies of brief reports and one copy of other materials. In addition, send one clearly labeled reproduction quality copy of each figure or table. For general information on preparing materials for publication in the *Bulletin*, we encourage authors to consult the author guidelines in the January issue of the *Journal of the Experimental Analysis of Behavior*. If possible, send text and figures of final versions on disk.

Brief Reports and Technical Information should be no longer than 2,000 words. They can be written in APA style (without an abstract) or in summary form. Please prepare figures and tables to fit the column or page width of the *Bulletin*. Incorporate information typically included in figure captions in the text.

Research in Progress may be up to 1,000 words long.

Laboratory Descriptions (as in Spring, 1990, 1991, and 1993 issues) may be up to 2,000 words long (including publication list).

EAHB SIG members have a standing invitation to submit *Abstracts* from posters and presentations given at conferences. Abstracts should be 200 words or less. Please include, on the same page as the abstract, the name and address of a contact person and a full citation for the presentation.

Please submit brief reports, technical information, and laboratory descriptions to John Crosbie, Department of Psychology, West Virginia University, P.O. Box 6040, Morgantown, WV 26506-6040; submit research in progress, abstracts, and news to Dean Williams (Parsons Research Center, P.O. Box 738, Parsons, KS 67357).

Submit brief reports and technical information by February 15 and all other materials by March 15 for the Spring 1997 issue.

1997 OUTSTANDING GRADUATE STUDENT PAPER AWARDS

The EAHB-SIG congratulates the recipients of Outstanding Paper Awards in its 13th Annual Student Paper Competition. The competition solicited student submissions addressing any topic relevant to the experimental analysis of human behavior. Established members of the SIG and selected guest experts served as peer reviewers on the manuscripts. On the basis of reviewer recommendations, this year's winners, and the titles of their papers are:

Mark D. Johnston, University of Kansas, An Investigation of Proactive Interference in Individuals with Developmental Disabilities. (Dr. Kathryn J. Saunders and Dr. Dean C. Williams, sponsors)

Jennifer O'Donnell, West Virginia University, Indirect Effects of Response-Cost Punishment with Humans: Punishment Contrast. (Dr. John Crosbie, sponsor)

Jerry A. Rea, University of Kansas, An Analysis of Four Sex Offenders' Sexual Arousal in the Natural Environment Through the Use of a Portable Penile Plethysmograph. (Dr. Joseph E. Spradlin and Dr. Kathryn J. Saunders, sponsors)

Ruth A. Rehfeldt, University of Nevada, Transferring Discriminative Control over Temporally Differentiated Responding Through Equivalence Classes. (Dr. Linda J. Hayes, sponsor)

The winners will be honored at an awards symposium at the 1997 ABA Convention in Chicago where they have been invited to present a summary of their work. Watch the Spring edition of the Bulletin for summaries of the winning papers. For information about the 1997-1998 competition (submission deadline: September 19, 1997), write: Dr. Michael Markham, Department of Psychology, Florida International University, University Park, Miami, FL 33199, Telephone 305-348-1230.

Thanks to the competition coordinators, Barbara Kaminski and Michael Markham, and the reviewers for this year's competition:

Alan Baron
Bill Buskist
David Case
Mark Galizio
Ted Hoch

Scott Lane
Gregory Madden
Michael Markham
William McIlvane
Carol Pilgrim

Roger Poppen
Howard Rachlin
Michael Schlund
Joseph Spradlin
Robert Zettle

Dr. SIG would like to join the membership in thanking **Barb Kaminski** and **Tom Critchfield** for their years of service to the SIG. Both Barb and Tom have served beyond the call of duty in both quality and quantity (Barb served 4 years as Dr. SIG's Student Paper Competition Coordinator, and Tom served 3 years as one of Dr. SIG's Co-chairs/Co-editors—Tom also does our home page). Our new horses are John Crosbie as Co-chair/Co-editor and Michael Markham as Student Paper Competition Coordinator. Thanks Barb and Tom. Good Luck John and Mike. Special thanks also go to **Pat White** who saved the SIG by producing this issue of the Bulletin entirely in-house. We would also like to thank Susan Jack, Mark Johnston, and Michael Mueller for help with this issue.

BRIEF REPORTS

ESTABLISHING A GO-LEFT/GO-RIGHT AUDITORY DISCRIMINATION BASELINE IN AN INDIVIDUAL WITH SEVERE MENTAL RETARDATION

RICHARD W. SERNA, JULIA A. JEFFERY, & LAWRENCE T. STODDARD
E. K. SHRIVER CENTER AND NORTHEASTERN UNIVERSITY

This paper presents a case study in auditory discrimination learning in an individual with developmental disabilities. The study is part of our larger research effort to define variables that influence acquisition of listening skills in this population (e.g., Dube, Green, & Serna, 1993; Serna, Stoddard, & McIlvane, 1992; Soraci, Stoddard, Serna, McIlvane, & Carlin, 1994; Stoddard & McIlvane, 1989). In this paper, we detail procedures used to capitalize on the participant's pre-experimental behavioral repertoire to establish experimental differential auditory stimulus control. The procedures are based on methods of *stimulus-control shaping*.

Stimulus-control shaping is a generic term for a number of conceptually related methods that establish new discriminations through gradual stimulus changes in existing discriminations (McIlvane & Dube, 1992). The net result of these techniques is a *transfer of stimulus control* from current discriminative stimuli to new stimuli. In practice, the initial discrimination is typically one that already exists or is easily acquired, and the new discrimination is a more difficult one that would not be acquired without the transfer procedure. Early work by Sidman and Stoddard (1966, 1967), Touchette (1968), and others brought these methods to bear on the learning problems of individuals with developmental disabilities like mental retardation.

This research received support from the National Institute of Child Health and Human Development (Grant HD 27703). We gratefully acknowledge Fay Iennaco, Alison McVay, Susan Stanford, Paul Filkins, and Aimee Smith for their assistance with data collection, and two *EAHB* reviewers for comments on earlier versions of the manuscript. Address correspondence to Richard W. Serna, Behavioral Sciences Division, Eunice Kennedy Shriver Center, 200 Trapelo Road, Waltham, MA, 02254 (E-Mail: rserna@shriver.org).

The present case study illustrates novel stimulus-control shaping procedures with an individual who showed particular difficulty acquiring differential auditory stimulus control. Among the more interesting aspects of the procedures were (a) the transformation of a tabletop matching-to-sample task to matching on the computer, and (b) transfer of control by an auditory-visual discrimination to an auditory-position discrimination. Below, we first describe our participant. Then we summarize our participant's experimental history and the problems that led to the questions posed in the present study.

Background. The participant, referred to as MBS, was a 14-year-old male with autism and severe mental retardation. MBS attended an area residential school for individuals with developmental disabilities, where he was taught various rudimentary prevocational and language skills. He was able to speak and sign a few words, many of which were related to food items or restaurants he liked. His age-equivalent scores on the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981) and the Gardner Expressive One-Word Picture Vocabulary Test (Gardner, 1990) were 1-11 and 2-0, respectively. School records indicated that no basal or standard score were achieved with the Stanford-Binet. No particular problems with hearing had been noted.

Prior to the current study, we were unable to teach MBS differential control by spoken words, such as *Touch* and *Wait*, in the context of a Go/No-Go task (e.g., D'Amato & Colombo, 1985). Our Go/No-Go task required participants to touch anywhere on a gray touch-sensitive computer screen (cf. Dube & McIlvane, 1989) in the presence of a spoken, digitized S+ word, and refrain from touching in the presence of a different S- word. The majority of errors were responses to the S- word.

