Seven Successive Saturdays

Teaching Throwing: Precision Teaching in Physical Education

Cindy Street and Her Second Graders Relate to Rapid Practice and Charts

Repeated Readings With Precision Teaching to Distinguish LD From NLD

The Inner Eye: Improving Self-Esteem

Precision Teaching and Alzheimer's

Chart Share:

Precision Learning a Collegiate Vocabulary

In Memoriam: Addie Jane Barnes

Marie C. Cull, Phillip Ward, William J. Sweeney, & Gregg E. Drevno

Phillip Ward, Marie C. Cull, William J. Sweeney, & Gregg E. Drevno

Malcom D. Neely, Cindy Street, & Pupils

Patricia M. Daly & Jean Guldswog

Abigail B. Calkin

Carolyn Talbert-Johnson & John O. Cooper

A. Jane Barnes

A Publication of The Standard Celeration Society
The *Journal of Precision Teaching* (ISSN 0271-8200) is a multidisciplinary journal 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 (See Volume VIII, Number 2, Fall, 1991, pp 51--52.)
* 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.

The *Journal of Precision Teaching* staff:
Claudia E. McDade, Editor
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The *Journal of Precision Teaching* (ISSN 0271-8200) is published biannually by the Standard Celeration Society at the Center for Individualized Instruction, Jacksonville State University, Jacksonville, AL. Annual United States subscription rates are $25.00 for libraries, $20.00 for individuals and agencies, and $16.00 for full-time students. Advertising rates are available on request. Any article is the personal expression of the author(s); any advertisement, the responsibility of the advertiser. Neither necessarily carries *Journal* endorsement. Reproduction for scientific and scholarly purposes of any material published in the *Journal* will be permitted following receipt of written request. Address such requests to the editor at the above address.
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Editor's Comments

Claudia E. McDade

The Standard Celeration Society, chartered in 1992, is now the publisher of the *Journal of Precision Teaching*. Membership information about the Association for Precision Teaching, a division of the Standard Celeration Society, is contained in this issue. Charter membership is available through March 1, 1993. Also note the announcement and call for proposals for the 11th International Precision Teaching Conference, Salt Lake City, UT from March 24--27, 1993.

Beginning with Volume X of the *Journal*, issues will be published in Fall and Spring, so that classroom teachers can receive a full volume during a school year. Teachers won't want to miss the measurably effective instruction in a number of settings described in this issue. Malcolm Neely and Cindy Street team taught a second grade class to reach reading fluencies with rapid practice and charting four days a week for an entire school year. Twelve of their 24 pupils were at risk, served by Chapter 1 reading services. By the end of the year only three of the 12 still qualified for remedial assistance. Patricia Daly and Jean Guldswog used repeated readings with fourth graders--both regular ed and special ed--and demonstrated improvements on at least one generalization task for every student.

Thanks to Phillip Ward, Marie Cull, Bill Sweeney, and Gregg Drevno, Precision Teaching has entered the world of physical education--at least at The Ohio State University. Their articles involve instructing preservice teachers to discriminate correct and incorrect tool and component skills of throwing and to provide positive feedback for correct performance. Then the preservice teachers applied their new skills to enhance the throwing behavior of developmental students.

Carolyn Talbert-Johnson and John Cooper brought Precision Teaching to self-dressing skills for Alzheimer's patients. Not only did all subjects reach aim in fluency of dressing, but very positive responses were seen in their caregivers as well.

Comparing one-minute timings to twenty-four hour timings, Abigail Calkin summarized 45 projects in which she or her friends and colleagues counted inner behaviors. She discovered that the frequency of inners ranged from 0 to 82 regardless of demographics. One-minute timings had a strong effect on the frequency of inners, but not much effect on celerations.

What diversity in one issue! Pleasant Charting!!
Association for Precision Teaching
...a division of the Standard Celeration Society

Association for Precision Teaching

A network and support group for Precision Teachers and Precision Learners--those who use the Standard Celeration Chart in education, training, and self-directed learning.

Standard Celeration Society

A professional organization for all those who use the Standard Celeration Chart in education, therapy, economic analysis, marketing, financial planning, quality improvement, performance management or science.

Why Join

The Association for Precision Teaching (APT) provides a “home” for charting and Precision Teachers. It is a network of colleagues and friends devoted to improving teaching and learning. A variety of benefits to members includes:

* a year’s subscription to the *Journal of Precision Teaching*
* reduced conference fees for the International Precision Teaching Conference
* periodic mailings and notices about developments in Precision Teaching

History

The Association evolved from a 25-year history, beginning with the founding of Precision Teaching by Dr. Ogden Lindsley, supported by the Precision Teaching Project in Great Falls, Montana, and maintained with ten international Precision Teaching Conferences. In 1990, PT leaders from around North America decided it was time for an organization with expanded scope—to serve a broader range of needs for communication and networking among Precision Teachers and to make PT methods available to those seeking measurably effective educational alternatives. The APT, as part of the Standard Celeration Society, will address those needs with more than a conference, including the *Journal*, a membership directory, and opportunities to serve on committees and special projects.

Charter Membership

The Association welcomes support from those wishing to provide an extra contribution to its success during the initial year in existence. Charter membership will only be available to those who apply before March 1, 1993. Charter Members will be recognized in Association publications for the lifetime of the organization.
Association for Precision Teaching
...a division of the Standard Celeration Society

Membership Application

Name: __________________________________________________________

Title: ____________________ Organization: ________________________

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In 255 characters (including spaces) or less please write any description of yourself--interests, professional activities, etc.

