B. F. Skinner - Mnemonic for His Contributions to Precision Teaching

Ogden R. Lindsley

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Chart Share:

Precision Administering

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Sending a Note Home - a Great Motivational Factor For a Seven-Year-Old Female Learning Basic Subtraction Problems

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Standard Glossary/Charting Conventions (Revised)

A. Jane Barnes

In Memorium: John A. Barlow

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The Journal of Precision Teaching (ISSN 0271-8200) is a multidisciplinary journal that is dedicated to a science of human behavior which includes direct, continuous and standard measurement. This measurement includes a standard unit of behavior, frequency; a standard scale on which successive frequencies are displayed, the Standard Celeration Chart; a standard measure of behavior change between two frequencies, frequency multiplier, and a standard, straight-line measure of behavior change across seven or more frequencies, celeration. Frequencies, frequency multipliers, and celerations displayed on the Standard Celeration Chart form the basis for Chart-based decision-making and for evaluating the effects of independent variables.

The purpose of the Journal of Precision Teaching is to accelerate the sharing of scientific and practical information among its readers. To this end, both formal manuscripts and informal, Chart-sharing articles are to be considered for publication. Materials submitted for publication should meet the following criteria:

* be written in plain English
* contain a narrative that is brief, to the point, and easy to read
* use the Journal of Precision Teaching Standard Glossary and Charting Conventions
* format references according to the Publication Manual of the American Psychological Association
* contain data displayed or displayable on the Standard Celeration Chart to justify conclusions made
* direct data points may be submitted, so the Charting Macro program (Slocum, 1990) may produce an electronic version of the Chart
* original charts may also be submitted.

Articles which are not data-based and do not include data displayed on Standard Celeration Charts may be included. These articles should substantially contribute to the development or dissemination of Precision Teaching/Learning. “About PT” is a column for shorter notes.

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Call for Manuscripts

The Board of Consulting Editors of the Journal of Precision Teaching met in May, 1991 at the Annual Meeting of the Association for Behavior Analysis in Atlanta, GA. It authorized the publication of a special issue of the Journal to serve as a reference manual of Precision Teaching. To be published in Fall, 1992, it will consist of two volumes—one on basic concepts and a second on applications. Possible topics for inclusion are presented below:

Basic Concepts of Precision Teaching

Introduction
History
Research on Effectiveness
Principles of Effective Teaching
Program Monitoring and Evaluation
Materials & Management
Importance of Fluency & Establishing Performance Aims

Charting
Data-based Decision Making
Remediation
Skills Management

Applications of Precision Teaching

Regular Education
College Students
Students with Mild/Moderate Disabilities
Students with Severe Disabilities
Students with Behavior Disorders/Emotional Problems
Teaching Social Skills/Appropriate Social Behaviors
Learning/Teaching Strategies
Business/Administration

Pre-school
Behavior Management

Members of the Precision Teaching community are encouraged to contribute manuscripts to this special issue, from these or other topics, and to adopt the issue as a text for teacher training, inservice training, and tutor training. Reviewers are also needed. Deadline for receipt of manuscripts is June 1, 1992.
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Editor's Comments

Claudia E. McDade

The Fall 1991 issue of the Journal of Precision Teaching celebrates an interesting range of applications of Precision Teaching—from self-improvement to modification of inappropriate social behavior, from special needs children to college students, from intensive interventions with one subject to entire lecture classrooms, from old-time Precision Teachers to novices, and from single Chart shares and case histories to rigorously designed research studies. For potential converts to Precision Teaching, this edition of the Journal may be a good immersion into the field and its many educational applications. For both novices and experienced Precision Teachers a revised version of Charting conventions adapted from the Handbook of the Standard Behavior Chart (Pennypacker, Koenig, Lindsley, 1972) and approved by the Board of Consulting Editors at its May, 1991 meeting is included.

Again, Ogden Lindsley reminds us of our roots as he develops another Precision Teaching mnemonic. This time he uses “B.F. Skinner” as a learning aid to remember Skinner’s contributions to Precision Teaching. Another historical perspective of note to Precision Teachers is a summary of the Great Falls Precision Teaching Project. The most widely publicized Precision Teaching success of an entire school system, the Great Falls approach is presented by Ray Beck, Project Director, and Richard Clement, Principal of Sacajawea Elementary School, who were instrumental in its development.

A contingent from Utah State University’s Department of Special Education (Ed Cancio, Richard Young, Chris Macfarlane, Rich West, and Martin Blair) describes the careful application of data-based decisions to eliminating potentially self-injurious eye-gouging behavior in a 14-year-old. Paul Andrews and Felix Billingsley, from the University of Washington, demonstrate the effectiveness of Precision Measurement in maintaining efficacious treatment in bringing a challenging behavior of a mentally retarded 16-year-old under stimulus control.

Extending the reading interventions developed in the Center for Individualized Instruction, reported in the last issue of the Journal, Bill Beneke, at Lincoln University, demonstrates reading improvement in his students in an introductory psychology class. His contribution also addresses the practical problem of delivering individualized instruction in a large lecture class.

A case history of self-monitoring of inner behaviors is presented by John Cooper, from Ohio State University. Two Chart shares were contributed, one from Nebraska, one from Florida. Tom McRudden, Patty Silkey, Donna Chaney, and Hans Langner used the Standard Celeration Chart to demonstrate that student assistance teams were not monitoring interventions they thought they were. Marcie Lucas and Bill Wolking used Precision Teaching to identify an effective reinforcer for an “at risk” second grader.

Also in this issue of the Journal, look for information regarding the Tenth International Precision Teaching Conference, a call for manuscripts for a special issue, and a revised subscription form reflecting new rates approved by the Board of Consulting Editors beginning with Volume IX. Sadly, there is a memorium column to mourn the passing of one of our own--John Barlow.

As the Journal of Precision Teaching is continuing to grow, we have applied to the Educational Resources Information Center (ERIC) to include the Journal in the Current Index to Journals in Education (CIJE) and to maintain archives of back issues in Resources in Education (RIE). We are in need of manuscripts and Chart shares, so please send us one today!
B. F. Skinner - Mnemonic For His Contributions
To Precision Teaching

Ogden R. Lindsley

I have often described the contributions of B. F. Skinner to Precision Teaching and Standard Celeration charting. Here's a mnemonic to help you list the most important of these.

B = Behavior
F = Frequency
S = Standard slope charts
K = Kid knows best
I = Induction
N = N of 1
N = No observer
E = Environment
R = Relationship recording

How Necessity Mothered This Mnemonic
While making last-minute preparations for travel to the 1991 American Psychological Association meetings in San Francisco, I disciplined myself to answer, before leaving, the many letters and reprint requests that had accumulated on my desk. This produced a stack of 9 by 12 inch manila envelopes too large to carry easily. So, I put them in one of my empty aluminum Halliburton briefcases. Before boarding the airplane, I would drop by the airport post office, which never has a line, and mail them.

I always carry two carry-on pieces of luggage, 1) my Halliburton briefcase containing my tickets, hotel reservation information and the vital notes, transparencies, and hand-outs for my talk; and 2) my carry-on bag with toilet articles, spare blue shirt, extra tie, running suit and shoes. For a three or four day trip, I need an extra suit and shirts, so I check a second long-trip bag with the extra clothing items. This conditions me always to have two bags, and on long trips a third bag with me. It is good to carry something in each hand, so I am well balanced for long walks to remote gates in large airports (e.g., Chicago, Dallas, and Atlanta). Always carrying a bag in each hand when both leaving and returning eliminates the tendency to leave a brief case at an airport counter, restaurant, phone, or restroom. Each hand must always carry something.

As I left our home, I carefully put my aluminum briefcase, my carry-on bag and my larger long-trip bag in my car (my three items for long trips). I drove the 65 miles to Mid-continent International Airport in Kansas City. I proudly mailed the contents of the briefcase at the airport post office, parked my car in the satellite lot, and took out my bags. As I picked up the aluminum case, I suddenly realized that it was too light! It was empty! I had just mailed its contents! The second aluminum case with my carefully selected presentation materials and in-flight work was still 65 miles away in our kitchen. I had but 30 minutes before flight time. My carefully designed system for not forgetting luggage had backfired because this time I had two briefcases instead of my usual one. I had four pieces to put in my car instead of my usual two or three pieces.

There was nothing to do but, relax, laugh at my error, and get on the plane. I purchased new tickets with my American Express card and boarded the plane like a tourist with clothes only. I had no papers to edit, no letters to answer, no work to do on the long flight to San Francisco through Salt Lake City. Sitting in the seat, I thought, what about my talk? No manuscript, no notes, no transparencies, no hand-outs! Well, I will just have to "wing it." Claudia McDade had listed my talk as "The roots of Precision Teaching - What we know that isn't so." I will have to list the things that we got from Skinner on a clear mylar at the overhead projector. I might forget an important one while on my feet in the auditorium. As a
check, I tried to list them there in my airplane seat. Even though I have recently written several articles listing Skinner’s contributions to Precision Teaching (Lindsley, 1991a, 1991b, 1991c), I could spontaneously list only a few. This was a sure sign that I needed a memory aid.

**Mnemonics and Other Mediators**

The first memory aid I recall was taught to me at about eight years of age by my father. It helped recalling the colors and sides of boat navigation lights. The short words - Red, Left, and Port go together, and the long words - Green, Right, and Starboard go together. I later added Hot and Cold for the lavatory water taps to my father’s memory aid. The first academic mnemonic I learned was “On Old Olympus’ Towering Tops A Finn And German Viewed Awesome Hops.” This jingle helped listing the 12 cranial nerves in numerical order: Olfactory, Optic, Ocular motor, Trochlear, Trigeminal, Abducent, Facial, Auditory, Glossopharyngeal, Vagus, Accessory, Hypoglossal. A book of hundreds of mnemonics has the title WASPLEG - a mnemonic for the 7 deadly sins: Wrath, Avarice, Sloth, Pride, Lust, Envy, Gluttony (Benne, 1988).

In *Verbal Behavior* Skinner called mnemonics formal self-prompts and gave the medical student cranial nerve jingle as an example (Skinner, 1957, p. 406). He did not mention the word mediation. In *Schedules of Reinforcement* mediating behavior was defined in the glossary as:

> Mediating behavior: Behavior occurring between two instances of the response being studied (or between some other event and such an instance) which is used by the organism as a controlling stimulus in subsequent behavior (Ferster & Skinner, 1957, p. 729).

In his glossary for “Mathetics,” a classic programmed instruction article, Tom Gilbert defined a mediator as:

> Mediator: An act interposed between the stimulus and the response of an operant to insure that the operant will occur until reinforcement gives it sufficient strength: S—(r • s)—R (Gilbert, 1962, p. 72).

Later, in *Human Competence*, he devoted 8 pages to mediators, describing mediation as the third of four principles of discrimination training. As mediation examples he gave letters shaped as objects (d=duck, a=apple, e=elephant, f=flag, i=indian, t=table, s=snake) for teaching letter sounds, and repeated his resistor color code mnemonic (Gilbert, 1978, pp. 289-294). He stated that “mnemonics is just one form of mediation” (Gilbert, 1978, p. 306).

Several Precision Teaching mnemonics have been developed. “PRICE”: Pinpoint, Record, Intervene, Chart, Evaluate lists the steps in a behavior management project (Lindsley, 1971). “PRACTICED”: Particular, Rapid, Added, Counted, Timed, Informed, Charted, Errorful, Daily lists the requirements for practice sessions. “MUSIC”: Multiply, Unique, Specific, Independent, Consequentated lists the counter-intuitive discoveries made by Precision Teaching. “REAPS”: Retention, Endurance, Application, Performance Standards, for listing the products of fluency (Haughton, 1981). To this I added “FUN”: Fun, Understanding stimulated, No cheating, as further fluency products. “SAFMÉDS”: Say, All, Fast, a Minute, Every Day, Shuffled lists the requirements for fluency card practice. I have recently described some of these along with other behavior analytic acronyms (Lindsley, 1991d).

**B. F. Skinner Contributions Mnemonic**

In the air between Kansas City and Salt Lake City on the inside of my Delta ticket folder I scribbled:

- **B** = Behavior (cycle and results)
- **F** = Frequency (count per time)
- **S** = Standard slope (charts)
- **K** = Kid knows best (learner decisions)
- **I** = Induction (teaching and research strategy)
- **N** = N of 1 (teaching and research tactic)
- **N** = No observer (self recording)
- **E** = Environment (selects and controls behavior)
- **R** = Relationships (recorded directly)

**Gilbert’s Resistor Color Code Mnemonic**

- a FIVE dollar bill is GREEN
- ZERO; BLACK nothingness
- ONE BROWN penny
- a RED heart has TWO lobes
- a WHITE cat has NINE lives
- THREE ORANGES
- SEVEN PURPLE seas
- a FOUR legged YELLOW dog
- a BLUE tail fly has SIX legs
- an EIGHTY-year-old man has GRAY hair
This mnemonic outlined my APA presentation. The audience welcomed it. Most of these Skinner contributions to Precision Teaching, and their particular relevancies have been described in detail (Lindsley, 1971, 1991a, 1991b, 1991c). Here I will briefly only summarize them.

**B = Behavior Cycle and Results**

During the first 5 years of Precision Teaching we gave a lot of attention to behavior cycles (Lindsley, 1964). The early Standard Behavior Charts had "movement cycle" where "counted" now appears. In the Behavior Research Company one week Short Courses we spent the first morning on how and what to count. A behavior cycle was over when a new one could begin. You counted the salient (e.g., jumps out at you) part of the cycle. You ignored the beginning and end of the cycle because attending to them interacted with the counting. For example, you counted each time the headache intruded. Watching for the beginning of a headache often seemed to create a headache. Watching for the end of a headache often prolonged it.

In 1965 I developed the Dead-Man test to determine whether you had really pinpointed a behavior or just a bodily position. The Dead-Man test was, "if a Dead-Man can do it, it isn't behavior."

Skinner said you could count either behavior or its effects (Skinner, 1938, p. 6). Skinner went on to say the best measure is counting the results of behavior (Skinner, 1938, p. 38). Tom Gilbert has labeled these results of behavior, accomplishments (Gilbert, 1978). In workshops in 1962, Tom said, "Behavior you take with you, accomplishments you leave behind." I have called this Gilbert's Leave-It test for accomplishment: "If you can leave it behind, it's an accomplishment."

Both the Dead-Man and Leave-It tests have been recently more fully described (Lindsley, 1991d). The Dead-Man test has been used successfully in changing the interpretation of a published example of the reinforcement of being quiet in a dental chair (a dead man keeps quiet) to the punishment of disruption (Malott, 1991). Many of the published effects of positive reinforcement with severely disturbed and autistic persons are similarly misunderstood punishment contingencies.

**F = Frequency - Count per Time**

In other articles I have described Skinner's contribution of frequency and its power in detail (Lindsley, 1991a). In summary, the powers of frequency are that it is: universal, sensitive, productive, a dimension of behavior, and it directly states the probability of occurrence.

The universality of frequency is shown by the frequency spectra used successfully in optics, sound, electricity, and electromagnetic radiation. Frequency puts behavior in the cgs (centimeter-gram-second) system with the major laboratory sciences. Stephen Graf recently called my attention to the fact that Buckminster Fuller wrote that only angle and frequency define all experiences (Edmondson, 1987, pp. 65-67). Hull's four allegedly different response measures: A- reaction amplitude or duration, str-latency, n-trials to extinction and p-percent of occurrence (Hull, 1943) are all just different frequencies.

The sensitivity of frequency to variables that change behavior is shown by comparing it to other behavior measures. In recording the effects of drugs on free operant human behavior, we found frequency to be 50 to 100 times more sensitive than percent correct (Lindsley, 1956). Classroom frequencies recorded 40 times more effects of curricular changes than did percent correct from the same practice sheets (Holzschuh & Dobbs, 1966).