MBS's propensity to respond to S- words prompted us to change the task from Go/No-Go to a Go-Left/Go-Right auditory discrimination (e.g., D'Amato & Worsham, 1974), in which a response is required on every trial. In our protocol, a participant

is presented with two identical white oval "keys" on the computer screen, centered flush left and right. The reinforcement contingencies specify a response to the left key in the presence of one word and to the right key in the presence of a different word. Generally, the task is taught as follows: During the initial sessions, each word is presented repeatedly in separate blocks of many trials, with only the correct key visible on the first trial of each block. As training progresses, the size of the blocks decreases, and the frequency with which the blocks alternate increases (cf. Saunders & Spradlin, 1989, 1990). When a participant demonstrates criterion performance at alternating blocks of five trials, the single-key prompt is removed. Eventually, "left" and "right" auditory stimuli are presented unsystematically.

For MBS, the procedure was not successful, even with auditory stimuli he could imitate and sign, such as *Chip, Cracker, M & M, Goldfish*. When the single-key prompt was eliminated, his tendency was to make an error only on the first trial of every block (see Table 1). The contingencies of the procedure had apparently allowed MBS to develop an *error-and-switch* pattern of responding that was efficient enough to obtain most of the reinforcers, but was not likely to have had any basis in auditory stimulus control. A number of attempts to break this pattern were unsuccessful.

Experimental questions. Part of MBS's nonexperimental behavioral repertoire included vocally naming and making manual sign equivalents in response to a few food items. To follow a strategy of capitalizing on any extant stimulus control in a low-functioning individual's repertoire (e.g., Etzel, & LeBlanc, 1979; Schreibman, 1975; Stoddard, 1982), we asked the following: Could we use MBS's existing auditory-visual relations to teach the Go-Left/Go-Right auditory discrimination baseline? Specifically, if MBS could say and sign the names of some actual foods, could photographs of the foods be used to prompt correct Go-Left/Go-Right auditory discrimination performance? Also, we asked whether Left/Right performance would be maintained if the photo prompts were removed (original criterion task).

METHOD AND RESULTS

Overview. The auditory stimuli were the spoken names *Cookie* and *Orange*. An assessment showed that MBS demonstrated the error-and-switch pattern with these stimuli during four sessions of a Go-Left/Go-Right auditory-only discrimination baseline (see Table 1, *Baseline*). Nevertheless, when presented with the actual food items in a separate test, MBS could

name and sign them. Therefore, based on his existing skills with these stimuli, we introduced procedures designed to (a) establish a tabletop left/right auditory-visual discrimination (LR-AV) in which a color photograph of a cookie was always presented on the left, and a photo of an orange slice was always presented on the right; (b) transfer LR-AV performance from tabletop photos to line drawings presented on the computer; and (c) fade out the intensity of the line drawings until the final criterion task involved only the dictated food names and the left and right response keys.

Pretests and LR-AV training. Brief pretests showed that MBS made manual signs for cookie and orange when presented with individual photographs of a piece of cookie and a slice of orange, but he was unable to select the correct photos in response to spoken samples. We then asked whether MBS would readily acquire the LR-AV task during training. Trials proceeded as follows: The experimenter dictated one of the two food words at random. MBS was required to "imitate" (sign) the dictated word. The experimenter then removed a shield revealing the photos (cookie, left; orange, right), placed flat over food wells on the table. If MBS selected the photo corresponding to the dictated, he was allowed to take the corresponding food from the well. MBS acquired this performance immediately: Across three sessions with 20 trials or more, MBS was correct 98% of the trials (see Table 1, *Training*).

Transfer A: Tabletop LR-AV to Computer LR-AV (Phases 1-6). The primary goal of these phases was to transfer LR-AV performance from tabletop to the computer by gradually introducing critical elements of the LR-AV computer task with succeeding phases. Table 1 shows the defining characteristics, the number of sessions, and the mean percent correct for each phase. Phase 1 consisted of LR-AV performance: 40-trial sessions, photos mounted 20 cm apart on a rectangular board presented flat on the table (horizontal plane), experimenter-spoken words, and no signing requirement. In this and all other phases, correct responses were reinforced with the corresponding food, presented adjacent to either the left or right response positions. In the next two phases, critical elements of the LR-AV computer task were introduced. For example, in Phase 2, the board on which the photo comparisons were mounted was presented on a vertical plane perpendicular to the table; in Phase 3, the spoken words were digitized and presented via an external speaker attached to a computer. In an attempt to ensure stimulus control

Table 1

Characteristics, Sessions, and Results of all Study Phases

Phase	Auditory stimuli	Differential response?	Comparisons	Comparison position; presentation	Apparatus	Number of sessions	Mean % correct
<i>Baseline</i> LR aud-only; blocks	digitized	yes	<i>blank keys</i>	vertical; white circles	computer	4	25% ^a
<i>Training</i> LR-AV	spoken	yes	photos	horizontal; cards over food wells	tabletop	3	98%
<i>Transfer A</i>							
1.	spoken	no	photos	horizontal; rectangular board	tabletop	8	97%
2.	spoken	no	photos	vertical; rectangular board	tabletop	3	98%
3.	digitized	no	photos	vertical; rectangular board	tabletop	14	99%
4.	digitized	no	photos	vertical; Mac-sized board	tabletop	1	98%
5.	digitized	no	line drawings	vertical; Mac-sized board	tabletop	1	100%
6.	digitized	no	line drawings	vertical	computer	2	100%
<i>Transfer B</i>							
7.	digitized	no	line drawings faded out	vertical	computer	8	98%
<i>Maintenance</i> LR aud-only	digitized	no	<i>blank keys</i>	vertical	computer	5	99%

^apercent correct calculated for first trial of each block only

by the photos and their left/right position, 14 overtraining sessions of Phase 3 were programmed. In Phase 4, comparisons were mounted on a board the same size as the computer. In Phase 5, the photographs were replaced with iconic line drawing representations of cookie and orange, each centered on a white circle; the circles appeared flush left and right on the board. In Phase 6, MBS was introduced to the LR-AV task entirely on computer; the line drawings were identical to those in Phase 5. MBS maintained highly accurate performance throughout all six Transfer A phases (see Table 1).

Transfer B: Fading out the visual stimuli (Phase 7). To fade the line drawings, their intensity on both the left and right keys was reduced gradually across blocks of trials in a session, until they were at 0% intensity and only the white circles remained (final performance). Stimuli were made less intense by turning off evenly distributed percentages of the pixels that comprised the graphics (McIlvane, Dube, Kledaras, Iennaco, & Stoddard, 1990). The intensity steps were programmed such that errors resulted in a return to the previous step. The programmed fading steps were themselves faded out across the eight

% of Full Intensity	Session							
	#1	#2	#3	#4	#5	#6	#7	#8
100%	4							
88%	4							
75%	4							
63%	4							
50%	4	4	4					
38%	4	4	4					
25%	4	4	4	4				
13%	4	4	4	4	4			
6%		4	8	8	4	8	8	2
0%	5	36	20	18	28	32	32	38
	trials per block							

Figure 1

sessions (Dube, Iennaco, Rocco, Kledaras, & McIlvane, 1992), as shown in Figure 1; each succeeding session contained fewer programmed steps, and/or fewer trials per step. Throughout the Phase 7 sessions, MBS maintained high accuracy on both fading and final performance trials, as shown in Figure 2.

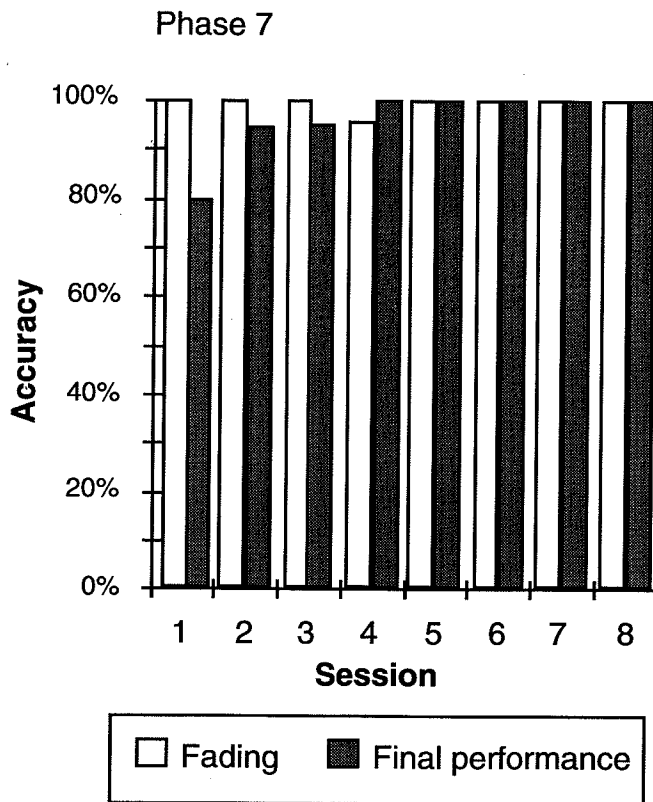


Figure 2

Maintenance. MBS received five sessions in which the session began with final performance. He made only three errors in a total of 200 trials.