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Make annual dues check in U. S. funds payable to the Standard Celeration Society.
Mail application and dues to:

D. C. Hendrickson, Membership Co-Chair
Association for Precision Teaching
454 Walnut Street Suite 3
Newton, MA 02160
Conference Announcement

Eleventh Annual International Precision Teaching Conference
Salt Lake City, Utah • March 24-27 1993

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For additional information write or call:

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Salt Lake City, Utah 84117
(801) 272-3431 • (800) 662-6624
Fax (801) 272-3479

NOTE: Poster Session Proposals will be accepted until January 15, 1993.
What is Precision Teaching?

Precision Teaching began more than 25 years ago with the invention, by Dr. Ogden Lindsley, of the Standard Celeration Chart (sometimes called the Standard Behavior Chart). The Standard Chart is a tool for recording and making decisions about learning and performance. Its scale "up the left" is frequency -- count per minute, per week, per month, or per year. Its scale "across the bottom" is calendar time -- days, weeks, months or years. Simply stated, Precision Teaching is use of the Standard Chart by teachers and students to make educational decisions.

By inventing the Standard Chart and training teachers and students to use it, Dr. Lindsley literally made scientific method available in the classroom. By deciding what to measure (academic skills, social behaviors, thoughts, feelings, etc.), setting learning and performance goals or "aims," charting, and deciding if and when to make program changes, teachers and students have been able to identify teaching and learning methods that work best for individuals while discovering general principles of curriculum and instruction.

Measured Effectiveness

Measurement and revision are built into Precision Teaching. Unlike most approaches to education which rely on occasional "research studies" to validate effectiveness, Precision Teaching involves daily measurement and continuous evaluation and revision of teaching or learning methods. Consequently, Precision Teachers do not merely seek effective instructional methods. Rather, they seek the most effective methods, those that produce the greatest possible learning and achievement for each individual.

Precision Teachers also conduct effectiveness studies. The most frequently cited study was the Sacajawea Plan of the Great Falls (Montana) Precision Teaching Project, conducted during the 1970s. By adding only 20 to 30 minutes per day of Precision Teaching to the usual curriculum and teaching methods, elementary school teachers helped their students gain by 20 to 40 percentile points on various sub-tests of standardized achievement tests, compared with students in schools that had not adopted Precision Teaching. These results led to validation by the U.S. Department of Education and dissemination of Precision Teaching methods through the National Diffusion Network. The results of the Great Falls project have been repeated and expanded throughout North America, with applications to virtually every student population including students with disabilities. Among the most dramatic results in recent years are huge gains in literacy achieved by adolescents and young adults using Precision Teaching methods.

27 Years of Measurably Superior Instruction

This year's conference brings together a remarkable group of educators -- truly among the finest and most effective in the World. This is no exaggeration -- their measured results speak for themselves. We also hope that all who participate will take home with them a renewed commitment to their students, to their own professional development, and especially to the broader society which is in such great a need of effective teaching methods. We need to spread the word!
We invite your participation in the 11th Annual International Precision Teaching Conference to be held in Utah March 24 - 27, 1993.

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 IPTC, 11th Annual International Precision Teaching Conference by November 20, 1992.

- **Speakers:** 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 24, 1993. The cost for the entire conference is $75. (non-commercial poster information tables are free). One covered table will be furnished for each display. Contact Jerry Christensen at the Utah Learning Resource Center for more information and Vendor /Poster Proposal form.

- **Team Presentations:** The 11th 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.
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 SHOULD be either typed, or printed from a computer.
- 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.
- You may submit as many proposals as you like (on individual forms). Please COMPLETE EACH FORM.

11th Annual IPTC, March 24-27, 1993, SLC, Utah
SPEAKER INFORMATION (Please type):

Primary Speaker Name________________________ Title________________________
Organisation________________________ Address________________________________
City________________________ State________________________ Zip____________________
Telephone: Office________________________ Telephone: Home____________________

Have you presented a session on this topic before: □ Yes □ No

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________________________
Organisation________________________ Address________________________________
City________________________ State________________________ Zip____________________
Telephone: Office________________________ Telephone: Home____________________

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 and tactics, methods, curriculum areas and 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 15, 1993.

AUDIO-VISUAL EQUIPMENT:

Each meeting room will be set theatre style with a lectern, head table, overhead projector and screen. All other audio-visual equipment must be ordered through the A/V company at your expense.
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 (or charts) 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.

11th Annual IPTC, March 24-27, 1993, SLC, Utah
Seven Successive Saturdays

Marie C. Cull, Phillip Ward, William J. Sweeney, and Gregg E. Drevno

This investigation examined effectiveness of teaching physical education preservice teachers to correctly discriminate pupil throwing. Three teachers served as subjects in this study. Teachers were given one traditional teaching day before intervention occurred. During intervention, teachers were taught to discriminate between correct and incorrect pupil throws. Following intervention, both teachers and pupils were video and audio taped, and systematically observed to identify correct teacher discrimination of pupil throws. Results indicate an increase in the frequency of correct teacher identifications and a decrease in the frequency of incorrect identifications. Implications are discussed.

Most physical education teacher education programs in the United States include a set of one on one, or one on two, teacher-pupil teaching experiences. These experiences typically involve time spent once or twice weekly in several different physical education settings. For example, at The Ohio State University, settings include 30 minutes spent in a swimming pool teaching swimming skills, 30 minutes spent teaching gymnastics skills (e.g., balances and rolls), and 30 minutes spent teaching fundamental movement skills (e.g., kicking, striking, throwing, and catching). In general, the teacher spends between 5 and 15 minutes on any one task in each setting. Preservice teachers are required to teach young children between seven and eight years of age each Saturday morning for a quarter. During this time it is common for teachers to be systematically observed using audiotapes (via wireless microphones), videotape, and direct observation by several observers including supervisors, parents, and researchers. Data are collected at least once per task per activity (i.e., swimming, gymnastics etc.), each day. Due to administrative and logistical problems, the ten weeks of the quarter are inevitably reduced to seven weeks, or more specifically seven Saturdays.