The productivity of frequency is shown by Pavlov's discovery of the laws of classical respondent conditioning by monitoring salivary drop frequencies (Pavlov, 1927). Skinner developed free operant conditioning by monitoring rat lever pressing frequencies (Skinner, 1938). Schedules of reinforcement were developed by monitoring pigeon key pecking frequencies (Ferster & Skinner, 1957). The multiply world of behavior and behavioral independence were both discovered from human frequency of Behavior Charts. Behavioral fluency and its results were discovered from human frequency charts (Haughton, 1981). All in all, frequency monitoring is probably the most highly productive, practical, and scientific behavioral method.

The probability of occurrence is directly recorded by frequency. Skinner thought probability was a very important aspect of frequency. The curve permits immediate inspection of rate and changes in rate. Such a datum is closely associated with the notion of probability of action (Ferster & Skinner, 1957, p. 7).

Frequency records what most people want to know about a behavior. What is the probability that it will occur? How often can I expect to find it? How often will I make errors? How often will
I be able to do it?

That frequency is more than a mere measure of behavior, that it is actually a dimension of behavior, can be easily demonstrated. Write your full name as slowly as you can for 5 minutes. Just barely keep the pencil moving. You should write no faster than 2 to 5 letters per minute. Note your signature when finished. About 7 out of 10 people write their 2nd or 3rd grade signature when writing as slowly as they can. This is frequency regression. Call out the old frequency and out comes the old behavior that has been dormant for decades. Change the frequency and you change the behavior. It is as simple as that. What better proof that frequency is a dimension of behavior?

S = Standard Slope Charts
The fact that the cumulative response recorder actually produced charts whose slopes were frequency and were standard for each species studied has been previously described (Lindsley, 1991a, 1991b). There were standard rat speed recorders (Skinner, 1938), pigeon speed recorders (Ferster and Skinner, 1957), and human speed recorders (Lindsley, 1956). A slope of 45 degrees was 4 per minute on the rat recorders. A slope of 42 degrees was 30 per minute on the pigeon recorders. A slope of 45 degrees was 20 per minute on the human recorders.

These standard frequency slopes gave us the idea for standard celerations on the Standard Celeration Chart. The four reference celerations on a rat recorder calibration grid were 1, 2, 4, and 8 responses per minute. Each is x2 the one below it. An angle of 27 degrees is 2 per minute. The four reference celerations on a Standard Celeration Chart are x1.4, x2, x4, and x16. Each is the square of the one below it. An angle of 34 degrees is x2 per celeration period.

K = Kid Knows Best
This is a slightly less tasteful version of the Precision Teaching slogan, "the child knows best." I dislike using the slightly derogatory "kid" in place of child, but "K" was difficult to match to a Skinner Precision Teaching contribution. My wife, Nancy, later suggested the German "kinder." But that seemed a little academic. Applications of "the child knows best" slogan have been detailed for many years (Lindsley, 1971, 1991b).

I = Inductive Teaching and Research Strategy
The inductive approach used throughout free operant conditioning and Precision Teaching has been covered in detail elsewhere (Lindsley, 1991b). I have suggested the induction ratio of the number of charts collected divided by the number of charts published (CC/CP) to put numbers on a scientist's degree of research induction. Skinner's CC/CP ratios were 40 to 1 for his pioneering free operant rat research (Skinner, 1938) and 78 to 1 for his schedules of reinforcement research with pigeons (Ferster & Skinner, 1957). Skinner's induction doubled in 19 years from 1938 to 1957. Our own Precision Teaching induction ratio has been 51 to 1 for the Behavior Bank (Lindsley, et al., 1971) and 97 to 1 for Precision Teaching Charts (Lindsley, 1990). Our induction doubled in 19 years from 1971 to 1990. Our Precision Teaching research induction is of the same magnitude as Skinner's free operant research induction. Also, Precision Teaching induction doubled in the same time that free operant induction doubled (e.g., x2 in 19 years which equals a celeration of x1.2 every 5 years).

N = N of 1 Teaching and Research Tactic
N of 1 means the number (N) of subjects or learners in the experiment or demonstration equals 1. Each learner serves as his or her own control. All experimental variables are tried on each learner (Johnston & Pennypacker, 1980, pp. 255-257). There are no experimental groups to compare with control groups. Averages have no value in a science of individual behavior. Hear it from Skinner:

A prediction of what the average individual will do is often of little or no value in dealing with a particular individual. The actuarial tables of life-insurance companies are of no value to a physician in predicting the death or survival of a particular patient (Skinner, 1953, p. 19).

Skinner once said when presenting research at a meeting of the American Psychological Association:

In deference to the standards of this association, I now will report on the other rat (Skinner, 1983, p. 123).

N = No Observer - Self-Recording
"No Observer" means just that. The best and most efficient learning occurs with self-counting, self-timing, self-charting. Skinner wrote in his first classic book:

All the figures in this book were made directly by the rats themselves (Skinner, 1938, P. 60).

Problems of observer reliability and validity disappear with self-recording. The only question left is...
what was the learner counting? The most valid answer is what the learner says he or she counted. Reliability is revealed by the bounce on the Charts and validity, by the time taken to reach aims.

**E = Environment Selects and Controls Behavior**

Environment means that you change behavior by changing its environment. Everything you do about behavior is in its immediate environment. You stimulate behavior from its environment. You record the effects of behavior on its environment. And, you accelerate and decelerate behavior by rearranging its environment. Skinner first called this "environmental control" (Skinner, 1938, p. 55; 1953, p. 227), occasionally "manipulation" (Skinner, 1953, p. 37), and, at the last, "environmental selection" (Skinner, 1990). A better name than "radical behaviorism" for free operant conditioning and applied behavior analysis might well have been "environmentalism." This would have located the behavior causation and control where Skinner meant it to be - in the immediate environment. Simply put, you change behavior by changing its environment.

**R = Relationships Recorded Directly**

Relationship recording has been used little in free operant conditioning and even less in Precision Teaching. It should be used much more. It means that instead of counting and charting a single behavior or accomplishment, you count and chart the performances that occur under one condition separately from the same performance occurring under other conditions. You count the relationships between the different behaviors and their related events. You count what Skinner meant by reflexes - completed Stimulus-Response relationships.

Relationships were recorded in the multiple and mixed schedules of reinforcement research. For example, with only one key being pecked, fixed interval 15 minute pecking was recorded on one recorder and fixed-interval 8 minute responding recorded on a second recorder (Ferster & Skinner, 1957). Relationship records were the core of my own social research with cooperative responding of two children recorded on one recorder (Azrin & Lindsley, 1956). In another experiment, six cumulative recorders simultaneously recorded socially stimulated and mechanically stimulated leadership between two persons (Cohen & Lindsley, 1964). Relationship records were the key to our powerful laboratory analysis of simultaneous discrimination and differentiation. In these experiments five recorders simultaneously recorded the development of different forms of stimulus discrimination and response differentiation (Barrett & Lindsley, 1962).

We called this functional recording and did a little in the early 1970's in improving social behavior between married couples. For example, a husband's attempts to compliment his wife were counted by the wife on one counter if they were received as complimentary, but on a different counter if they were received as criticisms (Duncan, 1971). These charts were useful in sharpening the husband's awareness of the effects of his intended compliments. Such sharpening of the awareness of each member of a couple greatly improved their relationship. Clearly, more relationship charting should be done. It is a rich field for clinical success and research discoveries.

**Conclusion**

I hope this B. F. Skinner mnemonic helps you the next time you are required to list B. F. Skinner's contributions to Precision Teaching.

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correct: Unpublished manuscript, University of Kansas Medical Center, Educational Research, Lawrence.


Lindsley, O. R. (1990, October). *Sharing key Charts that taught us most over 25 years*. Keynote Presentation at the 9th International Precision Teaching Conference, Boston, MA.


Dr. Ogden R. Lindsley is Founder of Precision Teaching and Professor Emeritus at the University of Kansas, Lawrence, KS.
The Great Falls Precision Teaching Project:
An Historical Examination

Ray Beck & Richard Clement

The Great Falls Precision Teaching Project is the most widely cited demonstration of the effectiveness of Precision Teaching. Combining use of the Standard Celeration Chart and principles of Precision Teaching originated by Ogden Lindsley, with additional techniques developed at the Experimental Education Unit at the University of Washington, educators in Great Falls, Montana, created a model of implementation and dissemination that has produced remarkable improvements in students' learning and achievement in both regular and special education classrooms.

Students showed marked improvements in classroom assignments, overall concentration and work habits, and displayed obvious enhancements in self-esteem. These effects led to use of Precision Teaching in all classrooms by all teachers, and to formal validation for both regular and special education by the U.S. Office of Education Joint Dissemination and Review Panel. Results included 20 to 40 percentile point improvements in basic skills achievement among regular elementary school students.

Introduction

The Precision Teaching Project has been a part of the Great Falls Public Schools for 15 years. Precision Teaching uses a set of measurement procedures for monitoring behavior and making decisions about the effectiveness of any teaching technique, curricular methodology, or behavioral intervention. It involves both direct and continuous observation and measurement of social and/or academic behavior. Precision Teaching is direct in the sense that it measures students' academic performance directly from the curriculum rather than indirectly by means of standardized tests. It is continuous insofar as measurement and charting of performance occur every day.

In addition to these key elements, the Great Falls approach includes specific instructional components emphasizing the remediation and/or development of basic skills through: (1) practice and drill, (2) setting of high academic performance standards, and (3) frequent data-based decisions.

The student receives daily opportunities to: (1) practice basic skills (e.g., reading, math, and spelling) at high performance levels, (2) maintain a charted record of daily growth, (3) progress through the curriculum at an individual pace, and (4) assist the teacher in making curricular decisions.

Initially, Precision Teaching procedures were used in Great Falls to assist mildly handicapped students with basic skill deficits in special education settings. Three elementary schools were chosen to house resource rooms where students received remedial instruction in math, reading, and spelling. The remediation focused only on the use of repeated practice using one-minute timings. Once students reached a predetermined rate (or "aim") of correct responding (i.e., 70-90 digits per minute in math facts), they moved to more difficult tasks in the curriculum sequence. Teachers and students used a set of decision rules with Standard Celeration Charts of daily one-minute timings. The rules specified a change in the program if: (1) the Charts showed no growth over three consecutive days, (2) the student was at "aim" (e.g., 200 words per minute) for two out of three days, (3) growth was less than x1.25 (25%) per week, (4) correct rates were decelerating, and/or (5) the student's progress was less than the projected celeration (learning rate) for three consecutive days. This model remained the focus of intervention strategies during the entire project period and is...
still the basic structure for special education resource rooms in Great Falls today.

The Sacajawea Plan
Many educators associate the Great Falls Precision Teaching Project with Sacajawea Elementary School which served the project as a training site for some 12 years. Moving from special education to the regular classrooms at Sacajawea was an evolutionary process. Initially, there were no stated objectives, routine methods, or procedures for the use of Precision Teaching in regular elementary classrooms. The transition from special education to regular education was the result of Sacajawea's involvement as one of six test sites in an experiment conducted by the Great Falls Public Schools Special Education Department. As part of the intervention plan, the principals and several staff members from three experimental schools visited the University of Washington's Experimental Education Unit and the Seattle, Spokane, and Tacoma Project.

Part of the visit permitted the observation of classrooms where students with learning problems were using teacher-made materials and teachers were obtaining daily timed samples of students' work. After visiting these classrooms, the Sacajawea teachers committed themselves to implementing Precision Teaching, not only in their resource rooms, but within every regular elementary class in the school.

A number of Sacajawea teachers felt that the same types of problems existed within regular classes as in special education settings. For example, students: (1) exhibited basic skill deficits, particularly in the areas of math, reading, and spelling, (2) lacked the tool skills such as "write numbers", "say sounds", "write letters", or "words" which are prerequisite to the basic skills of math, reading, and spelling, (3) were incredibly accurate, but painfully slow, and/or (4) lacked the ability to maintain skills over a period of time. (That is, they soon forgot their math facts, vocabulary, and spelling words.)

In the early stages of implementation, teachers were concerned with the amount of time Precision Teaching procedures would take from classroom instruction and with their ability to manage 25 to 30 individual student programs. However, through trial and "learning experiences", both teachers and students became comfortable with daily timings, charting, and the use of curriculum practice sheets. Most importantly, the students became comfortable with daily monitoring and with sharing their own performance gains with the rest of the class. The staff soon found that they had more, not less, instruction time. Students whose teachers set high performance standards progressed rapidly through the curriculum, particularly in the areas of reading and written assignments. Students seeing their gains in visual displays on Standard Celeration Charts demonstrated marked increases in self-esteem. In addition, youngsters extended their concentration, improved their work habits, and openly expressed pleasure with their individual progress. Some teachers reported that once students were accustomed to one-minute timings, they were better able to focus and concentrate on test material.

From a few teachers at the Sacajawea School in 1974, the Precision Teaching Model eventually involved 100 percent of the staff. Approximately 450 students were involved in reading, spelling, writing, math, geography, penmanship, art, and physical education programs using Precision Teaching. More recently, Precision Teaching has evolved into a preventative measure for students deemed "at-risk" for possible special education placement.

Evidence of Effectiveness
Throughout the Project's history, Precision Teaching techniques have been successfully applied to students in both regular and special education programs in grades K-12. The Great Falls Precision Teaching Project has demonstrated the efficacy of its approach to the United States Office of Education's Joint Dissemination and Review Panel on two occasions.

In the first review (1975), the panel examined the impact of Precision Teaching on mildly handicapped students for one academic year. In this evaluation, six elementary buildings were randomly assigned to experimental and control groups (3 buildings each). These schools were similar in terms of class size, pupil-teacher ratio, cost per pupil, type of support services, and family income. The students served were in the lower quartile of first, second, and third grade youngsters, and the intervention model included the following elements: (1) students practicing basic skills through daily one-minute timings, (2) setting high performance aims (e.g., 70-90 digits per minute in math facts, 200 words per minute in oral reading), (3) daily charting of performance, (4) data-based curricular decisions, and (5) use of a materials bank of 10,000 basic skill practice sheets.
Of the 19 experimental-control group comparisons, 15 (79%) of the experimental groups were significantly superior on post-test examinations. One experimental group caught up to a previously statistically superior control group.

In a second study, submitted to the Office of Education in 1979, Precision Teaching was validated for use by regular elementary programs. A longitudinal evaluation design demonstrated that students under the Precision Teaching model as first, second, third, and fourth graders significantly out-performed other district fourth grade students in the areas of reading, math, and spelling as measured by the Iowa Test of Basic Skills. Precision Teaching students out-distanced their control counterparts by over 20 percentile points in reading and some 40 percentile points in math.

A further study compared a Precision Teaching group against a control group of third graders on measures of reading and mathematics. Whereas control group students were superior on the measures prior to intervention, post-test scores showed a 24 percentile difference in favor of the Precision Teaching group in math and 32 percentile difference in reading over their counterparts.

A study conducted in 1977 attempted to follow up students who were deemed “remediated” in the 1974 Precision Teaching Project evaluation. Results revealed that youngsters remediated at the end of the 1974 school year were still meeting academic success with little or no washout effect, as measured by standardized achievement tests, classroom performance measures, and by teacher judgement. These data suggested that students under a Precision Teaching model did not regress once the intervention was withdrawn.

In 1981, the State of Montana Office of Public Instruction formally named the Precision Teaching Project as a proven-validated practice for use in high school math and English programs.

**Training and Dissemination**

The Precision Teaching Project remains one of the most significant demonstrations of effective dissemination and inservice training in American public education. Many educators who are familiar with Precision Teaching were first introduced to it through the Project. The procedures employed by the Project were and continue to be judged "best practices" in training and dissemination. Some of these practices are briefly described below.

**Exportable Training Materials**

Each participant in training sponsored by the Project received a manual that was designed not only to support the implementation of Precision Teaching in a classroom, but to support the sharing of techniques by trainees to a new generation of educators. The manuals, exercises, and masters for transparencies helped the trainees to remember what they had been taught and to teach others how to use Precision Teaching.