DISCUSSION

Prior to the beginning of the present study, MBS, an individual with autism and severe mental retardation, showed no experimental evidence of differential auditory control, despite extensive training with both auditory Go/No-Go, and Go-Left/Go-Right procedures. However, during the present study, MBS readily acquired Go-Left/Go-Right performance when photo prompts were displayed; thus, he demonstrated differential auditory stimulus control in the context of auditory-visual matching-to-sample task. Next, the discrimination was transferred from tabletop photos to computer line drawings. Finally, the visual prompts were successfully faded out to produce the Go-Left/Go-Right auditory-only performance.

The present demonstration of stimulus control transfer contributes to a growing body of literature in which stimulus control shaping procedures are used in the context of, or to achieve, conditional discriminations (e.g., Dube, Iennaco, & McIlvane, 1993; McIlvane, Withstandley, & Stoddard, 1984; Schilmoeller, Schilmoeller, Etzel, & LeBlanc, 1979; Soraci et al., 1994; Zygmunt, Lazar, Dube, & McIlvane, 1992). Some procedures (e.g., Dube et al., 1993) were designed to transform existing or readily acquired simple discrimination performance into conditional discrimination performance. Others, such as Zygmunt et al. (1992) and the present study, began with one type of conditional discrimination performance (identity matching) and transformed it into another (arbitrary matching).

For MBS, the conditional-to-conditional transfer procedures (LR-AV to LR auditory-only) proved effective, where the pre-experimental simple-to-conditional transfer procedures (removing the single-key prompt) did not. One reason may be that the easily acquired auditory-visual matching performance functioned to establish prerequisite conditional-discrimination task skills critical for the LR auditory-only criterion task. These skills include successive discrimination of the sample, control by the sample, simultaneous discrimination of the comparisons, and reversing discriminative functions of the comparisons (see Dube et al., 1993; Jackson, 1993; Saunders & Spradlin, 1989, 1990). Of course, one must find such an existing repertoire in the first place. Nevertheless, we believe this underscores the importance of closer examinations of participants' discrimination behavior outside the laboratory.

The present case study also raises some interesting questions about the necessary and sufficient conditions for achieving the transfer shown here that we did not experimentally address. First, at what point did the transfer occur? It may be that merely pairing form and position is sufficient, and that the fading was not necessary. Second, to what extent was the overtraining necessary? Third, how critical were the outcome-specific reinforcers to MBS's success? Finally, to what extent did the differential "naming" (signing) response facilitate acquisition of auditory-visual stimulus relations, as shown by others (e.g., Eikeseth & Smith, 1992; Sidman, Willson-Morris, & Kirk, 1986)?

REFERENCES

- D'Amato, M. R., & Colombo, M. (1985). Auditory matching-to-sample in monkeys (*Cebus apella*). *Animal Learning and Behavior*, *13*, 375-382.
- D'Amato, M. R., & Worsham, R. W. (1974). Retrieval cues and short-term memory in capuchin monkeys. *Journal of Comparative and Physiological Psychology*, *86*, 274-282.
- Dube, W. V., Green, G., & Serna, R. W. (1993). Auditory successive conditional discrimination and auditory stimulus equivalence classes. *Journal of the Experimental Analysis of Behavior*, *59*, 103-114.
- Dube, W. V., Iennaco, F. M., & McIlvane, W. J. (1993). Generalized identity matching-to-sample of two dimensional forms in individuals with intellectual disabilities. *Research in Developmental Disabilities*, *14*, 457-477.
- Dube, W. V., Iennaco, F. M., Rocco, F., Kledaras, J. B., & McIlvane, W. J. (1992). Microcomputer-based programmed instruction in identity matching to sample for persons with severe disabilities. *Journal of Behavioral Education*, *2*, 29-51.
- Dube, W. V., & McIlvane, W. J. (1989). Adapting a microcomputer for behavioral evaluation of mentally retarded individuals. In J. A. Mulick & R. F. Antonack (Eds.), *Transitions in mental retardation* (Vol. 4, pp. 104-127). Norwood, NJ: Ablex.
- Dunn, L. M., & Dunn, L. M. (1981). *Peabody Picture Vocabulary Test - Revised*. Circle Pines, MN: American Guidance Service.
- Eikeseth, S., & Smith, T. (1992). The development of functional and equivalence classes in high-functioning autistic children: The role of naming. *Journal of the Experimental Analysis of Behavior*, *58*, 123-133.
- Etzel, B. C., & LeBlanc, J. M. (1979). The simplest treatment alternative: The law of parsimony applied to choosing appropriate instructional control and errorless-learning procedures for the difficult-to-teach child. *Journal of Autism and Developmental Disorders*, *9*, 361-382.
- Gardner, M. F. (1990). *Expressive One-Word Picture Vocabulary Test-Revised*. Novato, CA: Academic Therapy Publications.
- Jackson, J. (1993). Thematic match to sample: Teaching children conditional discriminations without verbal instructions. *Experimental Analysis of Human Behavior Bulletin*, *11*, 16-17.
- McIlvane, W. J., & Dube, W. V. (1992). Stimulus control shaping and stimulus control topographies. *The Behavior Analyst*, *15*, 89-94.
- McIlvane, W. J., Dube, W. V., Kledaras, J. B., Iennaco, F. M., & Stoddard, L. T. (1990). Teaching relational discrimination to individuals with mental retardation: Some problems and possible solutions. *American Journal on Mental Retardation*, *95*, 283-296.
- McIlvane, W. J., Withstandley, J. K., & Stoddard, L. T. (1984). Positive and negative stimulus relations in severely retarded individuals' conditional discriminations. *Analysis and Intervention in Developmental Disabilities*, *4*, 235-251.
- Saunders, K. J., & Spradlin, J. E. (1989). Conditional discrimination in mentally retarded adults: The effects of training the component simple discriminations. *Journal of the Experimental Analysis of Behavior*, *52*, 1-12.
- Saunders, K. J., & Spradlin, J. E. (1990). Conditional discrimination in mentally retarded adults: The development of generalized skills. *Journal of the Experimental Analysis of Behavior*, *54*, 239-250.
- Schilmoeller, G. L., Schilmoeller, K. J., Etzel, B. C., & LeBlanc, J. M. (1979). Conditional discrimination after errorless and trial-and-error training. *Journal of the Experimental Analysis of Behavior*, *31*, 405-420.
- Schreibman, L. (1975). Effects of within-stimulus and extra-stimulus prompting on discrimination learning in autistic children. *Journal of Applied Behavior Analysis*, *8*, 91-112.
- Serna, R. W., Stoddard, L. T., & McIlvane, W. J. (1992). Developing auditory stimulus control: A note on methodology. *Journal of Behavioral Education*, *2*, 391-403.
- Sidman, M., & Stoddard, L. T. (1966). Programming perception and learning for retarded children. In N. R. Ellis (Ed.), *International review of research in mental retardation* (Vol. 2, pp. 151-208). New York: Academic Press.
- Sidman, M., & Stoddard, L. T. (1967). The effectiveness of fading in programming a simultaneous form discrimination for retarded children. *Journal of the Experimental Analysis of Behavior*, *10*, 3-15.
- Sidman, M., Willson-Morris, M., & Kirk, B. (1986). Matching-to-sample procedures and the development of equivalence relations: The role of naming. *Analysis and Intervention in Developmental Disabilities*, *6*, 1-19.
- Soraci, S. A., Stoddard, L. T., Serna, R. W., McIlvane, W. J., & Carlin, M. T. (1994). Auditory spatial location in auditory-visual matching to sample:

- A preliminary investigation. *Experimental Analysis of Human Behavior Bulletin*, 12, 14-16.
- Stoddard, L. T. (1982). An investigation of automated methods for teaching severely retarded individuals. In N. R. Ellis (Ed.), *International review of research in mental retardation* (pp. 163-207). New York: Academic Press.
- Stoddard, L. T., & McIlvane, W. J. (1989). Establishing auditory stimulus control in profoundly retarded individuals. *Research in Developmental Disabilities*, 10, 141-151.
- Touchette, P. E. (1968). The effects of graduated stimulus change on the acquisition of a simple discrimination in severely retarded boys. *Journal of the Experimental Analysis of Behavior*, 11, 39-48.
- Zygmunt, D. M., Lazar, R. M., Dube, W. V., & McIlvane, W. J. (1992). Teaching arbitrary matching via sample stimulus control shaping to young children and mentally retarded individuals: A methodological note. *Journal of the Experimental Analysis of Behavior*, 57, 109-117.

THE STEADY-STATE STRATEGY IN HUMAN OPERANT RESEARCH: HOW STABLE ARE WE?

RUTH ANNE REHFELDT AND PATRICK M. GHEZZI
UNIVERSITY OF NEVADA

Establishing a steady, stable rate or pattern of responding prior to introducing a change in experimental conditions is a familiar strategy among single-subject researchers. The rationale for this was first given by Sidman (1960), who defined a "steady-state" as behavior that "does not change its characteristics over a period of time" (1960, p. 234). Sidman argued at length that the researcher who consistently obtains a steady-state is well on the way to identifying, and ultimately exercising control over, the variables of which a given behavior is a function. In arguing for the steady-state strategy, Sidman urged researchers, first, to adopt a stability criterion that yields "orderly and replicable functional relations" (p. 259), and second, to report the criterion that was used so that others could benefit by reproducing a comparable state in their own laboratories.

Despite the methodological soundness of the steady-state strategy, some researchers have objected not only to the practice of adopting a stability criterion, but also to the reporting of one that may have been used. The objections come mainly from workers in applied areas, who maintain that they seldom have the luxury of establishing a steady-state prior to manipulating experimental conditions; moreover, even if a stability criterion was used, it would be so unique to the individual, setting, and response under investigation that its use by others would fail to yield "orderly and replicable functional relations" (Barlow, Hayes, & Nelson, 1984). The point is also made that

applied workers can never achieve control over their subjects' inheritance and extra-experimental histories to the extent enjoyed by basic researchers, and thus are unable to obtain comparable levels of stability. For these reasons, some have proclaimed the steady-state strategy to be impractical, if not irrelevant, to human experimentation, contending that Sidman's (1960) discussion pertains *exclusively* to animal researchers (Hersen & Barlow, 1976, p. 74-75).

Where do researchers in the experimental analysis of human behavior stand on the issue of using and reporting steady-state criteria? The question is an intriguing one in that it poses a dilemma for basic human researchers: Sympathetic to the objections raised by their applied colleagues, they are nonetheless committed to the same set of methodological standards that govern animal research (Baron, Perone, & Galizio, 1991a, 1991b). Presumably, this includes using and reporting stability criteria in their research practices.

In seeking an answer to our question, we examined all studies involving human subjects that were published in the *Journal of the Experimental Analysis of Behavior* (JEAB). Our aim was to determine the frequency with which researchers using humans as subjects reported their stability criteria. We equated a report of a stability criterion with actually using it as a guide for changing experimental conditions, and likewise equated a failure to report a stability criterion with not using one for such guidance. Although

other journals occasionally publish articles with behavioral emphases involving human subjects, our view was that the best representation of single-subject research involving humans over the course of several decades would be found in *JEAB*, and that we would therefore obtain an accurate picture of where human operant researchers stand in terms of using and reporting steady-state criteria.

We examined all studies published in *JEAB* from 1958 (Volume 1, Number 1) to 1995 (Volume 64, Number 3). Only human subject studies involving at least one phase change were considered. If more than one experiment was reported in the same article, each experiment was treated as an independent study. Each study was coded as a member of one of the following mutually exclusive (and exhaustive) categories:

- 0 = This study does not meet criteria for inclusion in the review.
- 1 = This study does not report a steady-state criterion.
- 2 = This study reports a statistical steady-state criterion.
- 3 = This study reports a mastery steady-state criterion.
- 4 = This study reports a visual steady-state criterion.

A *statistical criterion* was defined as one that establishes an acceptable amount of variability over a given number of data points. An example appeared in an article assessing the effects of experience, instructions, and schedule-correlated stimuli on concurrent performances. The investigators stated that "each pair of concurrent schedules remained in effect until relative response rates in three consecutive 10-min sessions differed by no more than 10%" (Takahashi & Iwamoto, 1986, p. 259).

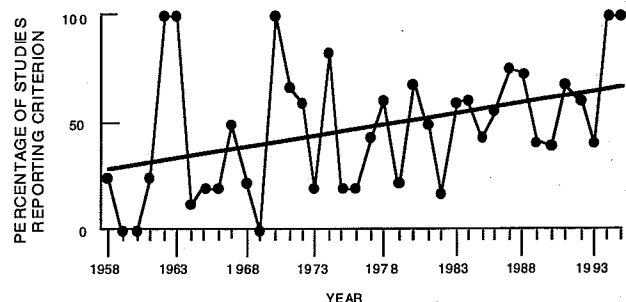
A *mastery criterion* was defined as one that requires that subjects respond correctly on a certain proportion of trials. An example of this criterion was reported in an experiment studying the generation of six-member stimulus classes, in which subjects were required "to achieve an overall score of at least 90% correct" to advance from one phase to another (Sidman, Kirk, & Willson-Morris, 1985, p. 26).

A *visual criterion* was defined as one that clearly states that the decision to change phases was based on an inspection of graphically displayed data. An example was found in a study investigating the effects of smoked marijuana on progressive-interval schedule performance, in which it is stated that "responding was considered stable if rates of responding during the final three sessions of a schedule condition did

not show an upward or downward trend" (Dougherty, Cherek, & Roache, 1994, p. 75).

Researchers occasionally noted that experimental phases continued until responding stabilized, without further specifying the criterion upon which they based their judgment of stability. Because details of the criterion were not conveyed, these studies were coded as not reporting a steady-state criterion. The same was true for studies in which it was stated that conditions were continued for a fixed amount of time based on the researchers' judgment of time required to achieve stability. In both of these cases, it is difficult to see how others could replicate the procedure in their own laboratory without being informed as to the criterion that was employed.

Of the studies published from 1958 to 1995 that met criteria for inclusion in this review, 46% reported a steady-state criterion. Figure 1 shows the percentage of studies each year which reported a steady-state criterion. Visual inspection of the figure shows that the percentage of studies which reported stability criterion each year has been sporadic, but the fitted regression line suggests a slight upward trend. Of those studies that reported steady-state criteria, 30% were statistical, 53% were mastery, and 17% were visual.



What conclusions can be drawn from these data? It appears that those whose work with humans has been published in *JEAB* have sometimes adopted the steady-state strategy to guide changes in experimental conditions, and at other times have not adopted that strategy. If the production of steady-states is a defining feature of experimental methodology in the analysis of behavior (see Perone, 1991, p. 139), this finding may be of some concern. At the same time, the practice of using and reporting steady-state criteria does appear to be increasing slightly over time. We hope that in the coming decades this trend will continue to the point where using and reporting steady-state criteria becomes a "steady-state" practice.