Teaching teachers to correctly analyze and appropriately respond to pupils in these settings represents two of the principal goals of this preservice teaching experience. In previous systematic observations of teachers in these settings, the researchers had determined that teachers typically failed to discriminate (almost without exception) the correct performance and were also non-contingent with feedback they provided (e.g., prompts, attempts at reinforcement, etc.). The teachers responded in much the same way after each pupil performance without regard to the performance of the pupil. This study investigated the effects of teaching preservice teachers to discriminate correct pupil performances. Standard Celeration Charts show the teachers' progress in correctly discriminating their pupils' behavior.

Method

Subjects and Setting
The subjects were three female students majoring in physical education, but identified by the professor in charge of this class as being at risk of failing the class. These preservice teachers were in their first or second year of the physical education program at The Ohio State University. Each teacher was assigned two, eight-year-old children. The eight-year-olds were enrolled in the University's Developmental Movement Education Program, designed to teach elementary school-aged children's basic motor skills in several activities including, gymnastics, swimming, sports, and games.

Materials
Archery-like targets and several buckets of tennis, nerf and rubber balls were used.

The authors gratefully acknowledge Dr. Jacqueline Herkowitz and the teachers and pupils who participated in this research.
Procedures
Prior to the start of the study, teachers performed a component analysis of the throwing skill, and assessed their pupils' throwing. After one day of traditional teaching, the teachers were taught to discriminate correct pupil throws. Teachers were required to discriminate each others' throwing correctly before the next phase of the study began. Also, teachers were required to discriminate the researchers' behavior each week prior, usually the day before, to the teaching session. These discriminations served to calibrate both the researchers' and teachers' behavior throughout the study.

During the study when students performed the skill correctly, the teacher praised and in some cases gave students stickers as reinforcers. When a pupil performed the skill incorrectly, the teacher was required to remain silent and not move. The teacher could model and ask the child to practice the correct response only after three incorrect performances in a row were observed.

Precision Teaching Procedures
The teachers and pupils were video and audiotaped throughout the study. Researchers using these tapes first coded the pupil's tool skill (a component of the throw) as either correct or incorrect, and then coded the teacher's response as either a "Say" or "No Say" (movement cycle) condition. If the "Say" or "No Say" conditions corresponded to the correct pupil performance, the teacher's behavior was coded as correct. If there was no correspondence, the teacher's behavior was coded as incorrect. Standard Celeration Charts were used to display the number of correct and incorrect correspondences over a constant 10 minute counting period for each of the seven Saturdays of the study. During the weekly calibration sessions, teachers were given feedback regarding the correct and incorrect responses from the previous week.

Accuracy Measures
As mentioned, both teachers and pupils were videotaped. The video camera was placed so that a pupil's behavior could be observed at all times. A teacher, almost always in view of the lens, wore a wireless microphone so that her verbal behavior could at all times be recorded. The videotapes were examined by two researchers using the component analysis provided by the preservice teachers; both pupil and teacher performances were assessed. The correct and incorrect correspondence was 100%.

Results

Standard Celeration Charts
Charts 1 through 3 represent the correct identification and response (i.e., "Say"/"No Say") by three preservice teachers to the ball throwing behavior of two students they were instructing. The data represent the correct and incorrect "Say/No Say" responses counting period.

Chart 1
After a one session baseline, Bev's data from Chart 1 revealed a "Take Off" learning picture. The number of correct "Say/No Say" responses per 10 minute counting period "jumped up" immediately after the discrimination training was implemented (intervention). Bev's scores for correctly identifying discriminations ranged from 26 to 70 with a median of 54 during the six intervention sessions. During intervention, the celeration of correct "Say/No Say" responses per 10 minute counting period was x1.25. The overall bounce in the data during intervention revealed a performance change of x3.0. This performance change indicated gradual improvement in discriminations and responses as Bev became more accustomed to the intervention. All learning opportunities (i.e., errors) remained below five with the exception of one outlier that occurred on session three. Learning opportunities that were below five were deemed inconsequential by the research team in terms of overall teacher performance.

Chart 2
After one session baseline, Sue's data from Chart 2 revealed a "Take-Off" learning picture similar to that on Chart 1. The number of correct "Say/No Say" responses per 10 minute counting period slightly improved immediately after the discrimination training was implemented. Sue's scores for correctly identifying discriminations ranged from 30 to 60 with a median of 42 during the six intervention sessions. The overall bounce in the data during intervention revealed a performance change of x2.0. This performance change
indicated a gradual improvement in discriminations and responses as Sue became more accustomed to the intervention. All learning opportunities remained below five with the exception of the outlier that occurred from session 3.

**Chart 3**

After a one session baseline, Mary's data from Chart 3 revealed a "Take-Off" learning picture similar to that on Charts 1 and 2. The number of correct "Say/No Say" responses per 10 minute counting period "jumped up" immediately after the discrimination training was implemented. Mary's scores for correctly identifying discriminations ranged from 30 to 60 with a median of 50 during the six intervention sessions. The acceleration of correct "Say/No Say" responses per 10 minute counting period was x1.2. The overall bounce in the data during intervention revealed a performance change of x2.0. This performance change indicated gradual improvement in discriminations and responses, as Mary became more accustomed to the intervention. All learning opportunities for Mary remained below five during the intervention.

**Discussion**

This study demonstrated that preservice teachers can be taught a discrimination program with relative ease and can implement it with high fidelity almost immediately. The frequency with which Bev, Sue, and Mary correctly identified pupil behaviors and responded correctly increased immediately after intervention. This study represents one of the first attempts to use Precision Teaching measurement strategies in preservice physical education. The learning pictures presented in Charts 1 through 3 present behavior frequencies. These frequencies provide an important measure of the effectiveness of this approach to teaching discriminations in teacher education in physical education.