**Demonstrations of Precision Teaching**

The training occurred at the Sacajawea Elementary School where Precision Teaching was being used every day in each of the classrooms. Trainees visited classrooms to see teachers and students using the techniques. Trainees were able to talk with students individually and to ask them about how Precision Teaching had helped them to learn more efficiently. These individual conferences provided the students an excellent opportunity to teach the trainees about Precision Teaching. Seeing the procedures in use helped to reassure the trainees that Precision Teaching was practical, useful, and acceptable to teachers and students alike.

**Second Generation Training and Demonstration Sites**

To aid in the dissemination of Precision Teaching, the Project established several second generation training and demonstration sites located in various sections of the country. Sites were certified according to their adherence to the Precision Teaching model developed by the Project. The Project also certified trainers at these sites. Certification required approval of training procedures and materials. Materials, training outlines and schedules, and training activities were essentially identical to those used by the Project at the Sacajawea Elementary School. Periodic site visits and recertification activities prevented deviation from the original model.

**Certified Trainers**

As the number of requests for training increased, the trainers supported by the Project in Great Falls became unable to respond to all of them. The project established a network of trainers certified to conduct training in the Precision Teaching model. To protect the fidelity of the model and to ensure its validity, the Project required additional training for its trainers as well as demonstrations of presentation and delivery. Additional documentation of training effectiveness and impact were also required of all certified trainers.
Trainer's Conferences
The Project held periodic conferences for certified trainers. These conferences provided trainers with opportunities to share the results of their activities and to learn about new developments from the Project. These conferences created a sense of identity and purpose among the certified trainers as well as an appreciation for the importance of maintaining the fidelity of the model.

Effective Teaching Techniques
Most in-service training programs fail for many of the same reasons preservice training has generally failed to achieve uniform acquisition of skills. According to Borg (1975), teacher training programs fail for three reasons: "the learner typically does not focus on specific teaching skills; he has no effective model to emulate; and he receives no feedback on his performance that he can translate into specific changes in his teaching behavior" (p.7). We have already described the attention given to the development and validation of the Precision Teaching model. The Precision Teaching Project also addressed Borg's other concerns. Each Precision Teaching skill was carefully targeted for training. Trainers used "hands on" exercises that simulated actual classroom application to give constant and immediate feedback to the trainees. Building "fluency" in performance is an important tenet of Precision Teaching. Trainees learned skills to build the fluency of their students by building fluency in their own performance. This was accomplished by giving trainees ample opportunity to practice the skills and techniques they would use later to apply Precision Teaching in their classrooms.

Plans of Intent
To increase the probability that trainees would use the techniques they had learned, each trainee completed a Plan of Intent as part of the training. Each trainee was asked to stipulate the how's, where's, and who's in a plan to use Precision Teaching in their own setting. Project trainers, who were scheduled for follow-up site visits, retained a copy of the Plan of Intent. The trainee kept a second copy as a reminder of the terms of the "contract for implementation" which it represented.

Implementation Checklists
Every trainee received a check list which referred to each element and practice required for complete implementation of the model. Using the checklists, trainee evaluated the quality of their Precision Teaching programs. Trainees and Project staff also used these checklists to help re-calibrate Precision Teaching efforts during follow-up training conducted "on site".

Follow-Up Training
Four to six weeks following training conducted at the Training and Demonstration site, a certified trainer visited the site(s) where the trainees were working. Plans of Intent were reviewed along with the implementation checklists. This one to two days of follow-up permitted training to be conducted "in the field" where the skills were expected to be used.

Administrative Support
Inservice trainers are sometimes surprised by how many teachers seem to be interested in applying the skills they have learned, but who then become quickly discouraged because they find little support or encouragement for doing so. We encouraged "whole school" adoptions of the model and expected school administrators to be full and active participants in the training. In this we created an environment in the adopting schools that encouraged continued implementation of the model.

Summary and Historical Credits
Since the original approval by the Joint Dissemination Review Panel in 1975 as a special education project, and later in 1979 as a regular elementary program, the Great Falls Precision Teaching Project has met the challenges of dissemination throughout the United States and Canada. As a part of its ongoing dissemination efforts, the Project also:

* presented to the World Congress for Exceptional Children, University of Sterling, Sterling, Scotland
* presented for four consecutive years at the Association for Behavior Analysis Conference
* presented at sixteen national conferences, including Council for Exceptional Children, Association for Children with Learning Disabilities, and American Association of School Administrators
* originated the International Precision Teaching Conference, which subsequently led to nine annual meetings
was selected by the Cantalician Foundation as one of six non-discriminatory instructional practices for minority students, U.S. Office of Civil Rights

has become a required course for certification in school psychology and special education, State of Montana, and

was awarded the “Pacesetter Citation” as one of thirty developer-demonstration projects in the United States to address “Nation At-Risk”.

Since 1975, the Project’s model has been adopted in 44 states, 3 provinces in Canada, and several school districts in England. Over 8,000 educators have been trained, impacting some 153,000 students. Although the original Project personnel have migrated to various parts of the country, Precision Teaching training is still available using the Great Falls model and can be arranged by contacting the first author through Sopris West, P.O. Box 1809, Longmont, Colorado 80502, (303) 651-2829.

Reference

Ray Beck was Director of Special Education, Great Falls Public Schools, and Project Director of the Precision Teaching Project. Richard Clement was the Principal of the Sacajawea Elementary School, Great Falls Public Schools, Montanna, and is currently the Principal of a junior high school in Ketchikan, Alaska.
Stimulus Control of Personally Intrusive Behavior

Paul E. Andrews and Felix F. Billingsley

This investigation examined the use of a nonaversive stimulus control procedure to manage the personally intrusive behavior of a male, adolescent student with mental retardation. Prior to intervention, the student touched and moved very close to other people, whether invited to do so or not. When treatment began, the student was allowed to touch and in other ways "invade the space" of a staff person in the classroom who wore a "touch button." If he tried to move closer than an arm's length to a person who was not wearing the button, that person moved away with minimal contact. An A A' B A' design and Precision Teaching were used to assess intervention effects. Results indicated a reduction in the frequency with which the student invaded the space of non-button wearers and an increase in the frequency with which he invaded the space of individuals who wore the button. Implications are discussed.

In recent years, means for controlling challenging behaviors which attempt to minimize aversive treatment components have received increasing attention in the behavior management literature (e.g., Carr, Robinson, Taylor, & Carlson, 1990; Donnellan, LaVigna, Negri-Shoultz, & Fassbender, 1988; Meyer & Evans, 1989). Social skills instruction, functional communication training, curriculum revisions, and differential reinforcement paradigm are methods that have been the subject of considerable scrutiny and recommended for potential application (cf. Helmstetter & Durand, 1991; LaVigna, Willis, & Donnellan, 1989). In addition, several stimulus control procedures have been described (Carr, Newsome, & Binkoff, 1976; Carr, Robinson, & Palumbo, 1990; LaVigna & Donnellan, 1986). Those procedures capitalize on the behavioral control exerted by a specific discriminative stimulus (SD) or by a stimulus class.

Two general categories of stimulus control procedures have been identified. The first is an "SD-introduction" method in which stimulus conditions associated with low levels of challenging behavior are identified. Those conditions are then introduced within problem situations (cf. Carr, Robinson, Taylor, & Carlson, 1990; Touchette, MacDonald, & Langner, 1985). The intent of the method is to reduce the probability that target behaviors will occur when SD's for low rates or intensities of those behaviors are present.

The second category of procedures involves the development of stimulus control rather than the identification and introduction of existing SD's. The power of an SD is initially established from the reliable reinforcement or punishment of behaviors which follow SD presentation (Malott, 1991; Sulzer-Azaroff & Mayer, 1991). Intervention, therefore, consists of reinforcing or punishing challenging behaviors when those behaviors occur in the presence of specified SD's, but not in the presence of other stimuli. Where the behavior is reinforced in the presence of the SD, the goal is to increase the frequency of the response in the presence of that stimulus and decrease it under all other conditions (cf. Terrace, 1966). An example of such an "SD-development" procedure was described by LaVigna and Donnellan (1986). In that example, stimulus control was successfully used to bring public masturbation by a five-year-old girl under the control of an SD using reinforcement strategies. The girl frequently masturbated in her classroom, and other students were beginning to imitate her behavior. Instead of using a punishment procedure to decrease the behavior, the teacher simply moved her to the bathroom and provided differential reinforcement for private masturbation. The bathroom became an SD for that behavior, while masturbation in the classroom was eliminated.

Donnellan, LaVigna, Negri-Shoultz, and Fassbender (1988) and LaVigna and Donnellan (1986) have noted a number of advantages associated with the SD-development approach described above. They indicated, for example, that:

1. It is a relatively unobtrusive technique that does not require the use of aversive treatment to establish control over the behavior.

2. It has the ability to control behaviors without eliminating them. Behaviors can then be directed to appropriate settings or limited in
Such a limitation may act to reduce the impact of the undesirable behavior on others and control the inadvertent reinforcement which may have acted to maintain the behavior at a high rate. In addition, procedures can be applied to systematically shape unacceptable response forms into acceptable forms, while challenging behaviors are under reliable stimulus control.

3. It can facilitate generalization when the SD is introduced in various settings and with various people.

In spite of such potential benefits, it has been suggested that this category of stimulus control procedures represents “one of the most overlooked, understudied and underutilized strategies available to us today” (LaVigna & Donnellan, 1986, p. 101). With the exception of two data-based case studies (Donnellan & LaVigna, 1986), development of stimulus control to manage challenging behavior of individuals with developmental disabilities in applied settings is limited to anecdotal accounts (e.g., LaVigna, Willis, & Donnellan, 1989). In the case study, demonstrations presented by Donnellan and LaVigna (1986), stimulus control techniques were used either singly, or as part of a treatment package, to manage the inappropriate verbalizations of a student with post-encephalitic brain damage and echolalia of a student with autism.

The purpose of this investigation was to examine the use of a positive stimulus control method to reduce undesirable and stigmatizing social behaviors. Specifically, we attempted to determine whether stimulus control could be effectively used to decrease the frequency with which a student with mental retardation touched other people, blew in their hair, and in other ways “invaded their space.” In addition, an attempt was made to determine whether decreases in challenging behaviors would be accompanied by increases in social interaction and to assess generalization of stimulus control from a classroom setting to vocational training sites.

**Method**

**Participant**

Dan was a 16-year-old male high school student in a class for students with moderate to severe disabilities. He was diagnosed with moderate mental retardation, mild cerebral palsy, ataxic hemiplegia, and a seizure disorder. His height and weight were normal for his age.

Dan had a history of interacting with others by moving within 15 cm of them, touching various parts of their body, blowing in their hair, and articulating in a way that caused him to spit in their faces. Such behavior was a severe liability to Dan’s ability to develop friendships, interact with clerks and restaurant workers in the community, or work in a permanent job setting. On the occasions when he did not exhibit those behaviors, interactions with Dan were described as friendly and enjoyable.

**Settings**

Dan’s instructional program occurred in both the school and the community. Vocational training was provided at two different job sites. Functional academics, domestic, and recreational instruction was conducted in the school and other community sites. The stimulus control intervention was applied in his classroom which contained 22 students, two teachers, and four instructional assistants. There were rarely more than 10 people in the room, however, because many students and staff were in the community at any given time.

Generalization probes occurred at both the job sites. One job site was a nursery school in the basement of a church. Dan and one or two other students cleaned the basement one day a week for two hours under the supervision of a classroom assistant. There were no other people at the site while they cleaned. The other job site was a large meeting hall of another church. Dan, six other students, a teacher, and a volunteer collated, taped, and labeled newsletters for two hours once a week. Some, but not all, components of the stimulus control procedure were designated for application in the generalization settings during the intervention phase of the investigation.

**Materials**

A small white button measuring 7 cm in diameter was used as the discriminative stimulus. The button had one small red dot (5 mm in diameter) 1 cm from the top of the button and another red dot 1 cm from the bottom. The two dots were 5 cm apart. Dan had not been exposed to the button prior to the investigation.

**Movement Definition**

Originally, “invading another’s space” was defined as Dan moving closer than one arm’s length (approximately 70 cm) to another person. There were occasions, however, when others came closer than an arm’s length to Dan (e.g., to sit beside him and help him with school work), and Dan appropriately talked to them or continued his on-task behavior. In addition, there were occasions when
people came into his space, and he inappropriately touched them or moved his face to within 15 cm of theirs. For those reasons, the definition of "invading another's space" was revised after one week of baseline assessment. Following that revision, invasion of another's space was scored if Dan moved closer than one arm's length to others, touched others in any way, blew in their direction, or moved his face within 15 cm of their face if they came closer than an arm's length to him. Appropriate interactions were defined as Dan's either responding to a question at a greater-than-arm's length distance or initiating verbal interaction directly to another person without invading his or her space. Appropriate interactions began when he started speaking and ended when either the other person began talking or Dan stopped talking for more than two seconds. Talking out loud without directing his conversation to any particular person was considered an inappropriate interaction.

Design and Procedures
The experiment used an A A' B A' design and Precision Teaching to evaluate the effects of intervention. The design was an adaptation of the standard A B A withdrawal design. The adaptation included two baseline conditions, so that the behavior could be measured in the absence of the stimulus button (the A phase), as well as in the presence of the button before the stimulus had acquired control over the behavior (the A' phase). A second adaptation was that the replication phase reintroduced the A' phase rather than the A phase in order to examine maintenance of stimulus control.

Baseline
During the first baseline condition (A), data were collected in the classroom and two job sites to determine the normal frequency and duration of Dan's intrusive behavior. Following that condition, an A' phase was introduced in which a staff member wore the button, but continued to respond to Dan in a typical manner. For example, if the button-wearer had always ignored Dan invading his or her space, he or she ignored him in the A' phase as well. Assistants and teachers took turns wearing the button, but no single person wore it for longer than 30 minutes at a time. The purpose of the first A' phase was to ensure that the button did not initially possess stimulus control properties for Dan. It was hypothesized that the button would not possess such properties and, therefore, that there would be no difference between the A and A' phase in the frequency with which Dan invaded the space of others. The A' phase was also initiated to provide a baseline measure both for people wearing the button and people not wearing it. During A and A' phases, staff members and students behaved in a variety of ways when Dan invaded their space, including pushing him away, telling him to stop, ignoring him, and moving away from him. Informal observation and self-report data indicated that their behavior toward Dan during these phases were similar to how they behaved around him before the study began.

There was limited access to the generalization sites by observers, so the A' phase was not assessed in those settings. It seemed reasonable, however, to presume that if the button did not possess discriminative stimulus characteristics in the classroom, it would be unlikely to possess such characteristics in the community.

Intervention
Treatment consisted of allowing Dan to come within approximately an arm's length and touch, and/or blow at, the person wearing the touch button, but no one else. The person wearing the button was permitted to move more than one arm's length away if Dan touched that person continuously for more than 15 seconds or if Dan hurt him or her. After breaking for one second, however, Dan was allowed to re-initiate contact.

In order to decrease the reinforcement density for participating in inappropriate interactions with non-button-wearers, those individuals (including classroom peers) were asked to interact with Dan only when he stood more than an arm's length away. They were instructed to move away from Dan with minimal physical contact or verbal interaction when he came within an arm's length of them. If Dan attempted to chase someone, the button-wearer physically stopped Dan and told him that he was only permitted to touch the person wearing the button.

In the generalization settings, staff members wore the stimulus button, but other components of the intervention were eliminated. Conditions, therefore, were equivalent to those which existed during the A' phase within the classroom.

Replication
Following intervention, the A' phase was reintroduced. During that phase, staff members took turns wearing the button, but Dan was not conditionally permitted to invade their space. Everyone, including the individual wearing the button, was instructed to attempt to react to Dan
the way he or she had before the intervention phase began.