In defense of not using or reporting stability criteria in human research, one might argue that the steady-state strategy is applicable only to research

with nonhuman organisms. One problem with this argument is that it assumes human behavior is either intrinsically variable, or is simply too difficult or impractical to control. The former hints at indeterminism, and the latter undermines the search for ways to isolate, eliminate, or otherwise control for extra-experimental sources of variability. When uncontrolled sources of variability permeate a body of evidence, statements regarding the reliability and generality of that evidence are likely to be imprecise. Given that many human operant researchers do use and report stability criteria some of the time, we can, to that extent, be confident of the reliability and generality of the research findings in our field.

The consequences of failing to use or report a stability criterion are most keenly felt when attempting to replicate an experiment. In order to do this, one must be oriented to all aspects of the original research. Two studies, one purporting to replicate the other, could generate widely different results if each used a different steady-state criterion. If these criteria go unreported, how can the results obtained from studies performed in different laboratories be integrated into a larger body of knowledge regarding the determinants of human behavior?

The past several decades have seen the production of much fruitful research in the experimental analysis of human behavior. We believe that because the experimental analysis of human behavior is a productive research enterprise in its own right, and procedural differences exist between experimental analyses of human and nonhuman subjects, it is imperative that human operant researchers use and report their stability criteria. All those involved in the experimental analysis of human behavior can profit from knowing each others' strategies for achieving steady-state responding, and only if procedures are replicated can our understanding of human behavior continue to expand.

REFERENCES

- Baron, A., Perone, M., & Galizio, M. (1991a). Analyzing the reinforcement process at the human level: Can application and behavioristic interpretation replace laboratory research? *The Behavior Analyst*, *14*, 95-105.
- Baron, A., Perone, M., & Galizio, M. (1991b). The experimental analysis of human behavior: Indispensable, ancillary, or irrelevant? *The Behavior Analyst*, *14*, 145-155.
- Barlow, D.H., Hayes, S.C., & Nelson, R.P. (1984). *The scientist practitioner*. New York: Pergamon Press.
- Dougherty, D. M., Cherek, D. R., & Roache, J. D. (1994). The effects of smoked marijuana on progressive-interval schedule performance in humans. *Journal of the Experimental Analysis of Behavior*, *62*, 73-87.
- Hersen, M., & Barlow, D. H. (1976). *Single-case experimental designs: strategies for studying behavior change*. New York: Pergamon Press.
- Perone, M. (1991). Experimental design in the analysis of free-operant behavior. In I. Iverson & K. A. Lattal (Eds.), *Experimental analysis of behavior: Part I* (pp. 157-186). Amsterdam: Elsevier.
- Sidman, M. (1960). *Tactics of scientific research*. Boston: Authors Cooperative.
- Sidman, M., Kirk, B., & Willson-Morris, M. (1985). Six-member stimulus classes generated by conditional discrimination procedures. *Journal of the Experimental Analysis of Behavior*, *43*, 21-42.
- Takahashi, M., & Iwamoto, T. (1986). Human concurrent performances: The effects of experience, instructions, and schedule-correlated stimuli. *Journal of the Experimental Analysis of Behavior*, *45*, 257-267.

SUBMIT ABSTRACTS, ARTICLES, CHAPTERS, AND BOOKS PUBLISHED, AND GRANTS RECEIVED FOR THE NEXT ISSUE

To keep current with member activities we would like to publish abstracts from conference presentations, articles published or in press, and grants received in every issue. Please send abstracts from ABA, Behavioral Pharmacology, and other Spring conferences. Abstracts (including those published as part of "Grants Received") should be no more than 200 words; those longer than 250 words will be returned to you for editing. Send to Dean Williams by March 15, 1997.

MEMBER ACTIVITIES

CONFERENCE PRESENTATION ABSTRACTS

Pictures of Thin and Full-Figured Body Types and Adult Female Body Dissatisfaction

K. Bartkowiak and L. B. Forzano
State University of New York College at Brockport

The media, with its projection of thin models as the ideal body type for women, has been implicated as a contributing factor in the development of eating disorders. It was proposed that exposure to pictures of female models of different body types would have different effects on the body dissatisfaction of college-aged females. The pictures of the models used in the current experiment were selected based on the consistent body type classifications by 100 female undergraduate students in psychology classes at two western New York state colleges. Ninety-three adult female college students were exposed to pictures of thin models, full-figured models, or fashion items and were then asked to rate their body dissatisfaction. The results illustrated a trend that after exposure to pictures of models with extreme body types, participant body dissatisfaction tends to improve.

Eastern Psychological Association, Philadelphia, PA,
March, 1996.

The Effects of Marijuana Alone and in Combination with Alcohol on Aggression

Donald M. Dougherty, Don R. Cherek,
and Robert H. Bennett
The University of Texas-Houston

In this study we are investigating the combined effects of marijuana and alcohol on aggressive responding. This drug combination, marijuana and alcohol, is of particular interest because it is one of the most common drug combinations occurring outside the laboratory. The Point Subtraction Aggression Paradigm[®] (PSAP) is being used to measure aggression. The PSAP has three response options: (1) point-maintained responding, emitting 100 responses on one button earns the subject 10 cents; (2) aggressive responding, emitting 10 responses on an alternative button ostensibly subtracts 10 cents from another person also working to earn money; and (3) escape responding, emitting 10 responses on another

alternative button sometimes protects the subject's point counter from subtractions. Aggressive responses in this paradigm are engendered by randomly subtracting points (every 6 s to 120 s) and attributing these point losses to another subject. We are holding the dose of marijuana (1.58% w/w THC) constant and varying the alcohol doses (0.0, 0.25, 0.50, and 1.0 g/kg). Thus far, it appears that marijuana in combination with alcohol produces greater increases in aggressive responding compared to either alcohol or marijuana consumed alone, but the effects of these drug combinations differ considerably between individuals.

Association of Behavior Analysis, San Francisco, CA,
May, 1996.

Effects of Reinforcer Magnitude on Human's Choices for Response Contingent Versus Noncontingent Schedules

Donald M. Dougherty and Don R. Cherek
The University of Texas-Houston

In this study we investigated the effects of manipulating the reinforcer magnitude on subjects' choices to earn points exchangeable for money by pressing a button maintained by a progressive ratio (PR) schedule or to receive points without responding on a fixed-time (FT) schedule. Subjects began each session with the PR requirement equal to 50 responses and its ratio requirement increased by 10% after each subsequent point presentation. At any time during the session, subjects could complete a fixed-ratio 10 response requirement on another button to initiate the alternative schedule condition, the FT 200-s schedule of point presentation. Subjects were instructed that no responding was required to earn points in the FT schedule, and once subjects switched to the FT schedule they remained in this schedule for the remainder of the 60-min session. This experiment examined the effects of increasing the point value from 10, 20, to 40 cents on choices in this procedure. As the value of the points increased, the number of responses, the rate of responding, the time spent, and the number of points earned in the PR component increased.

Association of Behavior Analysis, San Francisco, CA,
May, 1996.

The Relationship Between the Menstrual Distress Questionnaire and Aggressive Responding

Donald M. Dougherty and Patrick S. Bordnick
The University of Texas-Houston

This study investigated the relationship between the severity of self-reported menstrual cycle symptoms and a laboratory measure of aggression. Two groups of women were recruited, one group reporting low and one group reporting moderate to high perimenstrual symptoms. Scores of the Negative Affect subscale of the Menstrual Distress Questionnaire (MDQ) were used to define groups. Each of 40 subjects participated in three testing sessions of the Point Subtraction Aggression Paradigm®. This paradigm gives subjects the opportunity to earn points by responding on one button, and/or to subtract points (aggression) from a partner by responding on another button. Subjects were periodically provoked by subtracting a point from the subject's counter and attributing these subtractions to the responding of the partner. There were two significant findings: (a) the high symptom group emitted higher rates of aggressive responding than the low symptom group; and (b) rates of aggressive responding were significantly correlated with the Negative Affect and Behavior Change scales. These findings indicate that MDQ scores are related to an individual's tendency to respond aggressively when provoked, and are consistent with previous studies demonstrating that the severity of MDQ scores are correlated with a diversity of self-report and performance measures.