The study also lends support to the validity of conducting a seven week training program designed to improve preservice teacher discrimination of pupil behavior. The teachers in these settings are frequently assessed on their ability to produce a rate of "feedback" per minute. Seldom is the accuracy of correct and incorrect discriminations taken into consideration. However, errors in discrimination, while significantly decreased with respect to baseline, were not reduced to zero during this study. All teachers who participated in this study received a passing grade in the class. The criteria for this grade remained the same (i.e., rate of "feedback" per minute) as did for the other teachers in the class.
DAILY BEHAVIOR CHART (DCM-9EN)
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6 CYCLE - 140 DAYS (20 WKS)

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ADVISER
MANAGER

Mary
BEHAVER
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Preservice
Teacher
AGF
LABEL
COUNTER

The Ohio State University AGENCY

Count
TUER

Sweeney
CHARTER

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140
COUNT PER MINUTE
0 1 10 100 1000
COUNCING PERIOD FLOORS
MIN HRS
0 5 10 15 20 25 30 35 40 45 50 55 60

SOME DISTINCTION TREATMENT
Teaching Throwing: Precision Teaching in Physical Education

Phillip Ward, Marie C. Cull, William J. Sweeney, and Gregg E. Drevno

This investigation examined the effects of physical education preservice teachers' correct discrimination of pupil throws. The subjects in this study were six female 8-year-old children. The teachers were taught to discriminate between correct and incorrect pupil throws. Pupils were videotaped and systematically observed to identify correct and incorrect throws. Teacher behavior was also recorded to provide an assessment of the fidelity of the treatment. Results indicate that after intervention, correct pupil throws increased in frequency, and incorrect throws decreased in frequency. Implications for physical education instruction are discussed.

Pupil performance in physical education classes is frequently measured in terms of how pupils spend their time (Siedentop, 1991). Inductively derived systematic observation systems are used to categorize pupil behavior into broad response classes. For example, a typical profile of a pupil in a physical education class might be described as: Susie spent 50% of the available time on task, 20% of the time listening to instructions, 10% of the time off task and 20% of the time involved in non-instructional activity such as waiting to get her name marked off on a roll, moving from place to place and gathering equipment. Time on task and its many variations are posited as proxy variables for pupil achievement (Siedentop, Tousignant, & Parker, 1982). Such information is used to define the effectiveness of the teacher in both research and undergraduate teacher assessment.

Another ubiquitous performance measure in physical education is an assessment of outcome, (e.g., did the ball go through the hoop, how fast did the child run). Though a valid and important measure, focusing on outcome alone and not technique is a counterproductive strategy. For example, a child might perform a forward roll to his feet, but have rolled on his head and not on his shoulders. In Precision Teaching, technique is more commonly referred to as tool movement. Tool movements are usually derived from a component analysis of a skill. There are several component analyses of sports skills in physical education (Vickers, 1990).

This investigation examined the effect that preservice teachers had when they discriminated between the correct and the incorrect tool movements of pupils learning to throw. The results of a pilot study found that teachers could be taught to discriminate pupil behavior with little effort and with high accuracy, but the question remained, "What effect did this discrimination have upon pupil throwing?" This investigation sought to examine the effect of teacher discrimination in terms of pupil throwing performance using the Standard Celeration Chart as the measurement tactic and diagnostic tool.

Method

Subjects
The subjects were six female eight-year-old children. The children were enrolled in the The Ohio State University's Developmental Movement Education Program where instruction is provided in aquatics, basic gymnastics (e.g., balances and rolls), and fundamental motor skills (e.g., running, striking, throwing, and catching). The program is supervised by faculty and graduate students specializing in teacher education and movement development and staffed by undergraduates majoring in physical education. The subjects were paired and each pair was taught by an undergraduate student. The instruction occurred over seven successive Saturdays of a school quarter.
**Materials**
Archery-like targets and several buckets of tennis, nerf and rubber balls were used.

**Procedures**
One day of traditional teaching was conducted before the teachers began using the intervention. The instruction involved teachers providing feedback in the form of prompts, praise, and corrections to students. For the most part, this feedback was poorly provided. It tended to be a "hit or miss" affair with little differentiation noticeable in either teacher or pupil performance with reference to the previous throw by the pupil. After the day of traditional teaching, the teachers were taught to discriminate correct pupil throws. When the pupil performed the skill correctly, the teacher praised and, in some cases, gave the students stickers as reinforcers using a simple token economy. When the pupil performed the skill incorrectly, the teacher was required to remain silent and to reduce any physical movement (e.g., gestures etc.). The teacher could model and ask the child to practice the correct response only after three consecutive incorrect performances were observed.

**Precision Teaching Procedures**
The teachers and pupils were video and audiotaped during the study. Researchers viewing these tapes coded first the pupil's tool skill (a component of the throw) as either correct or incorrect, and then coded the teacher's response. Standard Celeration Charts were used to display the number of correct and incorrect pupil tool movements over a constant 10 minute counting period for each of the seven Saturdays of the study. The 10 minute counting period was selected because this was the time allocated by the program coordinator for each teacher to instruct at any one activity station during the Saturday class.

**Accuracy and Procedural Reliability**
Both pupil and teacher performance were assessed. The video-camera was placed, so that the pupil's behavior could be observed at all times. While almost always in view of the lens, the teacher wore a wireless microphone, so that her verbal behavior("Say"/"No Say") could at all times be recorded.

**Dependent Measures**
The pupils were videotaped throughout the study. Videotapes were examined in slow motion by two researchers using the component analysis provided by the teachers. Each pupil's throw was coded as a correct or incorrect tool movement. The correct/incorrect correspondence was 100%. The component analysis that the teacher used was a modified version of the Developmental Movement Education Program handbook (Herkowitz, 1991).