Data Collection
One of the investigators and a high school student assigned as a peer tutor in the classroom collected data. The investigator collected data alone on Tuesdays and the student collected data alone on Wednesdays and Fridays of every week. They both collected data at the same time on Thursdays, with the student serving as primary observer, to measure interobserver reliability. Data were not collected on Mondays due to Dan’s schedule, nor were they collected during the last five Tuesdays of the study due to a schedule change. In addition, data were not collected on some days due to absences, schedule changes, or school holidays and cancellations. The data collectors sat in the room at desks and recorded data on tally sheets.

After testing different durations of time for the first four recorded days, continuous recording for 30 minutes was employed. During the data collection interval, the frequency with which Dan invaded the button-wearer’s and other people’s space was recorded, as was the frequency with which Dan talked to other persons at a distance of greater than one arm’s length. As Dan decreased invading other people’s space, he was expected to increase appropriate interactions.

The investigator collected data at the job sites alone to assess generalization. Those data related only to Dan’s invading the space of the button-wearers and others. Appropriate interaction data were not collected because interaction with others at job sites during work time was often considered inappropriate. Three probes were taken at each site in the baseline phase and in the intervention phase, and two probes were conducted at each site during the replication phase.

Interobserver Agreement
As mentioned previously, the investigator and a high school peer tutor collected data in the classroom on the same day once a week to assess interobserver reliability. They sat at least five meters from each other and usually on the other side of the room (i.e., approximately 10 meters apart). Interobserver reliability was measured during 24% of all sessions. A frequency ratio, calculated by dividing the smallest of the two frequency counts by the largest, was determined after each interobserver session.

Reliability scores were calculated for three behaviors: invading the button-wearer’s space; invading non-button-wearers’ space; and appropriate interactions. The median reliability score for invading the button-wearer’s space was .93, with a range of .65 - 1.0. There was only one case in which reliability was below 80%. The median reliability measure for invading non-button-wearers’ space was .91 with a range of .67 - 1.0. Reliability between .70 and .80 was obtained in two instances. The median reliability score for appropriate interactions was .87, with a range of .29 - 1.0. Three scores below .80 were obtained.

Because reliability was unacceptably low in several instances, data obtained by the reliability observer were included in the data display for the Results section of this investigation and are represented by asterisks (*). A point on which only an asterisk can be seen indicates 100% agreement. Those data were presented in order to determine whether scores obtained from the reliability observer would suggest substantially different conclusions than those based on the scores of the primary observer. An examination of reliability observer data suggested that conclusions would not differ and provided support for the findings discussed in the Results section.

Procedural Reliability
During the treatment phase, the investigator measured procedural reliability of the entire program and calculated a procedural reliability ratio in a manner similar to that described in Billingsley, White, and Munson (1980). The entire program was written on a program plan sheet listing the set-up required, materials needed, and the arranged events or consequences for Dan’s behavior. For example, the plan stated that if Dan moved within an arm’s length of another person, that person was to move away from Dan immediately with minimal interaction. The procedural reliability ratio was calculated by dividing the number of times people moved away from Dan by the total number of opportunities (i.e., the number of times they moved away plus the number of times they did not). The ratio was calculated for set-up, touching the button-wearer, and touching non-button-wearers. Set-up was either correct or incorrect, based on whether someone wore the button at the beginning of class. Touching the button-wearer was counted if the person allowed Dan to touch him or her for at least 15 seconds.

Procedural reliability was measured during 38% of the intervention sessions. The set-up was correct every time. Procedural reliability for touching the button-wearer ranged from .93 to 1.0 with a median of 1.0.
Procedural reliability for touching non-button-wearers was extremely variable and required instructional intervention. All other students in the classroom had mild to severe mental impairments and often, when Dan touched them during the intervention phase or other times, they would ask him to stop or not respond at all. For the first five sessions of the intervention phase, instructions were provided to students and staff before the period began. Students were occasionally verbally reminded to move away from Dan, but that prompt alone produced low reliability ranging from .20 to .89 with a median of .55. After the 12th recorded day, students were physically moved away from Dan if he touched them and if verbal prompts were not successful after one second. That change is reflected in data displays by a dashed vertical line. With physical prompts, perfect procedural reliability (i.e., 1.0) was obtained during sessions 13 -15 of the intervention phase.

Results
Chart 1 depicts the frequency with which Dan invaded the space of people other than the button-wearer. The frequency of inappropriate movements during baseline phase A ranged from .28 per minute to 2.23 per minute (67 times during the half-hour assessment period). Phase A' frequencies fell within the range obtained during phase A and accelerated across the three sessions of that phase. The frequency of challenging behaviors decelerated rapidly during the first six recorded days of phase B; however, acceleration of those behaviors was noted across the six recorded days which followed, concurrent with decreases in reliability of treatment application. Following the implementation of practices which increased procedural reliability, low levels of inappropriate behavior were once again obtained. During the last three days of phase B, the frequency with which Dan invaded the space of others ranged from .07 per minute to .13 per minute, which was never more than four times during the half hour of assessment. Frequencies of invading the space of others when the A' phase conditions were reinstated increased to levels similar to those observed during the original baseline phase.

Chart 2 indicates the extent to which Dan invaded the space of button-wearers. Intervention phase data suggested that, although considerable variability existed in Dan's challenging behaviors, levels of responding were typically above those during baseline assessments and indicative of the development of stimulus control. Relative stability was achieved during the final seven assessment sessions of the phase and, in the last three sessions, the median frequency showed an increase of x3.4 over that of the three baseline datum points. In addition, an increase of x2.3 was noted over the median frequency with which Dan invaded others' space during corresponding intervention sessions illustrated in Chart 1. During the second phase A', responding was characterized by a high degree of variability, suggesting a breakdown of stimulus control.

Chart 3 indicates that appropriate interactions with others accelerated during the baseline phase. Once treatment began, however, the frequency with which Dan interacted with others steadily decelerated, eventually falling below the counting period floor toward the end of the phase. During the reinstatement of phase A' conditions, however, frequencies of appropriate interaction once again accelerated.

Data that were collected at the two generalization sites are displayed in Chart 4. Those data reflected general patterns of behavior which were consistent with those observed in the classroom. Invading the space of those not wearing the button substantially decreased during the treatment phase, but returned to baseline levels during the last phase (A'). During intervention, Dan invaded the space of the button-wearer at frequencies comparable to those with which he invaded everyone else's space during baseline. Invading the button-wearer's space decreased in the last phase.

Discussion
This study demonstrated that a nonaversive stimulus control procedure could successfully decrease inappropriate invasions of others' space. The frequency with which Dan displayed challenging social behavior decreased substantially when he was permitted to invade the space of the person wearing the discriminative stimulus button. Dan learned that he could come near and touch others, but only in certain contexts. Future steps planned by Dan's classroom staff include reestablishing stimulus control and using that control to provide a basis for shaping the behavior into socially appropriate forms of touching (e.g., shaking hands) and teaching Dan appropriate occasions and persons for touching. As Donnellan and LaVigna (1986) have noted regarding socially stigmatizing behaviors, "Ultimately, the solution is to develop effective social interaction skills ... Even when such training is underway, however, these behaviors must be addressed, as they may have serious consequences for individuals and programs" (p. 25). The current investigation indicated that stimulus control procedures can be an effective initial means.
for addressing such behaviors.

Data obtained in the study also illustrated the importance of relating frequent, direct, measures of target behaviors to assessments of the extent to which procedures were applied as planned. By noting that an undesirable acceleration of the data was accompanied by decreases in procedural reliability, it was possible to conclude that the problem was not one of treatment failure, but of implementation. Steps could then be taken to remediate that problem in a timely manner.

An unexpected result was that the frequency with which Dan interacted, with persons other than the button-wearer, decelerated during the intervention phase. During the baseline phase, Dan would often begin a conversation with a person at an appropriate distance and then get very close to that person. In the intervention phase, people ignored him and moved away when he came too close. It is possible that Dan failed to discriminate that social interactions could be maintained, as long as he stayed at arm's length and that the act of moving away by others served as an unplanned punisher for the entire unit of interaction. Dan, therefore, may have simply reduced the frequency with which he began conversations at an arm's length distance, rather than increasing the frequency with which he started conversations and maintained them at that distance thereafter. In any case, it seems that additional program components would be necessary to ensure an increase in Dan's appropriate conversational behaviors.

Generalization of stimulus control was observed at the two job sites as shown in Chart 4. While few trials were administered during each phase, the data effectively support the findings in the classroom. It is important to note, however, that since no reliability data were collected in generalization settings, conclusions must be considered tentative. The possibility of achieving generalized outcomes, however, seems deserving of research efforts in the future.

**Limitations**

At least initially, the staff in the classroom were reluctant to try this program for more than one period per day. This is testimony to the cooperation, involvement and dedication required by positive programming. Rather than simply requiring teacher-administered punishment, Dan's program involved the entire classroom -- staff and students alike. Staff time and energy were required to help train other students to move away from Dan, which added to their reluctance, and procedural reliability difficulties were noted.

On the other hand, many "traditional" behavior management programs may appear relatively simple on their face, but present a variety of difficulties and/or disadvantages during implementation. For example, overcorrection may produce strongly resistive behaviors on the part of learners, negative reactions from staff members (Miltonberger & Fuqua, 1981) and time-out may result in students being excluded from educationally important situations.

Educators who desire to use stimulus control or other positive approaches to behavior management should, therefore, be prepared to meet practical challenges. However, they need not presume that such challenges will necessarily be greater than those generated by many alternative methods which have frequently characterized programs for individuals with moderate to severe disabilities.

**Implications for Educators: Developing and Applying Positive “SD-Development” Behavior Management Programs**

1. Determine whether it is appropriate to reinforce the performance of target behaviors in the presence of specified SD's. Some indicators:

   a. The target behavior is considered challenging simply because it occurs in inappropriate context (including settings, persons, etc.).

   b. The target behavior is considered undesirable, but can be tolerated if it occurs primarily in the presence of only a very limited range of stimuli.

   c. Training in alternative, appropriate behavior forms can be facilitated if performance of the target behavior is limited to specific, teacher-selected conditions.

Some contraindicators:

   a. Performance of the target behavior presents a danger to the learner or others.

   b. Conditions under which performance of the target behavior would be acceptable or tolerated cannot be identified or arranged.

2. Specify an appropriate stimulus or set of stimulus conditions in the presence of which performance of the target behavior
will be followed by reinforcers.

3. If it is desired that the target behavior be performed in the presence of specified SDs under nontraining conditions (i.e., when access to reinforcers is not under strict manager control), identify circumstances under which generalization probes will be conducted.

4. Implement training and assess performance of target behaviors in instructional and generalization settings. An effective stimulus control program will be indicated by increases in the frequency of the target behavior in the presence of SD conditions and a decrease in its frequency in the absence of such conditions.

5. Collect frequent procedural reliability data to ensure that reinforcers follow performance of the target behavior only in the presence of specified SDs.

References


Paul Andrews is currently a teacher in the Lake Washington School District in Kirkland, Washington, while Dr. Felix Billingsley is Professor of Special Education at the University of Washington, Seattle. The authors thank Richard Haines, Ed Herbert, and Lake Washington High School for their support and express appreciation to Tim Slocum for assistance in developing computer-generated Standard Celeration Charts.
<table>
<thead>
<tr>
<th>Program &amp; Date</th>
<th>Programmed Event</th>
<th>ACCELERATION OR MONITOR</th>
<th>DECELERATION OR MONITOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/12/90</td>
<td>During designated periods, different staff members who are in the same room as Dan take turns wearing the button for up to 30 minutes at a time. Dan follows his normal daily schedule. The button-wearer is visible to Dan at all times and allows his/her space to be invaded when Dan desires. The button-wearer intervenes when Dan attempts to chase a non-button-wearer in an effort to invade that person’s space.</td>
<td>Dan seeks out button-wearer to initiate contact 1:1</td>
<td>Dan moves closer than an arm’s length, touches, blows at, or moves his face within 15 cm of any non-button-wearer 1:1</td>
</tr>
<tr>
<td>Time: Two to three 1-hour school periods per day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locations: classroom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials: button, data sheets, stopwatch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>People: Dan, all staff and students around him</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedural Reliability Intervention</td>
<td>Students who do not move away from Dan when he invades their space are physically moved away from him if verbal prompts are not successful</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Chart 1**

- **Baseline - No button-wearer (A)**
- **Baseline with button-wearer (A')**
- **Intervention phase - Dan is permitted to invade button-wearer's space, but no one else's (B)**
- **Instruction provided to increase procedural reliability (still B phase)**
- **Return to Baseline phase for replication (A')**

**Invasions of Others' Space per minute**

**Calendar Days**

- □ = Primary Observer's Record of invasions of others' space
- × = Reliability Observer's Record of invasions of others' space
Baseline - staff wore the button, but treated Dan as they had before. (A' phase)

Intervention - Dan is permitted to invade button-wearer's space (B)

Instruction provided to increase procedural reliability (still B phase)

Return to Baseline phase for replication (A')

- □ = Primary Observer's Record of invasions of button-wearers' space
- ✗ = Reliability Observer's Record of invasions of button-wearers' space

Invasions of Button-wearers' Space per minute

0.001 0.01 0.1 1 10 100 1000

Calendar Days

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
Chart 4:

- **Baseline - No button-wearer (A phase)**
- **Intervention - Dan is permitted to invade button-wearer's space (B)**
- **Return to Baseline phase for replication (A')**

- **Instruction provided to increase procedural reliability (still B phase)**

**Invasion of Others' Space per Minute**

- □ = Non-button-wearers: Preschool Site
- ▲ = Non-button-wearers: Church Site
- ■ = Button-wearer: Preschool Site
- ▼ = Button-wearer: Church Site

**Calendar Days**

0 7 14 21 28 35 42 49 56 63 70 77 84 91 98 105 112 119 126 133 140
Eliminating Self-injurious Behavior Through the Use of a Functional Analysis, Antecedent Interventions, Reinforcement Procedures and Data-Based Decision Making

Edward J. Cancio, K. Richard Young, Christine A. Macfarlane, Richard P. West and Martin E. Blair

Steve, a 14-year-old male student with a visual impairment and autism, exhibited self-injurious behavior (eye gouging) for over five years. This behavior was significantly reduced after conducting a functional analysis and employing antecedent changes and positive consequences. Precision Teaching techniques were used to monitor the intervention and make data-based decisions regarding intervention phases. A micro-reversal was implemented to determine experimental control. After the occurrence of self-injurious behavior was reduced to a low frequency, a change was made from a fixed interval schedule to a variable interval schedule of reinforcement. The use of the variable reinforcement schedule reduced the behavior even further. Since only two sessions remained before school adjourned, data were collected during the summer, the extended school year program. Even with a new staff, the occurrence of the eye gouging remained low and manageable throughout the follow-up phase.

Self-injurious behavior is one of the most extreme and destructive forms of human psychopathology. The descriptions, incidence and effects of self-injury, as well as interventions applied in an effort to control it, have been thoroughly documented in the literature (Bauer, Shea, & Gaines, 1988). Bauer et al. (1988) have contended that more time has been spent researching and refining the management of self-injury than any other behavior.

Self-injurious behavior (SIB) has been classified as repetitive, self-directed acts that result in physical harm or tissue damage (Bauer et al., 1988). Singh and Millichamp (1985) describe SIB as any self-inflicted, repetitive action that results in lacerations, bruising or abrasions. SIB varies in severity, yet can be so potentially dangerous as to be life threatening (Bauer et al., 1988).