American Psychiatric Association, New York, NY, May, 1996.

Reinforcement Variables and Discrimination of Complex Stimuli in Mental Retardation

William V. Dube and William J. McIlvane
E. K. Shriver Center

Stimulus control was evaluated in three individuals with moderate to severe mental retardation by delayed identity matching-to-sample procedures. One and two-element sample stimuli were presented on SSS and CSS tasks, respectively. In pretests, accuracy scores on SSS tasks were uniformly high. On CSS tasks, however, scores were substantially lower, apparently because only one of the two sample elements reliably controlled matching selections (restricted stimulus control). Subjects were then given SSS training sessions with a new set of four stimuli.

Correct matching responses for two of the stimuli were followed by reinforcers on a variable ratio schedule that resulted in a high rate of reinforcement, and correct matching for the other two stimuli was followed by reinforcers on a variable ratio schedule that resulted in a relatively low rate of reinforcement. In CSS tests that followed, stimulus control was restricted to the high-rate sample element. Subjects were then given additional SSS training with reversed reinforcement schedules for all stimuli, and the CSS tests were repeated. Stimulus control continued to be restricted in all subjects, but control shifted to the new high-rate stimuli (the former low-rate stimuli). These results demonstrate direct experimental control of restricted stimulus control by reinforcement contingencies, and they set the stage for new, potentially more informative experimental analyses of this phenomenon.

American Psychological Association, Toronto, Ontario, Canada, August, 1996.

Self-Control and Impulsiveness in Adult Human Females: Effects of Food Preferences

L. B. Forzano
State University of New York College at Brockport

This experiment examined the effects of food preference on adult human females' choice behavior in a self-control paradigm. Subjects demonstrated significantly less self-control in conditions in which subjects had a higher preference for the juice received as the less delayed, smaller amount reinforcer than for the juice received as the more delayed, larger amount reinforcer. The results demonstrate that subjects' food preferences can influence self-control for food reinforcers.

Eastern Psychological Association, Philadelphia, PA, March, 1996.

Choice in a Self-Control Paradigm: Effects of Reinforcer Quality

L. B. Forzano
State University of New York College at Brockport

Self-control has been defined as the choice of a more delayed, larger amount of reinforcement over a less delayed, smaller amount of reinforcement, and impulsiveness has been defined as the opposite. Several experiments have found that a number of factors can affect the degree of self-control demonstrated by adult humans, including amount, delay, and rate of reinforcement. However, the majority of these experiments have used qualitatively

identical reinforcers for both response alternatives. The lack of research regarding the effects of reinforcer quality on self-control in humans is unfortunate because laboratory research on self-control choices that involve qualitatively identical reinforcers may not be applicable to the world outside the laboratory, where humans most often choose between qualitatively different reinforcers. Experiments examining the effects of reinforcer quality on self-control with adult humans are discussed. Reinforcer quality was defined by differences in preference for different types of juice. Specifically, the experiments discussed examined the effects of reinforcer preference, in particular, food preference on adult human females' choice behavior in a self-control paradigm. The results demonstrate that subjects' food preferences can influence self-control for food reinforcers.

Association for Behavior Analysis, San Francisco, CA, May, 1996.

Risk-Sensitivity in Humans: Does the Form of the Variability Matter?

Cynthia J. Pietras, Timothy D. Hackenberg, and
Philip N. Hincley
University of Florida and Temple University

The purpose of this experiment was to examine humans' choices between fixed and variable outcomes with the same mean value, and to compare the effects of different types of variability in temporally distributed outcomes. Adult humans were given repeated choices between fixed-interval 30-s schedules and variable-interval 30-s schedules of light presentation, with each light later exchangeable for money. The delay intervals composing the variable schedule varied systematically across conditions according to the following distributions: Bimodal, negative exponential, normal, and rectangular (equal probability). All distributions had identical minimum and (with one exception) maximum values. Data collected thus far indicate that, regardless of the characteristics of the variable schedules, humans are either indifferent between the two schedules or else show a preference for the fixed schedule. These results are in contrast to those normally obtained with nonhumans, which generally show clear preferences for variable over fixed schedules of equal mean value.

Association for Behavior Analysis, San Francisco, CA, May, 1996.

Variations in the Functional Analysis Approach to the Assessment of Problem Behavior: The use of Conditional Probabilities to Confirm a Priori Hypotheses

Scott H. Kollins, Bart M. Sevin, Rebecca S. Blakman, Jennifer C. Willis, Patti Fitzsimmons, Geoff Martin, Elliot Paletz, and Karla J. Doepke
Auburn University

Functional analysis has been used extensively to assess and guide intervention for challenging behaviors. This method, however, has most frequently been employed with individuals exhibiting developmental delays. As a result, these analyses are often conducted in controlled settings where the independent variables can be closely manipulated by the experimenters. The use of such assessment techniques to evaluate and make treatment decisions for less severe behavior in regular classrooms is less common. Following a descriptive analysis of the behavior of a 5-year-old male kindergarten student, we developed hypotheses regarding the function of his disruptive behavior. Using a variation of traditional functional analytic techniques, data were collected via an interval recording system during regular classroom activities. For practical reasons, teacher-administered consequences were not delivered contingent on each occurrence of the target behavior. However, the use of conditional probabilities permitted an alternative means of analyzing the function of problem behavior. We discuss this type of analysis as a means of extending functional analytic technology into regular academic settings.

Association for the Advancement of Behavior Therapy, New York, NY, November, 1996.

New Directions in Research on Stimulus Equivalence

Carol Pilgrim
University of North Carolina at Wilmington

Most theoretical interpretations of stimulus equivalence emphasize that classes formed in the laboratory provide a useful model of the complex human abilities traditionally called cognitive. However, scientists outside of behavior analysis use different strategies to make inferences about the phenomena to which equivalence accounts have been applied. Three experiments were designed to allow a more direct comparison between our equivalence literature and that of other psychological approaches.

Experiment 1 revealed that, following interrelated conditional discrimination training, college students sorted stimuli into class-consistent groups both before and after exposure to probe trials, and when nodal stimuli were not included in the sorting task. These data seem consistent with those from cognitive developmental studies of categorization and concept formation. Experiment 2 revealed that college students asked to estimate reinforcer frequency for all trial types presented during training and testing reported frequent reinforcement not only for correct baseline choices, but also for class-consistent symmetry and equivalence probe-trial choices. Higher estimates were given for baseline trial types than for symmetry trials, which in turn generated higher estimates than equivalence trials. These estimation data seem analogous to some from studies of incidental learning and semantic memory. Experiment 3 revealed only limited evidence of class-consistent clustering when college students were given a test for free recall of the experimental stimuli used during equivalence training and testing. These data appear somewhat inconsistent with the robust clustering effects reported in the cognitive literature for verbal recall, although increased clustering might occur with different training and testing conditions.

American Psychological Association Annual Convention, Toronto, Canada, August, 1996.