**Independent Measures**
Procedural integrity defined as the correct discrimination by the teacher indicated by the "Say" (correct tool movement), or "No Say" (incorrect tool movement) movement cycle, and is reported below for one pupil from each pair. Procedural integrity ranged from 73% to 100% across all subjects.

**Results**

**Standard Celeration Charts**
Data presented on Charts 1 through 3 represent one pupil from each pair of pupils who served as subjects in this study. The data represent the number of correct and incorrect tool movements per minute during the 10 minute counting period.

**Chart 1**
Results on Chart 1 indicate a dramatic "jump up" in Sally's throwing behavior after the discrimination training intervention when compared to the previous baseline (change from baseline to intervention indicated by the phase line). Sally's scores for correct throwing at the target ranged from 5 to 33 with a median of 24 during the intervention condition. This was an impressive improvement from just one correct throw during baseline. During intervention, the celeration of correct throwing behavior per 10 minute counting period was x1.5, while the learning opportunities (i.e., errors) was x1.8. The data on her throwing performance reveals a "Cross-over Jaws" learning picture. This cross-over occurs when the initial number of learning opportunities is greater than the number of correct responses in contrast to later responses where the number corrects are greater than the number of learning opportunities. Her overall performance change from baseline through intervention was x35.0
while the learning opportunities was +18.0.

**Chart 2**
Debbie's results on Chart 2 indicate a "jump up" in throwing behavior after the introduction of the intervention when compared to the baseline. Debbie's scores for correctly throwing at the target ranged from 10 to 29, with a median of 18.5 during the intervention condition. The celeration of correct throwing behavior per 10 minute counting period was x1.25, while the learning opportunities was +1.7 during intervention. Debbie's data on her throwing performance reveals a "Cross-over Jaws" learning picture. Her overall performance change from baseline through intervention was x9.0, while the learning opportunities was +15.0.

**Chart 3**
Ann's results indicate a "jump up" in the number of correct throws and a "dive" in the number of throwing learning opportunities after the introduction of the intervention. Ann's scores for correctly throwing at the target ranged from 5 to 28, with a median of 16 during the intervention condition. Her celeration of correct throwing behavior was x1.5 during intervention, while learning opportunities was +1.5 per 10 minute counting period. Ann's throwing performance reveals a "Cross-over Jaws" learning picture. Her overall performance change from baseline through intervention was x9.0, while the learning opportunities was +18.0.

**Discussion**
The results indicate that correct tool movements of ball throwing in physical education are easily observable, measurable, and changeable. Initial measures obtained during traditional teaching indicated a high number of incorrect tool movements for each subject and a low number of correct tool movements. All three pupils were able to make rapid celerations of correct tool movements after intervention and a reduction in the frequency per session of incorrect tool movements. The relevance of this statement becomes more significant because each of the subjects in this study had been a part of the developmental motor program for at least three quarters. That is, they had been instructed on how to throw correctly by past teachers in the program, and it appeared that they had achieved little mastery of the tool movements required for the throw.

A common argument in favor of using non-tool movement measures in physical education is that such observations are difficult because of a lack of permanent products either in the form of the performance (i.e., the throw) or the product (e.g., hitting the target). The results of this study suggest that teachers who correctly discriminate correct and incorrect tool movements and provide their pupils with appropriate feedback can affect changes in acquisition of tool movements by their pupils. This finding suggests that proxy measures of pupil performance such as time on task need not be the method of choice in assessing pupil performance in physical education. Correct identification of pupil performance when combined with outcomes is likely to produce the most accurate measure of pupil skill and the most valid measure of teacher effectiveness.

This study used Standard Celeration Charts to display behavior. Future studies might do well to use some of the other Precision Teaching practices. For example, what would be the effect on pupil performance if sprints were used (i.e., the child encouraged to throw as many as possible during a one-minute timing), or if the child charted his/her own progress using a peer tutor to provide feedback?

**References**

Phillip Ward is a Ph.D. student in the Department of Physical Education Teacher Education; Marie Cull and Gregg Drevno are Ph.D. students in the Department of Special Education - all at The Ohio State University, Columbus, Ohio. Bill Sweeney, Ph.D. is newly affiliated with the Department of Special Education, Gonzaga University Spokane, Washington.
CALENDAR WEEKS

SUCCESSIVE CALENDAR DAYS

SUPERVISOR  ADVISER  MANAGER
Sweeney      The Ohio State University
Ward        Agency
              DEPOSITOR

Ann BEHAVER  6 AGE  PME LABEL  Balls Thrown
Sweeney      CHARTER  Counted

DAILY BEHAVIOR CHART (DCM-9EN)
6 CYCLE - 140 DAYS (20 WKS)
BEHAVIOR RESEARCH CO
BOX 3531 KANSAS CITY KANS 66103
Cindy Street and Her Second Graders Relate to Rapid Practice and Charts

Malcom D. Neely, Cindy Street, and Pupils

Second-grade pupils and their teacher accepted rapid reading practice and Standard Celeration Chart viewing as processes to improve reading mastery. The 24 pupils (12 identified as at-risk learners) and teacher share their initial apprehensions, and final realizations and attitudes about those processes. Descriptive feeling and statement counts, as well as testimonial samples from the pupils, showed their enthusiastic acceptance. Increased practicing and desire to practice, improved initial reading and practiced reading from September to June, lesson celerations, and a divide-by four reduction in identified at-risk pupils showed pupil gains for the year.

At the beginning of the 1991-1992 school year, Camelot Elementary School staff made our second grade a focus of concern for Chapter 1 reading services. We identified 19 at-risk pupils among a total of 54 second graders. A grade-level split absorbed six of the 54. Two teachers shared the remaining 48. My teaching assistant assisted one teacher, and I assisted the other.