Schopler, Reichler, and Lanning (1980) maintain that SIB is less common among children living at home and in the community than among institutionalized children. Schroedel, Schroedel, Smith, and Dallidief (1978) reported that the likelihood of an individual exhibiting SIB increases with the duration of his or her institutionalization, the severity of the handicapping condition and language deficits. Ten percent of institutionalized persons with severe disabilities and 40 percent of institutionalized persons with schizophrenia exhibit some form of SIB. Head banging is more frequent among males, self-biting among females and eye-gouging among persons with visual impairments (Bauer et al., 1988). Face slapping, head banging, eye gouging and hand biting continue to concern those who work with persons with autism and with other developmental disabilities; in part, because of frequent failures to control SIB among persons with severe disabilities. Recent work has centered on investigating those variables involved in the maintenance of this behavior. Researchers have identified four classes of variables involved in the maintenance of SIB: social attention, tangible consequences, escape from unpleasant situations, and sensory stimulation (Durand & Crimmins, 1988a). Hopefully, a more thorough understanding of maintaining variables should lead to more effective treatment of SIB.

Intervention strategies for SIB should be based on an assessment of the individual, his or her environment and the characteristics of the behavior (Bauer et al., 1988). Planning treatment requires careful consideration of the behavior, setting and maintaining contingencies (Bauer et al., 1983). The importance of determining factors maintaining an individual's SIB has led to a focus on assessment procedures. Iwata, Dorsey, Slifer, Bauman, and Richman (1982) devised a series of analogue conditions to determine the role of social attention, sensory stimulation and task demands on the SIB of nine subjects. They found considerable variability both within and between their subjects in these three conditions, suggesting that the occurrence of SIB may be a function of multiple variables. Similarly, Carr and Durand (1985) observed that low levels of adult attention and high levels of task demands were discriminative stimuli.
for the occurrence of SIB in three children with developmental disabilities.

The applied behavioral literature provides extensive support for the need to assess many variables in carrying out a functional analysis of behavior (LaVigna, Donnellan, & Mesaros, 1986a). A functional analysis (as discussed here) is a procedure for using assessment data to determine the purpose of behavior, so effective behavioral interventions can be programmed. A functional analysis is complete when three main outcomes are accomplished:

1. Operational definition of the undesirable behavior(s).
2. Prediction of times and situations when the undesirable behavior(s) will and will not occur across a full range of typical daily routines.
3. Definition of the function(s) (maintaining reinforcers) that the undesirable behavior(s) produces for the individual. (O'Neill, Homer, Albin, Storey, & Sprague, 1990).

Kanfer and Saslow (1969), for example, identify a number of dimensions which should be considered in carrying out such an analysis. These include analysis of historical setting events, antecedent events, organismic variables, motivation, and skill levels.

A functional analysis can provide the practitioner with information about the ecology of the problem behavior, the environmental context, the contingency rules, and the message value of the behavior (i.e., communicative intent). With this abundance of information the practitioner can more fully consider various behavioral interventions. The selection of behavioral interventions can focus on antecedents and consequences. Some treatment programs have utilized the delivery of aversive procedures as a consequence for the occurrence of the problem behavior. Recently, approaches to the treatment of aggression and other SIB have incorporated the systematic assessment of environmental variables into the selection of a specific intervention. As a result, intervention can effectively address the antecedents preceding the problem behavior and positive consequences for using appropriate alternative behaviors. (LaVigna, Donnellan, & Mesaros, 1986b; Repp & Singh, 1990).

Interventions should not simply reduce behavior problems. In choosing an intervention, the practitioner must also consider the effect of the intervention on the learner’s quality of life. From an ethical point of view, interventions should teach the learner an appropriate alternative response. The effectiveness of less restrictive interventions has been enhanced by pretreatment analysis of the effects of various environmental variables on SIB. While punitive procedures may produce rapid and sharp suppression of problem behaviors, serious questions about the durability and generalization of treatment effects, side effects, and social validity have suggested that the present punishment technology has narrow utility and is of little value for true community and social integration (LaVigna, Willis, & Donnellan, 1989). Foxx and Livesay (1984) proposed that our field become less concerned with the magnitude of treatment effects and how quickly they can be produced, and become more concerned with the durability of the effects.

Nonaversive behavior management seeks alternatives to the emphasis on behavioral suppression through aversive contingencies and calls instead for a focus on positive interventions that educate and promote the development of adaptive behavioral repertoires (Homer et al., 1989). Some commonly used examples of the use of positive consequences include differential reinforcement of other behavior (DRO), differential reinforcement of incompatible behavior (DRI) and differential reinforcement of alternative behaviors (Alt-R). Two examples of antecedent changes are curricular interventions and ecological manipulations. These types of interventions have the following advantages over more aversive interventions. First, these approaches are positive and safe. Second, new behaviors that become established reduce the risk for developing new problem behaviors. Third, positive approaches typically produce long term effects. As a new repertoire is built, natural contingencies in the environment maintain the behavior. Fourth, positive approaches are efficient, using whatever limited resources may be available in a given setting while contributing to the acquisition of general educational and developmental goals. Fifth, positive approaches are socially valid. The concerns and feelings of both the learner and others in his or her environment are addressed. Finally, positive approaches contribute to the dignity of the student. This enables the student to be treated with respect and dignity by peers and staff (Donnellan, LaVigna, Negri-Shoultz, & Fassbender, 1988).

In this study, we succeeded in reducing the eye-gouging behavior of a 14 year-old male student with autism and visual impairment. We accomplished this by utilizing a functional analysis to
select nonaversive procedures, and evaluating the effects of those procedures with Precision Teaching techniques, specifically data-based decisions.

We implemented the O'Neill, Horner, Albin, Storey, & Sprague (1990) functional analysis procedure in conjunction with Durand & Crimmins' (1988) Motivational Assessment Scale. We utilized these tools and procedures because we felt they were comprehensive in nature. We intervened using sunglasses, manipulatives, and differential reinforcement of other behaviors (DRO). We also employed Precision Teaching procedures, specifically using celebrations to make data-based decisions on a weekly basis. This enabled us to monitor the effects of interventions and make adjustments in the interventions as they are needed.

Method

Participant & Setting
Steve, a 14 year-old male student with visual impairment and autism, who displayed self-injurious behavior (eye gouging), participated in the study. The eye gouging was more likely to occur during times when he was left alone and during free-time activities, when his hands were not occupied. He also displayed stereotypic behavior, which consisted of hand flapping, head shaking, moving his head from side to side and moving his hands repeatedly in front of his eyes. Steve responded to simple requests and had five signs in his repertoire (i.e., bathroom, music, please, drink, and eat). He could serve foods with assistance, be ate and drank independently, but he needed assistance with toileting and walking around the building.

This study was conducted in a regular middle school in a program for students with severe multiple disabilities. The program served four students with autism and three with severe mental retardation. Staff consisted of one full-time teacher, three full-time and one half-time paraprofessionals. Instruction included: vocational training, self-help skills (e.g., toileting, grooming, dressing self), money recognition, writing, counting, daily living (e.g., setting table, preparing meals and snacks, washing dishes, and vacuuming), language, and fine and gross motor training. Students participated in the following integration activities: volunteer work in the middle school cafeteria, home economics, and community training (e.g., ordering meals in fast food restaurants, purchasing reinforcers from the local variety store, and purchasing foods from local grocery stores).

Experimental Design

The effects of treatment on Steve's eye gouging behavior were evaluated using an ABC...design with a micro-reversal. There were two main conditions: baseline and intervention with several variations of the intervention condition. Utilizing data-based decisions throughout this study created ten phase changes during the intervention condition. They were: (1) wearing sunglasses; (2) wearing glacier sunglasses (sunglasses with side shields); (3) glacier sunglasses, using manipulatives; (4) glacier sunglasses, using manipulatives and DRO on a one minute schedule for social and primary reinforcers; (5) glacier sunglasses, using manipulatives and social reinforcement delivered every minute, while primary reinforcers (i.e., edibles) were delivered every three minutes; (6) wearing glacier sunglasses, using manipulatives and DRO, with social reinforcement delivered every minute and primary reinforcers (i.e., edibles) delivered every two minutes; (7) wearing glacier sunglasses, using manipulatives and DRO social reinforcement delivered every minute and primary reinforcers (i.e., edibles) delivered every three minutes; (8) wearing glacier sunglasses, using manipulatives and DRO on a variable one minute schedule for social reinforcers and a variable three minute schedule for primary reinforcers; (9) wearing glacier sunglasses, using manipulatives and social reinforcement delivered every minute, while primary reinforcers (i.e., edibles) were delivered every three minutes; (10) wearing glacier sunglasses, using manipulatives and DRO on a variable one minute schedule for social and primary reinforcers and a five minute variable schedule for primary reinforcers. Phase 10 consisted of follow-up data during summer school with the same intervention procedures as Phase 9 but implemented by new staff members. Also, within the intervention condition a micro-reversal was conducted to document that the treatment variables were actually controlling the behavior. This reversal consisted of a 30 minute block of time during a single experimental session, when the intervention procedure and a reversal phase (i.e., no intervention) were alternately in place for six five minute periods (i.e., three periods of each condition). This process was used because it would be inappropriate to remove the intervention for long periods of time.

Target Behavior, Measurement and Interobserver Reliability

The subject exhibited eye gouging which consisted of: (1) sticking the right index finger into the outside corner of the right eye and penetrating the eye socket; (2) sticking the left index finger into the outside corner of the left eye and penetrating the eye socket; (3) sticking both index fingers into the eyes penetrating both eye sockets simultaneously (i.e., right finger, right eye, and left finger, left eye); or (4) moving index finger back and forth.
over the eye and under the eyelid. Steve has
demonstrated this behavior over the last five years.

We chose a frequency recording procedure to mea-
sure the occurrence of eye gouging, because the
study targeted only one child with one behavior
problem, and because of the ease in determining
when the behavior began and ended. Data were
summarized as rate per minute. Experimental
sessions lasted sixty minutes and were conducted
in the special education classroom, once a day,
five times per week.

A primary observer collected data daily. In addi-
tion, a second trained observer independently col-
lected interobserver reliability data during 22% of
the sessions (i.e., 35 sessions) while the experi-
ment was in progress. Training was conducted
until the second observer reached a criterion of
100% agreement for three consecutive experi-
tmental conditions. Ninety-seven percent agreement,
with a range of 75% to 100%, occurred between
the two observers using the frequency ratio
method (Kazdin, 1982).

Procedure

Functional Analysis

Before collecting baseline data, a functional analy-
sis was conducted that consisted of: (a) describing
the undesirable behavior operationally, (b) predict-
ing the times and situations under which the eye
gouging occurred or did not occur across the full
range of typical daily routines, and (c) defining the
functions (i.e., maintaining reinforcers) of the eye
gouging (O'Neill, Horner, Albin, Storey, &

The process of conducting the functional analysis
focused on the following steps:

1. An interview with the teacher was con-
ducted in order to obtain information about
when and how the behavior occurred.
This took one sixty minute session.

2. Observation data were collected to de-
terminate the pattern of eye gouging. This re-
quired sixty minutes a day for three days.

3. Possible hypotheses were derived, and
the teacher conducted environmental
manipulations to test the hypotheses (e.g.,
repeatedly presenting and withdrawing
environmental conditions in order to deter-
mine if there were consistently related
behavioral changes). This activity consisted
of ten five minute conditions, conducted
within a sixty minute session.

During the manipulation of environmental vari-
ables, we attempted to limit any negative effects on
the subject which follow:

Environmental Manipulations Guidelines

1. We determined the level of potential
risk involved for the student and staff.

2. We employed protective procedures for
student and staff. Steve was not left
alone; staff immediately stopped his eye
gouging when it occurred.

3. We only conducted manipulations
where it was possible to readily control the
situation.

4. We considered assessment of "precur-
 sor" behaviors as an alternative strategy.

During the environmental manipulations, five con-
ditions were presented to Steve in order to test the
reinforcing properties of these conditions and de-
termine which one initiated the least amount of eye
gouging. The five conditions under which data
were collected and the sequence in which they
were introduced were when Steve:

1. wore sunglasses,
2. looked through a kaleidoscope,
3. listened to music,
4. viewed a light box with differ-
ent color overlays,
5. manipulated objects.

Each condition lasted five minutes. After the full
sequence was completed, an identical second se-
quence was implemented. After assessing the data
on the environmental manipulations (see Chart 1),
we hypothesized that Steve was engaging in this
aberrant behavior for the purpose of sensory stim-
ulation. We concluded this due to the absence of
eye gouging behavior while Steve was wearing
sunglasses.

The Motivation Assessment Scale (MAS)

Following the functional analysis, Steve's teacher
completed the MAS to validate our original hy-
pothesis. This scale includes 16 questions about
the possible influence of social attention, escape
from unpleasant situations, tangible reinforcers,
and sensory feedback on challenging behaviors
(Durand & Crimmins, 1988b). Respondents are
asked to rate the likelihood of the target behavior
occurring in various situations on a 7-point Likert-
type scale.

Steve's SIB received the highest scores on the sen-
sory category, suggesting that the SIB may have
been maintained by sensory stimulation. The re-
results of the MAS supported the data obtained from
the functional analysis. Steve was engaging in this
aberrant behavior for the purpose of sensory stimulation. Results from these assessments should be viewed with caution. As with any functional analysis, the present methodology cannot be said to conclusively determine the function of this student's SIB.

Intervention

After completing the functional analysis and the MAS, we designed the initial intervention (i.e., Phase 1). We discussed the proposed intervention with Steve's teacher, parents, and other school personnel. The team decided that the intervention would begin with Steve wearing sunglasses. We made data-based decisions to maintain or modify the intervention on a regular basis (i.e., on a weekly basis and sometimes on a daily basis). All intervention procedures were administered by the classroom's paraprofessionals working in the class; they were trained by the first author.

Data-Based Decisions and Results

Phase 1: Wearing sunglasses

Throughout the various intervention phases, we interrupted each episode of eye gouging and told Steve to keep his finger out of his eyes. The behavior decreased substantially at the beginning of phase one which consisted of Steve's wearing of sunglasses. Following five days where data could not be collected, the incidence of eye gouging returned to levels that approximated baseline conditions. Following another period wherein data were not collected, eye gouging continued at levels similar to those observed during baseline; however, there was considerable reduction in performance level on the last day of this phase. This dramatic drop in performance was related to events beyond our control that effected the representativeness of the data, and therefore we did not attribute great significance to it. Overall, the celeration for this first phase of treatment was x1.05. In this phase throughout the study, the record floors varied in response to the observation and data collection opportunities. Occasionally, adjustments and observation time periods were required to accommodate early dismissals, assemblies, or circumstances such as prior activities lasting longer than anticipated.

Phase 2: Wearing glacier sunglasses

In an attempt to make it more difficult for Steve to engage in eye gouging, we introduced the use of glacier glasses, sunglasses with side shields attached to the frame. Associated with this change, the occurrence of eye gouging decreased initially and then increased somewhat throughout the remainder of the phase. Overall, the celeration for this phase was x6.00, a turn up of x5.70 from the previous phase. Obviously, another change was needed in Steve's treatment program.

Phase 3: Wearing glacier glasses and using manipulatives

We determined that an addition to inconveniencing eye gouging, we needed to establish a new behavior that would be incompatible with eye gouging. We conducted a preference assessment (Dyer, 1987) to determine which manipulative activities would appeal to Steve. He chose a vibrator, thick water balloons, a thick balloon with marbles in it, a ball, plastic shapes, and a plastic tube. Opportunities to manipulate these articles were combined with the wearing of glacier glasses during Phase 3. Steve was allowed to manipulate the articles only during times when academic responsibilities were not requested. Only one article was available at a time, but the articles were presented in a random order to limit the probability of satiation. Steve's preferred articles were the vibrator, the plastic tube, and the balloon with marbles. The eye gouging decreased considerably during this phase, resulting in a turn down of x16.50. The phase celeration was +2.75, which resulted in the lowest rate of eye gouging in the study.