The Neuroanatomy of Drug Craving in Crack Cocaine Addiction: A PET Analysis

J. Schweitzer, K. Drexler, C. Quinn,
F. Muhammad, R. Gross, T. Faber,
J. Hoffman, and C. Kilts

Emory Center for PET and the Atlanta VA, Emory University, Atlanta, GA

The high rate of recidivism associated with the treatment of crack cocaine dependence is plausibly related to frequent and intense drug craving. We have used a PET neuroactivation analysis to define the functional organization of the craving human brain in crack dependence. Subjects were right-handed African-American males admitted to the VA for treatment of crack cocaine dependence. Study inclusion criteria included the absence of opiate, ethanol or marijuana dependence, and above-average mental imagery ability and a positive history of drug craving. Individualized scripts were constructed from the memory content of the physiological reactions and environmental contexts of crack cocaine use or of an anger-provoking scene. Positron Emission Tomography (PET) images were acquired using the blood flow tracer $H_2^{15}O$. Sessions included image

acquisitions during a resting condition, and during imagery of binaurally presented control (beach or forest), cocaine use, or anger scenes. Subjects reported vivid imagery for all scenes, and moderate to intense craving or anger associated with imagery of the respective scenes. Imagery-induced drug craving, compared to control scene imagery, was associated with activation of temporal, frontal and cingulate sites, predominantly lateralized to the left hemisphere. The amygdaloid complex was not activated during craving induction. Induced drug craving and anger were associated with comparable increases in heart rate. Imagery-induced anger, compared to control scene imagery, was associated with activation of the left amygdaloid complex, and orbital frontal, cingulate and temporal cortex. Common sites of activation in the orbital frontal, middle temporal and cingulate cortex were associated with induced drug craving and anger. These results support the use of script-guided mental imagery in functional neuroimaging of drug craving.

Society for Neuroscience, Washington, DC, November, 1996.

Instructions and Schedule Sensitivity: Does Degree of Accuracy of Instructions Matter?

Manish Vaidya and Timothy D. Hackenberg
University of Florida

Adult humans worked on a two-component multiple schedule of points exchangeable for money. Within each component, subjects chose repeatedly between a fixed time--60-s schedule and a progressive time schedule of point delivery that started at 0 s and increased by a fixed number of seconds after each point delivered by that schedule. Choice of a fixed time schedule reset the progressive time schedule to 0 s. In one of the two components (the changing component), the step size of the progressive time schedule was manipulated across conditions. In the other component (the unchanging component) the step size of the progressive time schedule was held constant at 4 s. Some subjects received no instructions regarding the contingencies. Other subjects received explicit instructions regarding the optimal pattern of choices. These instructions were initially accurate in both components of the multiple schedule but grew more inaccurate with changes in the step size of the progressive time schedule in the changing component. Choice patterns of subjects in both groups came under control of the multiple schedule contingencies. The instructions appeared to attenuate sensitivity to the contingencies: Responding in these subjects generally remained instruction-appropriate for a

greater number of conditions than for the noninstructed subjects, despite losses in potential earnings.

Association for Behavior Analysis, San Francisco, CA, May, 1996.

Effects of Psychotropic Drugs on Stimulus Control

Dean C. Williams

University of Kansas Parsons Research Center

A basic finding from behavioral pharmacology is that behavior under strong stimulus control is relatively insensitive to drug effects, and behaviors under weak stimulus control are more sensitive to drug effects. This notion has had little impact on studies of the cognitive effects of drugs in individuals with mental retardation. These studies typically use identical tasks to assess individuals with differing intellectual abilities, and then perform statistical

analyses on group data. This tactic results in a high degree of variability in performance across individuals and general insensitivity of the measures. Many individuals perform at either chance or maximal accuracy levels, which cannot be used to detect drug induced impairment or enhancement respectively. An alternative strategy is to adjust the task difficulty for individual subjects to bring strength of stimulus control under direct experimental control. For example, we manipulated the difficulty of a repeated acquisition of simple discriminations task in individual subjects by varying the number of discriminations to be learned in each session. The difficulty of a delayed, matching-to-sample task for assessing memory was manipulated by varying the number of different stimuli used each session. These procedures showed differential sensitivity to the effects of propranolol in two subjects and to sertaline in another subject undergoing clinical drug changes while performing these tasks daily.

American Psychological Association, Toronto, Canada, May, 1996.

GRANTS AWARDED TO EAHB SIG MEMBERS

Grant Title: A Pilot Investigation of Functional Neuroanatomy of ADHD
Principal Investigator: Julie Schweitzer
Affiliation: Emory University School of Medicine
Agency: NIMH
Dates: 04/01/96-03/31/97
Amount: \$25,000

Although Attention Deficit Hyperactivity Disorder (ADHD) is considered the most common child psychiatric disorder, little is known about the functional neurological deficits associated with this disorder. Functional neuroimaging techniques such as positron emission tomography (PET), that assess interactions between behavior and regional brain physiology may lead to the development of a better understanding of ADHD and more effective treatments. The proposed project will study differences in regional cerebral blood flow (rCBF) using [¹⁵O]-water, during the performance of an auditory vigilance task in adults diagnosed with ADHD and a matched-group of normal control subjects. Task-related changes in rCBF will be measured during a resting state condition, a PASAT (auditory vigilance) condition, and a control state condition, with each task presented twice in each of the PET imaging sessions occurring on two consecutive days. This repeated-measure, within-subject design will allow for the assessment of differences that may emerge over time between groups, while also increasing the power to detect brain functional differences between the ADHD and

control groups. These data are expected to reveal differences in patterns of task-related rCBF between the groups, with these differences increasing with repeated PASAT presentations.

Grant Title: Social Shaping of Attributions, Attitudes and Beliefs: The Roles of Listeners and Listener Challenges
Principal Investigator: Bernard Guerin
Affiliation: University of Waikato
Agency: University of Waikato SSSRC Grants
Dates: 1997-1998
Amount: \$10,500

In a review just completed (Guerin, 1996), many predictions were generated which throw light on the social contexts that control conversation, and on the functions of presenting of attitudes, beliefs, or attributions in conversation. Attributions, attitudes, and beliefs are treated as just different verbal behaviors that affect listeners differently, and they can be used interchangeably for different effects. For the major two types of attributions typically studied, for example, it can be predicted that dispositional attributions ("John did well at the exam because he is smart") as opposed to situational attributions ("John did well at the exam because the test was easy") will be more difficult for a listener to argue back against, will be more persuasive, and will lead listeners to report both that the event is more likely to re-occur in the future and that the sentence is informative. Such

listener effects shape speakers to use those types of attributions differentially in the future. Experiments will test for the social contexts under which people will "choose" to speak using attitudes, beliefs, and attributions.

Guerin, B. (in press). The social context of communication: Communicative power as past and present social consequences. In J. L. Owen (Ed.), *Context and communication behavior*. Reno, NV: Context Press.

Grant Title: Social Influence Strategies of Children and Resistance to Social Influence: Studies in Naturalist Settings

Principal Investigator: Bernard Guerin

Affiliation: University of Waikato

Agency: University of Waikato SSSRC Grants

Dates: 1997-1998

Amount: \$7,500

Some of the most important social behaviours are learned early in childhood. Children learn to speak

and to cooperate; they also learn to compete and fight. By the time researchers study adolescent social behaviour, many of the patterns are already there. Adolescents are influenced to join cliques and social groups which encourage certain behaviours, be they useful behaviours, like cooperation, or risky behaviours like drug use. I propose to study the social influence tactics used by children across several ages, to follow the same children through a period of 2 years to find the changes that occur, and produce methods for teaching children more appropriate social influence tactics and resistance to influence tactics. Predictions for social influence tactics come from a behavior analysis approach developed for adults (Guerin, 1995, in press).

Guerin, B. (1995). Social influence in one-to-one and group situations: Predicting influence tactics from basic group processes. *Journal of Social Psychology*, 135, 371-385.

Guerin, B. (in press). The social context of communication: Communicative power as past and present social consequences. In J. L. Owen (Ed.), *Context and communication behavior*. Reno, NV: Context Press.

RECENT PUBLICATIONS OF EAHB SIG MEMBERS*

Allen, T. J., Dougherty, D. M., Rhoades, H. B., & Cherek, D. R. (in press). A study of male and female aggressive responding under conditions providing an escape response. *The Psychological Record*.

Brady, N. C., McLean, J. E., McLean, L. K., & Johnston, S. (1995). Initiation and repair of intentional communication acts by adults with severe to profound cognitive disabilities. *Journal of Speech and Hearing Research*, 38, 1334-1348.

Brady, N. C., & McLean, L. K. (1996). Arbitrary symbol learning by adults with severe mental retardation: A comparison of lexigrams and printed words. *American Journal on Mental Retardation*, 100, 423-427.