The teacher, Cindy Street, received 12 of the at-risk pupils in her class of 24. Even though Cindy and I respected one another's skills, we had not worked together closely. I considered how to introduce Precision Teaching to her and to her pupils. As first-graders, the pupils received six, one-minute reading timings on five periodic reading progress checks. Just recently they received another reading check as second-graders--all test experiences! Cindy acknowledged our pupils' reading progress data viewed on our Standard Monthly Summary Charts as useful. Still, she was cautious about daily charted practices.

Lesson to Introduce Measurement
On September 19 and before Chapter 1 services began, Cindy allowed me to lead a comprehension lesson. An objective for the lesson was the review of story setting. Part of my agenda was to show frequency measurement. Another agenda was to show measurement using other than the written word--hear/think--a task not yet well established by Cindy's pupils.

The concept, setting, proved quite "rusty" for the class. Setting was first reestablished and then embellished. I then read the first five paragraphs of Anderson's The Little Mermaid while the children listened. They had a piece of white drawing paper in front of them. They were to think about what they would draw to show the setting of the passage (i.e., think/draw). After the first reading, the pupils drew and colored for ten minutes while I reread the passage. Figures 1 and 2 show two pupils' drawings. Comparison of the two drawings shows young artistic realism and impressionism, but that is another story.

Collecting the Data
Each pupil then counted the number of items s/he drew that pertained to the setting. They tallied their counts on Post-its and left their Post-its stuck on their drawings. I counted each drawing and charted to see agreement. Chart 1 compares the children's self-counts with my counts.

The Chart shows a 52 idea ceiling (5.2 drawn ideas per minute for ten minutes), a 10 minute counting floor, and a 45 minute lesson floor. The Chart shows frequency profiles of the pupil-counts and my counts, equivalent quartiles, and range ends that differ. The median test shows any difference as minimal. Fisher's exact and Chi square showed no statistical significance.

Comparison of individual pupil counts and mine finds two pupils counted twice the ideas I counted and one nearly twice (x1.8). One pupil counted 3.5 times fewer. The rest counted within a factor of 1.4 of my counts. Also, one

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1 Monthly Summary Charts are available from Behavior Research Co., Box 3351, Kansas City, Kansas, 66131.
pupil drew four ideas not described in the *Little Mermaid* passage, and five each drew one.

**Results**
The experience and the data showed need for a little monitoring and counseling, but showed adequate trust all around. The experience showed comprehension measurement with no exchange of words. The experience also showed freedom of expression and pupils having fun. Cindy, her pupils, and I team taught, practiced, and charted the rest of the year.

**Procedure**

**Practice Reading Procedure**
Cindy introduced each story and developed each unit. She followed suggestions from the sight based, "Whole Language" design of Silver Burdett Ginn's *World of Reading* Teacher Manual.2 She did this every school day from 9:30 to 10:45. She also used teaching techniques collected by Theory Into Practice advocates (Hunter, 1982). Her teaching techniques included active learner participation during instruction and cooperative learning for guided and independent practicing.

We added rapid practice after morning recess from 11:00 to 11:45, four days each week. We added rapid practice to aim for higher mastery fluency, because pedagogical guided practicing and basal reader independent practicing have slower frequencies. These slower frequencies are what White and Haring (1976) called acquisition and initial fluency building stages.

On Monday and Tuesday a volunteer parent, Cindy, and I each listened to a third of Cindy's second grade pupils individually read two, one-minute practices aloud. They read phrase-words and sentence-words (i.e., See/Say) from the week's featured story. All pupils followed each reading. The adults charted each performance on the pupil's daily Standard Learning Charts,3 contained in individual binders, and returned them to their owners to view their dots and x's.

On Wednesday and Thursday the pupils read and listened to each other while Cindy and I monitored. Besides see/say, the pupils asked questions [G. L. Martin, personal communication, December, 1973] about the featured story. The questions were to think/say ask questions such as "where, when, who, which, what, why, or how". Errors included questions requiring a yes or no answer, repeated questions, and questions with no basis to the current story. After each timing, the listeners told us their partners' counts. We charted while the pupils watched.4

**Chart Talk**
Cindy and I talked with her pupils about what their Charts were showing. We drew learning pictures on the white board. We talked about celebrating low initial correct responses. We talked about celebrating the improving of correct and error learning courses. We talked about the fluency aim ranges drawn on their Charts. We talked about extra practice for threatened aims. We also talked about staying loose and having fun—after all, we were only practicing!

**Celebrate**
Cindy and I walked about the room looking at Charts. We celebrated steep learning pictures. We celebrated meeting fluency aims. We reminded all to consider the extra practice when their learning pictures showed them a need. We encouraged practicing at home with their daily phrase and sentence sheets. We gave them extra time to practice from their sheets and from their texts. Some pupils practiced with cross-age peers during the school day. We stayed loose, and we had fun.

**Testimonial**
In June, Cindy and her pupils agreed to share their feelings about rapid practicing and charting. We assisted the pupils in the classroom. Cindy wrote her own.

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2. As did the pupils' first-grade teachers the year before.
3. Standard Celeration Chart; Standard Behavior Chart; Standard Multiply-Divide Chart; Standard Equal Ratio Chart; and Six-Cycle, [Semilogarithmic] Chart are synonyms.
4. Also on Wednesdays and Thursdays we practiced spelling and other writing projects. Pupils with self-managing skills can do more.
Pupils
We presented the writing with three-part sentence starters, developing each one before continuing to the next.