Phase 4: Wearing glacier glasses, using manipulatives and DRO 1-M

Even though Steve's progress was acceptable, we thought we could hasten the decrease in eye gouging by presenting an edible reinforcer after each minute of time during which no instances of eye gouging were observed. The edible reinforcer (e.g., fruit, cookies, crackers, small pieces of candy, nuts) was paired with a praise statement. A beep tape was used to signal the end of each one-minute interval. When eye gouging was observed, we interrupted the behavior, and told Steve that he would not be able to receive the edible reinforcer, and reminded him that future rewards would be given him contingent upon the absence of eye gouging (e.g., "I can't give you a treat now because your finger was in your eye. Next time you will be able to earn a treat if your fingers are not in your eyes.").

The data suggest the decision to include the praise and edible reinforcer may have been unnecessary; the levels achieved during this phase may have been achieved without any change at all in the previous treatment condition. The incidence of eye gouging actually increased a little at the beginning of the phase, but then decreased through the middle part of the phase, producing the lowest rates yet of this behavior. The behavior increased
somewhat during the final portion of the phase, but the level was still lower than the ending level of the previous phase. While this phase may have been unnecessary, we did achieve a complete absence of the behavior during an experimental session for the first time in the study. This occurred three times during this phase. The overall acceleration during this phase was +1.33, a turn up of +2.06 from the previous phase.

During Phase 4, we decided to conduct a reversal to document that treatment variables were actually controlling the behavior. The teacher was not administering treatment all day long because she had other duties to perform. Although we felt this reversal was ethical, we wanted to minimize the amount of time without treatment during our session. We instituted a modified reversal which consisted of a 30 minute block of time; the procedure consisted of five minutes of treatment, then five minutes without treatment (i.e., withdrawal), repeated three times. The results provide evidence of experimental control; that is, reduced levels of eye gouging were consistently associated with the use of glacier glasses, manipulatives, and the DRO procedure. The following is a summary of the results of these six five minute periods:

<table>
<thead>
<tr>
<th>Treatment in Place</th>
<th>Occurrences of Eye Gouging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>Rate Per Minute</td>
</tr>
<tr>
<td>(A1)</td>
<td>0</td>
</tr>
<tr>
<td>(A2)</td>
<td>1</td>
</tr>
<tr>
<td>(A3)</td>
<td>0</td>
</tr>
</tbody>
</table>

Withdrawal of Treatment

<table>
<thead>
<tr>
<th>Occurrences of Eye Gouging</th>
</tr>
</thead>
<tbody>
<tr>
<td>(B1)</td>
</tr>
<tr>
<td>(B2)</td>
</tr>
<tr>
<td>(B3)</td>
</tr>
</tbody>
</table>

Phase 5: Wearing glacier glasses, using manipulatives and DRO 1-M (Social R+) DRO 3-M (Edible R+)

During Phase 5 we decided to thin the schedule of reinforcement. Social reinforcement was delivered every minute (similar to Phase 4), while edibles were delivered every three minutes. This was to prevent Steve from satiating on edibles. During this phase the occurrences of eye gouging accelerated by +20.

Phase 6: Wearing glacier glasses, using manipulatives and DRO 1-M (Social R+) DRO 2-M (Edible R+)

It appeared that we made the reinforcement schedule too lengthy and that we needed to alter the intervention. Therefore, during our sixth intervention phase, we continued to administer the social reinforcement every minute and deliver edibles every two minutes, contingent on Steve engaging in behavior other than eye gouging. This procedure was successful. Behavior decelerated by +2.0 (see Chart 2a).

Phase 7: Wearing glacier glasses, using manipulatives and DRO 1-M (Social R+) DRO 3-M (Edible R+)

During our next data-based decision meeting we decided to reinstitute our previous attempt to lengthen the reinforcement schedule for edibles. Social reinforcement was still on a one minute DRO schedule, but edibles were administered on a three minute DRO schedule. Behavior remained relatively low but was still highly variable. During the third day of this phase, an untrained paraprofessional ran the treatment program. None of the trained aides was available. Due to this change in personnel, eye gouging increased dramatically—up to 20 eye gouges in a sixty minute session (see Chart 2b, a continuation of Chart 2a).

Phase 8: Wearing glacier glasses, using manipulatives and VDRO 1-M (Social R+) VDRO 3-M (Edible R+)

When behavior stabilized once again, we decided to make another phase change. The goal of intervention phase eight was to thin the schedule of reinforcement. The second variable interval schedule was selected in an attempt to strengthen Steve's behavior and cause it to be more resistant to extinction. Intermediate reinforcement schedules typically are more successful in maintaining behavior over time. We continued to utilize a beep tape, but now the tape would beep on an average of every three minutes (e.g., sometimes it would beep every minute; other times it would beep every four or five minutes). This intervention modification further reduced the behavior (see Chart 2b); behavior was flat (±1.0) with a median of zero eye gouges during this phase.

Phase 9: Wearing glacier glasses, using manipulatives, VDRO 1-M (Social R+), and VDRO 5-M (Edible R+)

Intervention Phase 9 instituted a variable five minute DRO schedule. This phase change resulted in complete absence of eye gouging (see Chart 2b);
however, there were only two data points during this phase due school dismissing for summer recess.

**Phase 10: Extended school year program** -
- wearing glacier glasses, using manipulatives,
- **VDRO I-M (Social R+)** and **VDRO 5-M (Edible R+)**

Since only two data points existed during Phase 9, we continued to collect data during summer school (i.e., extended school year) even though there was an entirely new staff (i.e., a new teacher and three new paraprofessionals). The intervention was the same as Phase 9. Steve was never observed engaging in more than three eye gouges during any session throughout the summer. In just over half of the sessions, Steve did not engage in any eye gouging (see Chart 2b). The extended school year program was treated as a follow-up phase.

This study was part of the development of the **DECEL** software (Young, Macfarlane, Kemblowski, & Martin, 1991). Procedures were refined, formalized, and adapted for a computerized application. **DECEL** is an expert system that assists practitioners in conducting a functional analysis of challenging problem behaviors, designing interventions which includes development of alternate behaviors, monitoring student progress during implementation, and facilitating data-based decision making. This software helps less experienced professional use these procedures efficiently and effectively.

**Discussion**

Steve’s severe, chronic eye gouging had maintained at high levels for over five years. Steve’s physician was concerned that he may damage his eye to the point of popping his eye out of the socket. The findings of the study demonstrate that the use of a functional analysis paired with antecedent interventions, positive reinforcement techniques (DRO), and data-based decision making effectively decreased Steve’s eye gouging to near zero level. We believe that a major strength of this study was the use of a combination of procedures based a functional analysis and on-going data-based decisions.

Previous attempts to eliminate the eye gouging behavior were aversive in nature. For example, when Steve eye gouged or attempted to do so his fingers were taken out of his eyes, he was redirected, and told "no" sternly. The techniques we used allowed Steve to be treated in a positive and safe manner. New behaviors were taught, minimizing the risk of developing new problem behaviors. The approach was also socially validated by Steve’s parents, teachers, and staff supporting the intervention.

From the early days of behavioral analysis functional analyses have been recommended as a way to understand, and reduce or eliminate aberrant behavior (Baer, Wolf, & Risley, 1968; Bijou, Peterson, & Ault, 1968; Kanfer & Saslow, 1969; Skinner, 1938; Skinner, 1953; & Sidman, 1960). However, until recently, few researchers have reported utilizing a functional analysis when attempting to eliminate or reduce self-injurious behavior or any aberrant behavior (e.g., Berkman, & Meyer, 1988; Underwood, Figueroa, Thyer, & Nzeocha, 1989). A functional analysis identifies variables that maintain behavior. Therefore, it is our opinion that chronic and severe aberrant behaviors cannot be eliminated without a full functional analysis and that no behavior change procedure should be implemented without one.

Data were analyzed at least on a weekly basis by the team and sometimes on a daily basis, if the data warranted. Due to the utilization of data-based procedures, mistakes were recognized and remedied quickly (e.g., utilizing untrained paraprofessional, and thinning the reinforcement schedule to quickly).

We had a difficult time overcoming eye gouging behavior, but the combination of a functional analysis, systematic manipulations, identification of functions, positive interventions (e.g., manipulatives, DRO), and data-based decisions resulted in reductions of eye gouging to zero or near zero levels. There were no data as to which technique had the most impact on the behavior. The results could have been due to one of the techniques, (e.g., DRO, the sunglasses, or the use of manipulatives), but most likely the combination of all three of the techniques was needed. Future research needs to consider these relationships.

The weaknesses of this study included: the absence of collecting data on the actual use of the manipulatives, not collecting data on other appropriate alternative behaviors to replace the eye gouging, and the possibility of multiple treatment interference (Kazdin, 1982). If we had collected data on Steve’s use of manipulatives, we could have continually assessed the effectiveness of the different manipulatives and Steve’s preference to them. Nonaversive behavior management seeks alternatives to behavioral suppression through antecedents and positive contingencies and calls for a
focus on interventions to educate and promote the development of adaptive behavioral repertoire. Teachers and practitioners need to select appropriate alternative behavior to replace aberrant behavior. Data must be collected on this alternative behavior and decisions must be made based on the acquisition of new skills, as well as on the reduction of the problem behavior.

It is quite possible that the combination of the treatments caused the decrease of Steve's eye gouging. Multiple-treatment interference may arise when a subject receives two or more treatments within the same investigation. The results of the experiment may be internally valid; however, the possibility exists that the particular sequence or order in which the treatments were administered contributed to the results (Kazdin, 1982). Although this does not mean that the generalizability of this study is completely jeopardized, some caution should be considered when interpreting these results since it is not possible to know whether a certain procedure produced the change or a combination and/or sequence of procedures are responsible. However, even with these limitations, this study contributes to the treatment of persons with challenging problem behaviors. It is our hope that more teachers, practitioners, and researchers will follow the pattern of conducting a functional analysis before designing interventions to eliminate aberrant behavior and utilizing data to document success.

Future research in the area of SIB should also focus on the effects of functional curricula. Designing curriculum that meets both the student's functional needs and is incompatible with aberrant behavior may be more efficient and effective. Another aspect of our study which deserves further investigation is the functional relationship between undesirable behaviors and desirable alternative behaviors and making data-based decisions regarding those relationships. The systematic fading of the sunglasses (e.g., from glacier sunglasses to regular sunglasses, dark lenses to light lenses, and finally the removal of the glasses entirely) is a step in the process of teaching alternative behaviors and multiple outcomes in the remediation of severe self-injury: going "all out" nonaversively.

Summary of Steps for Translating This Research Into Practice

1. Operationalize behavior (i.e., pinpoint).
2. Conduct functional analysis (see O'Neill et al., 1990).
5. Choose a recording technique.
6. Collect baseline data.
7. Select intervention (e.g., DRO, DRI, or Alt-R).
8. Select the schedule of reinforcement.
9. During intervention, a kitchen timer or beep tape is set to a predescribed time. If no SIB occurs the staff member administers social reinforcement coupled with primary reinforcement (i.e., edibles).
10. If SIB occurs during interval, the SIB is interrupted and the student is told why he or she is not going to receive reinforcement. The student is given an opportunity to receive reinforcement during the next interval, if no SIB occurs.
11. Analyze data at least on a weekly basis. Then make treatment decisions based on the data.
12. Increase the duration of the intervals through out the behavior program as the students SIBs diminishes. If behavior is occurring frequently, start with a one minute schedule. Gradually increase the length of the intervals.
13. When the desired interval length is reached, use a variable interval schedule to strengthen low rates of the behavior.

References

Journal of Applied Behavior Analysis, 18, 111-126.


Ed Cancio is a doctoral student in the Department of Special Education at Utah State University, where Dr. Richard Young, and Dr. Rich West serve on the faculty. Dr. Chris MacFarlane is currently on the faculty of the University of Northern Iowa. An undergraduate student in the Special Education Department at Utah State at the time of this research, Martin Blair is now a classroom teacher. Kim Miske of the Logan City School District in Logan, Utah was Steve's classroom teacher. This research was partially supported by Grant No. 086C80030-90 from the Department of Education, Office of Special Education Rehabilitation.
Chart 1. Five-minute observations of self-injury reflecting five different environmental conditions.
CHART 2a. Occurrences of eye gouging.

6 CYCLE 20 WEEK

SUPERVISOR  ADVISOR  MANAGER  BEHAVIOR  AGE  LABEL  Eye Gouges
Kim Hiske  Mount Logan Middle School  Steve  14  COUNTER  COUNTED

INTRODUCTION
Wearing sunglasses to reduce self-injurious behavior (eye gouging)

Glacier glasses with side shields

Glacier glasses with manipulatives

Glacier glasses with manipulatives DRO(1) edibles every 2 minutes

Glacier glasses with manipulatives DRO(1) edibles every 3 minutes

COUNT PER MINUTE

COUNTING PERIOD FLOORS
Precision Teaching to Enhance Reading Skills of Introductory Psychology Students

William M. Beneke

Daily one minute timed readings (see/think) were immediately followed by one minute timed recalls (think/write). Students charted their reading and recall rates on Standard Celeration Charts, put their names on the reading, and submitted them to the instructor. This process required less than five minutes each day, produced a record of class attendance, and resulted in a 49% increase in reading rate and a 75% increase in recall rate over the semester. This procedure is a practical alternative to expansion of developmental education courses in reading and could also be used to enhance the effectiveness of existing developmental reading courses.

More students are entering college with deficient skills in reading, writing and mathematics. Plisko and Stern (1985) estimated that approximately one third of entering freshmen needs remediation. Most colleges now offer developmental instruction to meet this need. A 1985 study (Lederman, Ribaudo & Ryzewic) estimated that over 60% of four-year colleges and 80% of two-year colleges in the United States offer some form of developmental instruction.

Funds available to institutions of higher education for instruction are often fixed. The expansion of developmental programs further reduces funds available for instruction in college-level courses. Current debate centers on whether developmental courses should be dropped from the curriculum and whether students with basic skill deficiencies should be admitted at all (Mickler & Chapel, 1990).

In short, colleges and universities face difficult decisions about allocating resources. Does an institution expand developmental courses in order to retain under-prepared students at the cost of reduced funding for college-level instruction? Does it maintain funding of regular academic programs and ignore the special needs of students who enter with deficiencies in basic skills? Does it deliberately exclude such students from access to higher education? Posed this way, the decision becomes a dilemma. An alternative, which avoids the dilemma, is to devise means of incorporating developmental instruction into existing college-level courses. If this can be done without degrading the quality of instruction in the college-level courses, then institutions can attempt to meet the needs of students with academic deficiencies without diverting as many resources to developmental programs.

Reading instruction seems to be a "natural" for such an approach, because reading skills are used extensively in many courses. If the content of reading instructional materials is relevant to the course objectives, reading instruction should not detract from the academic goals of a course and may even facilitate mastery of objectives. Students who are prepared should profit as well. At minimum, they would gain better understanding of the content of the reading material; optimally, they would enhance reading skills in which they are already competent.

For such an approach to be broadly adopted in higher education, it would be highly effective yet require minimum investment of time, training and materials. The time devoted to enhance reading skills in a college-level course should be limited to small portions of overall class time. Since these courses would be taught by regular faculty members who are not specialists in reading, instructional methods must be easily understood and implemented. Costly materials or equipment would divert funds away from the instructional mission, defeating a major purpose of moving reading instruction into college level courses. With these limits, the reading instruction must be demonstrably effective. Techniques of Precision Teaching offer an excellent match for these requirements. Fluency seems to be a reasonable goal for reading skills, and brief timings can be introduced in the classroom without using large blocks of time and with very little teacher training. Two studies demonstrating the efficacy of such a Precision Teaching approach have already been conducted. Staff of the Center for Individualized Instruction at Jacksonville State University (Alabama) have assisted students in improving their reading rates and
comprehension. In a study skills course, McDade, Cunningham, Brown, Boyd and Olander (1991) found that charting daily one minute timed readings alone produced significant gains in both reading rate and comprehension. John Brown, a faculty member at the Center, used Precision Teaching approaches to incorporate reading instruction into the content of a developmental writing course (McDade & Olander, 1989). Brown utilized a one minute timing of reading (see/think), followed immediately by a one minute timing of comprehension (think/write). Students charted these timings. Finally, students were given five minutes to write an essay on an assigned topic relevant to the reading of the day. This procedure resulted in students' more than doubling their average reading speed and comprehension rates in eight weeks.