Dougherty, D. M., Bjork, J. M., Cherek, D. R., & Moeller, F. G. (1996). The effects of menstrual cycle phase and symptom severity on aggression. *Alcoholism*, 20, 503.

Dougherty, D. M., Cherek, D. R., & Bennett, R. H. (1996). The effects of alcohol on the aggressive responding of women. *Journal of Studies on Alcohol*, 57, 178-186.

Dymond, S. (1996). Conditional discrimination responding in nonhumans. *The Irish Journal of Psychology*, 16, 333-345.

Dymond, S., & Barnes, D. (1996). A transformation of

self-discrimination response functions in accordance with the arbitrarily applicable relations of sameness and opposition. *The Psychological Record*, 46, 271-300.

Dymond, S., & Barnes, D. (in press). Behavior-analytic approaches to self-awareness. *The Psychological Record*.

Flora, S. R., & Logan, R. E. (1996). Using computerized study guides to increase performance on general psychology examinations: An experimental analysis. *Psychological Reports*, 79, 235-241.

Gunthorpe, W., & Guerin, B. (1996). Conversational expansions and initiations form a response class for adults with intellectual handicaps. *Japanese Journal of Behavior Analysis*, 9, 2-10.

Guerin, B. (1996). A framework for analysing and changing human behavior. *Japanese Journal of Behavior Analysis*, 9, 151-157.

Guerin, B. (in press). The social context of communication: Communicative power as past and present social consequences. In J. L. Owen (Ed.), *Context and communication behavior*. Reno, NV: Context Press.

Guerin, B. (in press). How things get done: Socially, non-socially; with words, without words. In L. J. Hayes & P. Ghezzi (Eds.), *Investigations in behavioral epistemology*. Reno, NV: Context Press.

*Excludes JEAB, JABA, and *The Behavioral Analyst*.

- Guerin, B., & Sejima, J. (in press). Verbal community reinforcement, with an illustration using the Esoteric Buddhist concepts of *Fuse* and *Muzai No Nanase*. *The Psychological Record*.
- Heal, L. W., Borthwick-Duffy, S. A., & Saunders, R. R. (1996). Assessment of quality of life. In J. W. Jacobson & J. A. Mulick (Eds.), *Manual of diagnosis and professional practice in mental retardation* (pp. 199-209). Washington, DC: American Psychological Association.
- Holcomb, W. L., Stromer, R., & Mackay, H. A. (in press). Transitivity and emergent sequence performances in young children. *Journal of Experimental Child Psychology*.
- Kollins, S. H., Lane, S. D., & Shapiro, S. K. (in press). Experimental analysis of childhood psychopathology: A laboratory matching analysis of the behavior of children diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). *The Psychological Record*.
- Ledoux, S. F. (1997). Multiple selectors in the control of simultaneously emittable responses (A research program for undergraduates). In S. F. Ledoux (Ed.), *Origins and components of behaviorology* (pp. 205-242). Canton, NY: ABCs.
- Logue, A. W., Forzano, L. B., & Ackerman, K. T. (1996). Self-control in children: Age, preference for reinforcer amount and delay, and language ability. *Learning and Motivation*, *27*, 260-277.
- Mackay, H. A., Kotlarchyk, B. J., & Stromer, R. (in press). Stimulus classes, stimulus sequences, and generative behavior. In E. M. Pinkston & D. M. Baer (Eds.), *Environment and behavior*. Boulder, CO: Westwood.
- McLean, L. K., Brady, N. C., & McLean, J. E. (1996). Reported communication abilities of individuals with severe mental retardation. *American Journal on Mental Retardation*, *100*, 580-591.
- Pelaez-Nogueras, M., Field, T., Hossain, Z., & Pickens, J. (1996). Depressed mothers' touching increases infant positive affect and attention in still-face interactions. *Child Development*, *67*, 1780-1792.
- Pelaez-Nogueras, M., Gewirtz, J. L., Field, T., Cigales, M., Malphurs, J., Clasky, S., & Sanchez, A. (1996). Infants' preference for touch stimulation in face-to-face interactions. *Journal of Applied Developmental Psychology*, *17*, 199-213.
- Saunders, K. J., Williams, D. C., & Spradlin, J. E. (1996). Derived stimulus control: Are there differences among procedures and processes? In T. R. Zentall & P. M. Smeets (Eds.), *Stimulus class formation in humans and animals* (pp. 93-109). New York: Elsevier.
- Saunders, M. D., & Saunders, R. R. (in press). An analysis of stereotypy during prevocational instruction of an adolescent with severe mental retardation. *Behavioral Interventions*.
- Saunders, R. R. (1996). From review to commentary on Roche and Barnes: Toward a better understanding of equivalence in the context of relational frame theory. *The Psychological Record*, *46*, 477-487.
- Saunders, R. R., Saunders, M. D., Brewer, A., & Roach, T. (1996). The reduction of self-injury in two adolescents with profound retardation by the establishment of a supported routine. *Behavioral Interventions*, *11*, 59-86.
- Schweitzer, J. B. (in press). Delay aversion versus impulsivity: Testing for dysfunction in ADHD. *Journal of Child Psychology and Psychiatry and Allied Disciplines*.
- Stromer, R. (1996). On the benefits of direct teaching of spelling in children's language arts instruction [Summary]. *Perceptual and Motor Skills*, *83*, 489-490. [expanded report available]
- Stromer, R., & Mackay, H. A. (1996). Naming and the formation of stimulus classes. In T. R. Zentall & P. M. Smeets (Eds.), *Stimulus class formation in humans and animals* (pp. 221-252). New York: Elsevier.

Stimulus Class Formation in Humans and Animals

Edited by T. R. Zentall and P. M. Smeets

This book is available from: North Holland Elsevier Science B.V.
Sara Burgerhartstraat 25
P.O. Box 211, 1000 AE Amsterdam
The Netherlands (Cost: \$180 for nonauthors or \$126 for contributors)

Contributors to the book are:

Suzette L. Astley
Dermot Barnes
A. Charles Catania
Julio C. de Rose
Michael J. Dougher
William V. Dube

Mark Galizio
Elizabeth V. Gifford
Steven Hayes
Geraldine Leader
Harry Mackay
William J. McIlvane

Michael Markham
Irene M. Pepperberg
Carol Pilgrim
William A. Roberts
Kathryn J. Saunders
Paul M. Smeets

Joseph E. Spradlin
Robert Stromer
Peter J. Urciuoli
Edward A. Wasserman
Dean Williams
Kelly G. Wilson
Thomas R. Zentall

EAHB SIG MEMBERSHIP INFORMATION

You can join the SIG or renew your membership by completing the form below and sending it along with a check. Current members: Check your **MAILING LABEL**, it shows the year through which your dues are paid.

DUES are \$10 U.S. funds. Despite rising costs, the SIG is able to hold dues at a low level because (a) administrative costs are subsidized by the Parsons Research Center, University of Kansas, and (b) most of our members have generously added a *voluntary contribution* of \$2 or more to their dues. If you can afford an extra \$2, please send it—the SIG will put it to good use.

ADDRESS all correspondence to: Dean Williams, *EAHB Bulletin*, Parsons Research Center, 2601 Gabriel, P.O. Box 738, Parsons, KS 67357.

Members living outside the continental United States please add \$3 per year to help defray mailing costs.

Circle: New Member New Address Renewal

Amount enclosed—Payment for year(s) 1995 1996 1997

Dues: \$10 per year U.S.	_____
\$13 per year Foreign	_____
Contribution	_____
Total	_____

Name _____

If you are a new member, or have a new address, complete the following:

Department/Institution _____

Box or Street _____

City _____ State _____ Zip _____

Phone () _____ Interests _____

email _____

EAHB SIG
Parsons Research Center
University of Kansas
2601 Gabriel - P.O. Box 738
Parsons, KS 67357

Cloyd Hyten (96)
Center for Behavior Analysis
Univ. of N. TX, P.O. Box 13438
Denton TX 76203