The first part starter began with, "When we first began our one minute timings, I thought/felt . . ." The class practiced all year on developing "First . . . Then later . . ., and Finally . . ." while developing stories. We used this style to write this first part. We introduced one-minute "brain storming" (i.e., think/write). Cindy's pupils then wrote their feelings beside the sequences for the one-minute 'storm'. After the storm, we listed the feelings on the white board for all to use as they chose. The list below contains the pupils' 21 generated feelings:

<table>
<thead>
<tr>
<th>First:</th>
<th>good</th>
<th>hard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>nervous</td>
<td>scared</td>
</tr>
<tr>
<td></td>
<td>uncomfortable</td>
<td>needed help</td>
</tr>
<tr>
<td>Later:</td>
<td>felt OK</td>
<td>easier</td>
</tr>
<tr>
<td></td>
<td>OK to try</td>
<td>better</td>
</tr>
<tr>
<td>Finally:</td>
<td>happy</td>
<td>successful</td>
</tr>
<tr>
<td></td>
<td>easier</td>
<td>OK doing</td>
</tr>
<tr>
<td></td>
<td>not hard</td>
<td>OK to try</td>
</tr>
</tbody>
</table>

The second-part starter offered two choices: "The Chart showed me . . ." or "When I saw my dots, x's, and learning pictures I, . . ." Cindy's pupils generated 12 statements in the one minute; see below:

<table>
<thead>
<tr>
<th>Likes:</th>
<th>top score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dots (and my x's)</td>
</tr>
<tr>
<td></td>
<td>I learned</td>
</tr>
<tr>
<td></td>
<td>learning gains</td>
</tr>
<tr>
<td></td>
<td>I liked reading the stories fast</td>
</tr>
<tr>
<td></td>
<td>when my errors got low</td>
</tr>
<tr>
<td></td>
<td>when my dots got high</td>
</tr>
<tr>
<td></td>
<td>My charts showed my improving</td>
</tr>
<tr>
<td></td>
<td>They helped me (better) understand the stories we were reading</td>
</tr>
<tr>
<td></td>
<td>They were fast</td>
</tr>
<tr>
<td></td>
<td>they were easy</td>
</tr>
<tr>
<td></td>
<td>you could see my jump-ups</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dislikes:</th>
<th>x's on my story, 'Animal Facts &amp; Fiction'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sometimes the stories were boring; I would like different stories</td>
</tr>
<tr>
<td></td>
<td>when they (the charts) showed my bad scores</td>
</tr>
<tr>
<td></td>
<td>It (the Chart) took up room from my writing space</td>
</tr>
</tbody>
</table>

The third-part starter offered two feeling stimuli: "I liked and disliked my timed practices and Charts because . . ." Cindy's pupils offered 13 like statements and 5 dislike statements, as follows:

<table>
<thead>
<tr>
<th>Likes:</th>
<th>needed to improve</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>the practices were challenging</td>
</tr>
<tr>
<td></td>
<td>the practices were OK</td>
</tr>
<tr>
<td></td>
<td>what I needed to improve</td>
</tr>
<tr>
<td></td>
<td>I could feel good</td>
</tr>
<tr>
<td></td>
<td>I was doing better</td>
</tr>
<tr>
<td></td>
<td>my scores</td>
</tr>
<tr>
<td></td>
<td>I was a good student</td>
</tr>
<tr>
<td></td>
<td>I was actually improving</td>
</tr>
<tr>
<td></td>
<td>I needed more practice</td>
</tr>
<tr>
<td></td>
<td>a lot of errors</td>
</tr>
<tr>
<td></td>
<td>my dots were going up and my x's were going down</td>
</tr>
</tbody>
</table>

The pupils drafted their opinions in the three separate stages. They then copied their drafts to manuscript paper. Circumstances prevented timing the writing process. No timing prevented showing frequency measurement of our pupils' written compositions. We lost second-grader per minute words written, words spelled correctly, words spelled incorrectly, ideas written, feelings expressed, punctuation marked, or any number of parts of speech used. What we obtained was well-expressed, experienced opinions about rapid practicing and Chart viewing from 24 pupils. Figures 3 through 7 show five pupils' opinions.

Enthusiastic second grade pupils saw advantages of repeated, rapid practice, and of self-monitored Charts. The only critical remarks dealt with "boring" stories and that we placed the Charts in the way of comfortable writing.
When we first started our one minute practices, I thought it would be hard. And I was very nervous. But then I saw it would be O.K. and I felt better. Finally I was happy it was easy. I felt good.

The chart showed me that I needed to improve at first. I thought that the practices would be challenging. But then after a few weeks, I saw that the practicing was okay and finally I saw that I was doing better and that I was actually improving. I saw that the chart showed my scores. My scores are better.

I liked my dots and X's and I felt good about myself. From that day on to this day, I felt good. And I did better.

When we first began our one minute practices I felt just fine. It was hard. Later I felt better then that. It got easier and easier. Now I love it.

The chart showed me my scores. I needed to improve. Later my scores got better. It was easy. Finally I loved my scores. I felt good about myself. It showed me my dots were going up and my X's were going down. It helped me with other things like spelling. I liked to look at my chart because it was good.

I did like my chart all the time because it's okay to try. It was fun and hard. But I still liked it. It's okay if you are not the fastest. You can make mistakes.
When we first began our one-minute practices I felt shy. Then later I felt better. Then finally I felt good. When I saw my dots, X's, and learning picture, I need more help. I saw my scores. That was great! I was doing better at my scores. I was feeling good at my scores. My scores are great. I liked it. It was fun.

Joanna 6-5-92

When we first began our one-minute practices, I felt nervous and scared. I needed help. I felt better. It was OK. It was not hard. I was happy. The chart showed me that I needed to improve. And it showed me what I needed to improve. It showed me that I was actually improving. My chart showed me lots of things.
Shane 6-5-92

When we first began our one minute practices, I felt like a hard book opening up and I was a hard book to read but then I felt courage in my heart and then I got 3D and 2.