My study reports an attempt to replicate and extend this line of research, incorporating Precision Teaching techniques for reading instruction into a freshman-level introductory psychology course. I adopted the approach used at Jacksonville State University, combining a one minute timed reading followed by a one minute timed recall, with daily charting.

Methods

Subjects
Forty-nine students in an experimental section of introductory psychology at Lincoln University volunteered as subjects. Lincoln University is a public, open-admissions, historically Black institution in Missouri. Introductory psychology is a general education requirement for all students seeking a baccalaureate degree at Lincoln, so it is reasonable to expect this sample to be representative of Lincoln's undergraduate student population. Six students in this group were concurrently enrolled in a developmental reading course. Composite ACT scores were available for 30 of the students. The mean ACT Composite score was 15.1 with a standard deviation of 5.3. The mean national ACT Composite score at the time was approximately 19.

The control group consisted of 53 student volunteers enrolled in two other sections of introductory psychology. Included in this group were 11 students with concurrent enrollment in a developmental reading course. Other demographic information about the controls was not obtained.

Experimenter
It is important to note that prior to this study, I had no training, formal or informal, in reading instruction beyond my more general training in experimental psychology, learning, and operant behavior. At the time the data were collected, I had not yet been trained as a Precision Teacher. My exposure to Precision Teaching was limited to a week I had spent in the Center for Individualized Instruction at Jacksonville State University learning about the operation of their computer-assisted instructional system, several sessions on Precision Teaching that I had attended at the Association for Behavior Analysis, and limited reading of articles reporting results of Precision Teaching.

Materials
Thirty-six reading assignments, each 500 to 600 words in length, were prepared by retyping excerpts from published material. Prior to the study, measures of reading difficulty were obtained from computer analysis of each of the 36 assignments, using a commercial software product, Grammatik III (Wampler, Williams & Walker, 1988), which calculates the Flesch-Kincaid reading level. This software has been used elsewhere in research reporting the reading difficulty of public health literature (Alvord & Cheney, 1988). The 36 readings averaged 10.0 with a standard deviation of 2.2 on the Flesch-Kincaid grade-level scale.

The assignments were prepared by retyping the original material verbatim except that every 100 words, the cumulative word count was embedded in the test (i.e., if the two hundredth word of a reading were snake in the phrase, "... snake rattled...", it would be typed as "... snake 200 rattled..."). The excerpts were taken from several sources. Readings were predominately taken from psychology sources other than the students' text; readings also included a few excerpts from fiction and from natural history. A six cycle, semilog Standard Celeration Chart (Pennypacker, Koenig & Lindsley, 1972) was provided for each student to record individual performance.

The course final examination for subjects in the experimental group consisted of 100 multiple-choice questions drawn from the commercially available text bank (Beneke & Hancock, 1989) for the text.

Procedure
At the beginning of each of 36 class periods, the experimental students participated in a program consisting of a one minute reading (see/think) followed immediately by a one minute recall (think/write). Students indicated the number of
words read by circling the last embedded number they had encountered in their one minute reading.

In the recall session, they turned the reading sheet over to the blank reverse side and listed, in chronological order, as many ideas/concepts from the reading as they could. After the recall, students charted their reading speed and recall rate (items recalled/minute) on individual Standard Celeration Charts, put their names on the reading sheets and submitted them to the instructor. While students were charting their own progress, the instructor showed the Standard Celeration Chart with the class averages, through the preceding class, on an overhead projector. Students earned five points for each of the 56 days of participation, accounting for up to 12% of their course grade. Anyone arriving late was not allowed to participate that day. The instructor told this to the students on the first day of class, and stressed the advantages of improved reading skills. Aside from occasionally praising individual improvement, the procedures included no specific reading interventions.

Control subjects had the same one minute reading and recall timings for each of the two days at the beginning of the semester and two additional days at the end. Control students did not have Standard Celeration Charts and did not chart their reading and recall rates.

Results and Discussion

The primary finding was a substantial increase for experimental subjects in both reading and recall rates over the course of the semester. Controls did not change reading speed and showed only modest increases in comprehension. Mean daily data for all experimental students are shown in Chart 1 along with Flesch-Kincaid reading levels for each of the daily readings. The fluctuations in comprehension rate over days appeared to be inversely related to Flesch-Kincaid reading levels of the material. Reading speed showed very little bounce.

Charts for individual students were remarkably similar to the class mean chart. Data for two students are shown in Charts 2 and 3. J.B.'s reading rate (see Chart 2) increased from 200 to 300 words/minute over the semester. After some initial improvement, his recall rate appeared to be stable but inversely related to the difficulty of the reading material. P.B. (see Chart 3) showed a similar increase in reading rate. While her recall rate was inversely related to material difficulty, the recall rate also showed substantial improvement over the semester.

Comparisons based on the mean of the first two days to the mean of the last two days of participation for each student are shown in Table 1. Analysis of variance indicated a significant group-time interaction for reading rate, $F(2, 98) = 67.63, p < .001$, and for recall rate, $F(2, 98) = 56.48, p < .0001$. These data indicate that experimental subjects' reading speed and comprehension rate showed significant increases. Lack of corresponding increases in control subjects indicates that the increase cannot be attributed to the practice effects of the untimed reading involved in a semester's course work.

The social validity of this technique was further evaluated by examining student perceptions. Course evaluations were administered to the experimental group only. Included in the student course evaluation was a question asking students to indicate the extent to which they believed that their reading improvement transferred to reading in other settings. Although 30% of the students indicated that no transfer occurred and 5% were unsure, the majority reported either "slight" (43%) or "very much" (42%) transfer to other reading activities. Unfortunately, anonymity of the student course evaluation data form precluded relating responses on this item to the actual amount of improvement on the daily reading tasks.
Conclusions

This entire procedure required approximately five minutes of class time each day. Besides producing the desired effect on reading speed and comprehension, it generated an attendance record. The activity serves as a warm-up, interesting students in the rest of the class. Two practical limitations of this procedure were the costs of duplicating the daily readings for each student and the advanced planning to select and prepare the reading assignments. The research intentions in the present study required readings that the student had not previously encountered. In a non-research setting, controlling familiarity with the reading would be unnecessary. If readings are taken from the students' textbooks, duplicating and retyping costs could be avoided by requiring students to bring their texts to class.

If the textbook is used for the reading procedure, one would have to construct a table for each reading so that students could quickly determine their reading rate without the tedious task of having to count all the words and could be shown on an overhead projector.

I also would recommend placing cumulative word counts at the end of each line rather than embedding them every 100 words. This would permit students to readily determine exact reading rates. While knowing exact rates has no effect on the appearance of the Chart, it might enhance acceptance of the procedure by students (mine were distressed when they read almost to the next embedded number). On the other hand, such distress may be consequencing to achieve aim next time. Different instruction, curricula, rapid practice, aim setting, and consequences might also yield higher reading and recall rates with steeper celerations.

Even with the costs of selecting and providing copies of daily readings, incorporating reading activities into general education courses seems to be a promising and cost-effective alternative to expansion of developmental programs. If it were employed more generally, this approach would allow colleges and universities to meet the needs of under-prepared students without diverting funds from college-level instruction.

Linking these instructional activities conducted in non-remedial courses to developmental instruction in reading could enhance the effectiveness of both. Students not showing adequate celeration could be referred to developmental reading laboratories for additional timings on the same reading and other interventions as necessary.

References


Unpublished manuscript, Center for Individualized Instruction, Jacksonville State University, Jacksonville, AL.


Dr. William Beneke is Professor in the Department of Social and Behavioral sciences at Lincoln University in Jefferson City, Missouri. Bill received his training in Precision Teaching at the Ninth Annual Precision Teaching Conference in Fall, 1990, where portions of this research were presented.
The students did not practice on T, TH, or weekends as the charting implies; but lines connect all MWF data for the reader to see the inverse relationship between reading level of difficulty and ideas recalled more readily. For showing ignored data and no-chance days on the Standard Celeration Chart, see Handbook of the Standard Celeration Chart by Pennypacker, H.S., Koenig, C.H., & Lindsley, O.R., 1972, pp.18-21.
The students did not practice on T, U, or weekends as the charting implies; but lines connect all M-W-F data for the reader to see the inverse relationship between reading level of difficulty and ideas recalled more readily. For showing ignored data and no-chance days on the Standard Celeration Chart, see Handbook of the Standard Celeration Chart by Pennypacker, H.S., Koenig, C.H., & Lindsey, O.R., 1972, pp.16-21.
The students did not practice on T, TH, or weekends as the charting implies; but lines connect all M W F data for the reader to see the inverse relationship between reading level of difficulty and ideas recalled more readily. For showing ignored data and no-chance days on the Standard Celeration Chart, see Handbook of the Standard Celeration Chart by Pennypacker, H.S., Koenig, C.H., & Lindsey, O.R., 1972, pp. 18-21.
Can This Marriage Be Saved?  
Self-management of Destructive Inners  
John O. Cooper

By September 1990, many inner thoughts and feelings about my wife, children, and mother-in-law (i.e., my family) did not contribute to a good marriage. These problem thoughts and feelings persisted into February 1991. I became concerned about my marriage and the love of my wife. I did not want to let these thoughts and feelings to worsen or end 25 years of a loving and wonderful family arrangement. I knew the self-management projects of Precision Teachers such as Calkin (1981), Duncan (1971) and McCrudden (1990) and used their methods to change my destructive thoughts and feelings.

How I Managed My Problem

The Problem Defined
I used a wrist counter (Lindsley, 1968) for recording the Inners that were very negative/destructive or very positive/loving about my family. There were three main classes of destructive thoughts and feelings: (1) I engaged in self-pity. The self-pity focused on events such as cooking, general house cleaning (i.e., washing clothes, dishes, floors), and serving as taxi driver for the children. (2) I was agitated by my mother-in-law. (3) I developed strong thoughts and feelings for sexual activity with women other than my wife.

What I Did Before
Often, self-recording is sufficient to change problem behaviors (Hughes & Boyle, 1991). For one month beginning on February 16, 1991, I counted and charted the destructive and loving Inners on the Standard Celeration Chart. There was no improvement. The learning picture on the Chart shows the destructive thoughts and feelings occurred consistently more frequently than the loving Inners.

What I Did After
I counted daily all the loving thoughts and feelings about my wife and family that I could produce in one minute (i.e., think/count positives). Loving thoughts and feelings were of events from the first time I met my wife and our courtship, to special family events (e.g., holidays, vacations, birth of children, milestones). Examples of the loving thoughts and feelings recorded included: “I am glad I married this woman!” “What would I do without you?” “I am concerned about what you are doing.” “I love you, son.” Immediately following the introduction of think/count positives for one minute, the frequencies of destructive thoughts and feelings showed a jump down to below the counting period only with an occasional frequency spike. Loving thoughts and feelings show a corresponding jump up in frequencies. The think/count positives for one minute procedure was discontinued after nine one minute sessions. I continued counting and charting inner events until May 6, 1991.

The Improvement Continued
To assess maintenance, recording was reinstated on September 4, 1991. The frequencies show loving Inners remaining high with the destructive Inners low.

Comments
The intervention of think/count positives for one minute produced quick and durable positive improvement of inner events. I believe my personal history contributed to the effectiveness of this self-management project. The long positive family history with a wonderful wife and a happy marriage is likely to be linked to the immediate robust effect of the intervention. In addition, the self-management procedure was started before the destructive Inners actually impacted my family. I kept the Inners private and did not let them influence my public behavior.
Consumer Satisfaction
I was not pleased with the outcome of self-recording alone. The use of the Standard Celeration Chart and think/count positives for one minute was quick and easy to use. Destructive thoughts and feelings are no longer a personal or potential family problem. Best of all, I did not have to pay a marriage counselor. (See Chart pg. 45)

References

Chart Share Guidelines
People wishing to share interesting charts without writing lengthy “articles” are encouraged to submit a Standard Celeration Chart-share. Each Chart-share is limited to two pages in length—one Chart and a maximum of one page of explanatory text. The Chart and accompanying text will be printed on reverse sides of the same page to ensure they will not be separated or removed from the *Journal* for copying.

The Chart
The Chart should be as self-explanatory as possible. All the information at the bottom of the Chart (i.e., Supervisor, Adviser, Manager, etc.) should be completed as descriptively as possible. All charting conventions should be followed. If additional symbols or extensions of the conventions are required, they should be explained in an appropriate “Key.” For example, if in addition to charting “words said correctly” with a • and “words said incorrectly” with an x, you wish to note “words omitted” with a Δ, that should be noted on the Chart. Each phase of a multi-phase project should be clearly labeled with brief but descriptive phrases. For example, instead of labeling phases, “Phase I, Phase II,” etc., the phases might be labeled, “One minute of practice; teacher charts results,” and “Same practice; learner charts results.” Additional notes should be provided as necessary to explain the project, unplanned events which appeared to affect performances, and other features of interest.

The Back
The back of the Chart may be used to explain the project in more detail. At a minimum, you should try to provide the following:

1. title for the project;
2. your name and affiliation;
3. names and affiliations of other people involved in the project (first names, initials, or pseudonyms may be used to protect privacy, if necessary);
4. the purpose or goal of the project;
5. the specific measurement cycle(s) or target(s) being evaluated;
6. a brief statement of what you learned from the project.

Space permitting, you may add as much additional comment or discussion as you wish. If the submission exceeds the space available, the *Journal* editors will make whatever changes may be necessary while trying to preserve the basic message of the Chart-share.

Dr. John O. Cooper is Professor of Special Education at The Ohio State University and honorary Professor in the Center for Individualized Instruction at Jacksonville State University.
The purpose of this Chart sharing is to suggest how Precision Teaching procedures may be used in helping administrators to determine what is being done and what changes, if any, may be needed.

An instruction-special education task force met during the 1989-90 school year to improve the quality of instruction delivered to students in the Omaha Public School System. A Student Assistance Team (SAT) is frequently held by school personnel to think of interventions to help individual students who may be having academic and/or non-academic difficulties. After much discussion regarding SAT teams, the task force wanted to know more exactly what SAT teams were doing. To determine this, the task force decided to review the SAT teams' written records of what had been done from three schools. In total thirty-four SAT team records were reviewed.

The first Precision Teaching procedure is to identify, or "pinpoint", the behavior of concern (e.g., letters of the alphabet, etc.). Next, the pinpointed behavior is counted and charted, and interventions, or changes, are implemented as needed. Initially, when reviewing the records, a "pinpoint" or "pinpoints" had not been targeted by the reviewers. Review of a few records, however, indicated that teams were using a form, which contained intervention items classified within four categories (i.e., organizational, motivational, presentation, and curriculum). A miscellaneous category was added by reviewers for interventions, which they found in the records, but did not fit into the original four categories used by the SAT teams. The pinpointing and monitoring categories were used by reviewers to help organize and evaluate the SAT teams' written records.

Frequencies of intervention types, pinpointing and monitoring are displayed on Chart 1. The reviewers were able to locate in only five of thirty-four records (14.7%) identifiable student behaviors (e.g., identify alphabet letters) that could be counted. Student behavior was described in global terms (e.g., poor reader). Monitoring was a global term meaning some type of objective evaluation of an intervention's effect on student behavior (for example, a weekly spelling test). Monitoring as used by the SAT teams does not have the precise meaning that it has in Precision Teaching (i.e., daily behavior counts, divided by time, and charted on a Standard Celeration Chart). Even using the global meaning, only four of four-hundred-nine (.009%) interventions were monitored.

As a consequence of using Precision Teaching procedures to review the SAT team records, the task force recommended the staff be trained more precisely in pinpointing behaviors and monitoring them.

Hopefully, this Chart sharing has indicated how Precision Teaching procedures can be used in helping administrators bring order to the enormous amount of data which faces them and to help add precision to their decisions.

Tom, Patty, Donna, and Hans are school psychologists with the Omaha Public School System, Psychological Services, 3215 Cuming Street, Omaha, NE 68131.
DAILY BEHAVIOR CHART (DCM-SEN)

6 CYCLE - 140 DAYS (20 WKS)

BEHAVIOR RESEARCH

CALENDAR WEEKS

MIN HRS

PINPOINT

ORGANIZATIONAL

MOTIVATIONAL

PRESENTATION

CURRICULAR

MISCELLANEOUS

MONITORING

TOTAL INTERVENTIONS

1989 - 1990 SCHOOL YEAR

-COUNT-PER-MINUTE-

COUNTING PERIOD FLOORS
Discovering a personally meaningful motivator can increase one's rate of learning. Latoya was a participant in the “At-Risk Project”. She was failing to accomplish the basic tasks of a second grade student. She was especially behind in her mathematical skills. She made errors with her basic arithmetic facts. I used Precision Teaching and charted her progress in many academic areas, but my main concern was mathematics. A deck of 15 cards (SAFMEDS) was used and she was timed three times a week.

Not much seemed to motivate Latoya. I tried verbal reinforcement, stickers, extra recess time, but nothing seemed to motivate her. She constantly complained of stomach pains or headaches.

Three times a week for ten weeks, Latoya was taught and then timed for one minute. For the first seven weeks, Latoya only showed slight improvement. Then, in the eighth week, I told Latoya that if she got a couple more correct than the previous day, I would send a positive note home to her parents. All of a sudden, Latoya could not wait to be timed. She began to practice her problems at home. Her overall aim was to reach 25 correct and 0 errors.

On January 29, 1991, Latoya performed four correct responses and two errors. On April 5, 1991, she reached 34 correct answers and 0 errors. Latoya celeration lines for correct responses increased from x1.18 to x1.85. Her celeration line for errors in phase 1 was +1.21. Her celeration line for errors in phase 2 was x1.0 because there were no errors. Also, Latoya was one of four students out of 30 in her classroom who showed the greatest improvement in all academics over an eight week period.

The importance of personal motivation is vividly shown in this project. I have learned that motivation has a remarkable effect on the learning rate of a student. Motivation seems to be very individualistic. The use of Precision Teaching made it possible for me to observe Latoya’s improvement. Sending a note home was a positive reinforcer for Latoya to want to learn more.

Marcie Lucas is a student at the University of Florida in Gainesville. Dr. William Wolking is Professor of Special Education at the University of Florida in Gainesville.
Standard Glossary and Charting Conventions*
Fourth Revision
(Fall 1991)

Acceleration Target - a movement the behaver, manager, advisor, or supervisor expects to accelerate; the frequency is symbolized by placing a dot on the chart.

Accuracy Improvement Multiplier - a measure of change in accuracy over time; celeration correct/celeration incorrect.

Accuracy Multiplier - measure of accuracy: frequency correct/frequency incorrect; distance from frequency incorrect to frequency correct; also called the accuracy ratio.

Accuracy Pair - two movements, usually correct and incorrect, charted simultaneously.

Add-Subtract Scale - any measurement scale on which adding and subtracting by a constant amount is represented by a constant distance; the “up the left” scale on an equal interval chart.

Advisor - person who advises a manager, usually viewing Charts on a weekly basis.

**Aim - an ending goal set for an individual; usually expressed as a specific frequency; symbolized by drawing an “0” at the expected frequency.

**Aim Star - an ending goal indicating an aim date as well as an aim rate or frequency; symbolized by drawing an “@” at the expected frequency on the aim date.

Behaver - person whose behavior is displayed on the Chart.

Behavior Floor - the lowest daily frequency possible for a particular behavior; 1/number of minutes behavior can occur; symbolized by drawing a solid horizontal line on the Chart.

Bounce Around Celeration - up bounce and down bounce combined; the range of deviations of frequencies from the celeration line.

Celeration - basic unit of measurement of behavior change; change in frequency per unit time.

Celeration Aim - the expected celeration for a given movement.

Celeration Line - a best-fit, straight line constructed through frequencies of a given movement on the Standard Celeration Chart.

Celeration Multiplier (turn up or turn down) - value by which one celeration is multiplied or divided to obtain a second.

Change Day - first day of a phase change; symbolized by drawing a vertical line covering that day line on the Chart.

Counted - the behavior being measured.

Counting Period Ceiling - the highest frequency observable under a given counting procedure; symbolized by drawing a dash line on the Chart connecting the Saturday and Monday lines.

Counting Period Floor - the lowest frequency detectable by a given counting procedure; 1/number of minutes spent counting; symbolized by drawing a dash line on the Chart connecting the Tuesday and Thursday lines.

Cycle - distance on the Chart between consecutive powers of 10.


Deceleration Target - a movement the behaver, manager, advisor, or supervisor expects to decelerate; the frequency is symbolized by placing an “x” on the Chart.

Double Improvement Learning Picture - both movements of an accuracy pair with celerations in the expected direction; for example

\[ \begin{array}{c}
\times \\
\times
\end{array} \]

Down Bounce - the distance from the celeration line to the frequency farthest below it.

Duration - the amount of time it takes to complete one occurrence of a behavior; 1/number of minutes spent behaving.

Event-Following Celeration Line - a celeration line drawn through all frequencies for a
given movement just prior to a phase change.

Freehand Method - a method of visually estimating and drawing celeration lines.

Frequency - the unit of behavioral measurement; the number of movements per unit time.

Frequency Line - a horizontal line on the Chart; also called a counting line.

Frequency Multiplier (jump up or jump down) - value by which one frequency is multiplied or divided to obtain a second.

Geometric Mean - the appropriate method for obtaining an average on a multiply-divide scale.

Ignored Day - a day on which the behavior being measured occurs but is not charted.

Latency - the amount of time between the occurrence of a signal and the beginning of a movement; time from signal to start of movement.

Learning - a change in performance per unit time.

Learning Picture - the celeration lines of both movements of an accuracy pair viewed together; for example, • •

Manager - person who works with the behavior on a daily basis.

Median Celeration - the middle celeration is a celeration distribution; symbolized by drawing a “<” on the Chart.

Median Frequency - the middle frequency in a frequency distribution; symbolized by drawing an “<” on the Chart.

Most Recent Celeration Line - a celeration line drawn through the last 7 - 10 frequencies for a given movement.

Movement - recorded behavioral event; usually specified in terms of a movement cycle with a beginning, middle, and end.

Multiply-Divide Scale - any measurement scale on which multiplying and dividing by a constant amount represented by a constant distance; the “up the left” scale on the Standard Behavior Chart.

No Chance Day - a day on which the behavior being measured has no chance to occur.

Overall Celeration Line - a celeration line drawn through all frequencies for a given movement.

Performance - the number of movements per unit time; also called frequency.

Periodic Celeration Line - a celeration line drawn through all frequencies for a given movement in a specific time period, such as biweekly or monthly.

Phase Change - a deliberate alteration made to the behavior’s environment in an effort to improve the behavior being measured.

Quarter-Intersect Method - a method used when it is difficult to visually identify the exact trend of the frequency dots. For example, draw a vertical line halfway between the time period covered by the frequency dots (include ignored and no chance days) - thereby dividing the data into two equal parts and then divide the equal parts into halves; locate the median frequency for each half and put a dash where the median frequency value and the quarter line intersect for each half period; then draw a line connecting the dashes. This line forms the celeration line which is used for measuring the trend and the direction of the frequency dots.

Recorded Day - a day on which the behavior being measured has an opportunity to and is recorded.

SAFMEDS - card deck with questions on one side and answers on the other. The mnemonic is - Say, All, Fast, a Minute, Every Day, Shuffled.

Single Improvement Learning Picture - one movement of an accuracy pair with a celeration in the expected direction; for example, • • •

Split-Middle Line - a line drawn parallel to a quarter-intersect celeration line, such that half the data points fall on or above the line and half the data points fall on or below the line.

Standard Celeration Chart - a standard, six-cycle semi-logarithmic chart that measures frequency as movements/time and celeration as movements/time/time; Daily, Weekly, Monthly, Yearly and Summary versions are available; also called the Standard Behavior Chart.

Supervisor - a person who views the Charts on a frequent basis.

Total Bounce - distance from the highest to the lowest frequency; analogous to range of an add-subtract scale.

Trend-Following Celeration Line - a celeration line drawn through visible trends for a given movement.

Up Bounce - distance from the celeration line to the frequency farthest above it.

* * *

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** Additions to the Third Revision
In Memorium

John Alfred Barlow
January 22, 1924 to August 2, 1991

The threads of John's life were bound to family, teaching, internationalism, and mysticism. The influence of his life remains important to many. We shall miss John; however, his spirit and contributions will always remain with us.

Born in Gallipolis, Ohio to Alfred M. Barlow and Marian S. Barlow, John grew up around Cleveland, where his father was Chief Attorney for the Veterans Administration. He first traveled at age 13, when he spent a summer in Germany. The trip was arranged by his father, who wanted him to learn to respect cultural variety. After graduating from high school in 1942, John spent three years in the Army Air Force, serving in the South Pacific as a radioman in fighter-plane control. His experiences in combat during the Philippine Liberation campaign, along with his readings at the time, led him to a life-long commitment to non-violence.

On his return after the war, John enrolled in Oberlin College. Later, he entered the doctoral program in Psychology at Duke University where he was awarded his Ph.D. in 1952. While a student, John involved himself deeply in social-concerns. This led to his interest in the American Friends Service Committee, an Assistance Organization that shared his honesty, care, and respect for the needs of others. Participation in Friends activities became the outward expression of his strong inner commitment to the spirit of life.

In 1964, he was selected as a Fulbright Scholar, establishing a Department of Psychology at Thammasat University, Thailand. "Leadership as operant conditioning" developed into an intellectual focus for John, growing out of a childhood interest in China and his own interest in new teaching techniques. He was fascinated by the great social experiment of the Maoists, where mass-line leadership methods paralleled his techniques of Stimulus, Response, and Contiguity, the revised title of his 1965 book.

Teaching became John's primary passion, as well as profession. His research centered on it, involving him in programmed instruction and, later, in classroom techniques of student mastery before proceeding to new material. He never relaxed his concentration on teaching, and he never taught a course the same way twice. Intrigued by Precision Teaching late in his life, John completed his training as a Precision Teacher at the Ninth International Precision Teaching Conference and became a strong supporter of this Journal. John's honesty helped him approach others with consideration for differing perceptions and needs. He avoided exploiting others or allowing others to exploit him, knowing others' integrity to be as important as his own. Teaching was always a struggle to him, though a positive one; many students remember his efforts and value the learning he helped them accomplish.

John died of cardiac arrest at Brookdale Hospital in Brooklyn, New York.
We invite your participation in the 10th Annual International Precision Teaching Conference to be held in Utah between March 25 and March 28, 1992. Our theme will be "An Educational Summit: Establishing America's Agenda for Accountability."

HOW TO SUBMIT A PROPOSAL:

The International Precision Teaching Conference is designed to bring practical and relevant information to our audience. The convention features "program tracks," based on current and future education trends. Your program proposal should be designed for one of those tracks.

To be considered as a speaker, your proposal must reach Susan Fister, 10th Annual International Precision Teaching Conference by October 31, 1991.


erasers:

All program presenters should have experience presenting programs on the proposed topic. New presenters are encouraged to team up with veterans.

Exhibitor Showcase: A limited number of tables will be available for commercial displays at 8:00 a.m. on March 25, 1992. The cost for the entire conference is $75.00 (Non-commercial poster information tables are free). One covered table will be furnished for each display. Contact Jerry Chnstensen at the Utah Learning Resource Center for more information and Vendor/Poster Proposal form.

Team Presentations: The 10th Annual International Precision Teaching Conference encourages "teams" of speakers for the program sessions. These teams could be comprised of principals, teachers, superintendents, professors, or curriculum development specialists.

Registration Fees: ALL presenters must pay the appropriate registration fee. All presenters will receive program agreements for approved sessions, which must be signed and returned before final approval. Only those programs for which agreements are issued and returned will be included in the Conference Schedule.

CRITERIA FOR ACCEPTANCE:

All proposals are competitively reviewed through a careful and systematic peer review process. They are evaluated on the relevance, scope, clarity, and practicality of their content, and the specificity, and clarity of their objectives. This includes the possibility for audience participation, and the use of audio-visual materials, handouts and references.
The following criteria for acceptance MUST be met to be considered:

- The form must be accurately completed.
- The form MUST be either typed or printed from a computer. NO HAND-WRITTEN forms will be accepted.
- The name of the PRIMARY SPEAKER must appear on the form.
- The form should present concise objectives.

ABSTRACT CONTENT:

Your abstract paragraph should be a summary of the objectives in your presentation. Do not list your objectives here. Please elaborate. The paragraph should contain pertinent details of your presentation.

OBJECTIVE:

At least three objectives should be listed which describe the learning outcomes, such as "At the end of the session, participants will be able to demonstrate, identify, complete, etc...."

HELPFUL TIPS:

- Use of audio-visual equipment enhances your presentation.
- Group involvement, such as hands-on participation, enhances your presentation.
- Clear, concise proposals are an important part of the selection process.
- Proposals which are handwritten and illegible will not be considered.
- You may submit as many proposals as you like (on individual forms). PLEASE COMPLETE EACH FORM.

PRESENTATION:

Your program should relate to one of the following program educational tracks. Please check the track which is most closely related to your program. Choose one category only.

1. Futuristic Ideas.
2. Specific strategies, tactics, methods, curriculum areas & populations.
3. Effective leadership-shared empowerment.
4. Training, applications and accountability.
5. Other innovations.

PRESENTATION FORMATS:

- Pre-conference workshops: 3 to 6 hour in depth application training sessions on a selected topic.
- Full session: 50-minute presentations, mini-workshops, demonstrations, etc.
- Poster session: Informal 50-minute session providing an opportunity to share data and written summary text on tack boards with others.
Poster Session proposals will be accepted up until January 24, 1992.

SPEAKER INFORMATION (Please type):

Primary Speaker Name ___________________________________________ Title ____________________________
Organization ___________________________________________ Address ____________________________
City ____________________________ State ________ Zip ________
Telephone: Office ____________________________ Telephone: Home ____________________________

Have you presented a session on this topic before: ________ Yes ________ No ________
If so when and where? ____________________________________________

Note: All additional speakers should be contacted by you prior to submitting this proposal. IPTC will only correspond with the primary speaker. All other participants should be informed of program status by the primary speaker.

ADDITIONAL SPEAKERS (Use additional pages if necessary):

Name ____________________________________________ Title ____________________________
Organization ___________________________________________ Address ____________________________
City ____________________________ State ________ Zip ________
Telephone: Office ____________________________ Telephone: Home ____________________________

AUDIO-VISUAL EQUIPMENT:

Each meeting room will be set theatre style with a lectern, microphone, head table, overhead projector, and screen. All other audio-visual equipment must be ordered through the AV company at your expense.

PERMISSION TO TAPE:

Convention tapes will be made available for sale. Please complete the information below to allow for the recording of your program:

I give permission for IPTC to tape my session: ________ Yes ________ No ________
If yes, please sign: ____________________________________________
PROGRAM DESCRIPTION (Please type all information):

Please do not send supplemental materials.

Program Title: ____________________________________________

List in one clear sentence the goal of the session and list up to 3 objectives:

Goal: ____________________________________________

Objectives: 1. ____________________________________________

2. ____________________________________________

3. ____________________________________________

Program Abstract: a) Provide a short description of the program, and b) Include a description of Standard Celeration Charted data or other data that you plan to share supporting your conclusions or demonstrations.

Conference Program Copy: Provide no more than a 3-sentence description to be used in the final conference program, subject to editing.
Journal of Precision Teaching

Center for Individualized Instruction
Jacksonville State University

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