P2. I needed help getting scores and then darts were going down and empoving the darts were going up the chart was going Hi 1's where going low darts were going in to 200's and 100's and then we grew used to it and now I'm one of the third best readers and I'm the the 200 and 100persen.
At the beginning of the 1991 - 1992 school year, I faced the challenge of teaching 24 students, 12 identified as "at-risk", to read at grade level. My background is the "Whole Language" approach to teaching. I know, however, that not all children learn to read the same way. Malcolm approached me with the idea of rapid practice timings and charting. It was not easy for Malcolm to convince me that this was a viable teaching method. Still, I agreed to try. Malcolm initially did most of the instruction and charting. As the weeks went by and I became more confident with this method of teaching, I became more involved. I began to help with the daily charting. It was exciting to see the errors going down and the frequencies going up. The children also became more confident and secure in their abilities.

In January, Malcolm and I realized the children were ready for more responsibility. We let the students pair up and count for each other. This added additional motivation for the students to practice. During this entire school year, the students needed only verbal praise and viewing of their own Charts to maintain their high level of productive excitement. No stickers, candy, or other concrete awards were necessary.

As the year progressed and the students gained reading skills, I saw rapid practicing and charting as valued teaching strategies. These strategies promote individual growth by each student, and still permit whole group instruction. Charting, alone, is valuable. Charting allows for quick and easy evaluating for parent progress reports or decision making for pupil services.

Rapid timings and charting are now a strand in my teaching strategies. I practiced the method, saw the results, and observed highly motivated students.

**Results**

Desirae's two Charts showing her year's progress epitomize the class Charts (see Chart 2 and 3). A small acceleration (x1.03) in initial correct word reading rates across 230 calendar days characterizes most pupils' progress. This small acceleration resulted in a 2.5 reading rate multiplier from the project's beginning to the end of the year. Cindy's pupils read before practice 2.5 times faster in June than in September. The Chart position of the initial correct word reading rates mattered little. Pupils reading words for the first time at slow frequencies got faster reading words for the first time. Fast readers got initially faster, too. A small acceleration (x1.03) and resulting 2.5 multiplier of final correct words read across 232 calendar days also characterizes most pupils' progress. Cindy's pupils read with practice 2.5 times faster in June than in September.

Most Charts showed steep learning lines for stories practiced. Most story lessons consisted of only four practice days. The four practice days were curriculum driven - not Chart driven. There is a fear of not covering all the stories. A story a week is an implied rule. But the Charts influenced additional practice. Most of the pupil written opinions told us so. All pupils said they practiced at home. Specific celerations suggested when they did not.

By the year's end, 19 of Cindy's 24 pupils were practice reading between 140 and 340 correct words per minute (cwpm) including seven of Cindy's 12 at-risk pupils. The other five once achieved 140 cwpm when six practice days extended across a week-end. After a year of Whole-Language Reading Instruction and Precision Teaching "team teaching," only three of Cindy's twelve at-risk pupils again qualified for remedial assistance this forth-coming (1992-1993) school year. Cindy saw her pupils not only enjoy rapid practicing and Chart viewing, but profit from them, as well. Cindy and I enjoyed and profitted, too.

**References**

Haughton, E. Personal visitation to Elizabeth's classroom in Eugene, OR., 1971.

Dr. Malcolm Neely, a Charter Member of the Standard Celeration Society, has taught basic skills in grades 1 - 6 at Camelot Elementary School, Federal Way (WA) School District. He received his Ed.D. from the University of Kansas where he studied with Ogden Lindsley. Cindy Street has taught in the same district for 13 years; her B.A. is from the University of Puget Sorned.
Repeated Readings with Precision Teaching to Distinguish LD from NLD

Patricia M. Daly and Jean Guldswog

Three regular education students and two students with specific learning disabilities, all fourth graders, performed repeated readings using Precision Teaching with three stories and three practice sheets to assess generalization. Differences in aims reached, number of sessions to reach aim, frequency of learning opportunities, and celerations discriminated between the two groups. All students demonstrated improvements on at least one generalization practice sheet. Inconclusive data from generalization practice sheets support the use of some comprehension measure as dependent variable when oral reading fluency using repeated readings is being evaluated.

Fluent oral reading is important for at least three reasons. First, students who read fluently comprehend better. Dowhower (1987) found that students who reread passages, become more fluent, retained factual information better, detected errors such as misspellings and embedded nonwords in reread passages, and remembered important terms from their readings. Samuels (1979) explained these improvements in comprehension skills by asserting that fluency in reading allows students to attend to text meaning, whereas lack of fluency in oral reading requires that all the student’s attention is focused on decoding.

Second, oral reading and rereading give teachers instructional and remedial information about their students’ word attack skills, strategies, and word acquisition frequencies. When teachers know the particular strengths and weaknesses of students, their choices of remediation techniques are more likely to be efficient and effective. This information is not available when students read silently. Although oral reading fluency is not necessarily an agreed upon terminal goal of reading instruction in the educational community (reading aloud is not a common adult behavior), it does fill a very important instructional niche.

Third, fluency in oral reading can be considered a tool skill with wide applicability to many complex skills. These complex skills are primarily comprehension skills and include comprehension at all levels (literal, inferential, critical) and in all areas of the school curriculum (from literature to science). Johnson and Layng (1992) stress the notion that building fluency in tool skills improved accuracy and rate of correct completion of such complex skills as calculus and the advanced comprehension task of identifying faulty logic in lengthy passages. For these reasons it is justifiable to allocate instructional time to fluency building in oral reading in schools.

In special education many children with learning disabilities have reading problems. In fact, Lovitt (1989) comments “the inability to read and learning disabilities are synonymous to many educators” (p. 183). In the Interagency Committee on Learning Disabilities’ report to the US. Congress in 1987, the inability of children with learning disabilities to decode effectively is cited as a major reason for poor comprehension. An examination of the leading journals in learning disabilities quickly shows a strong focus on teaching comprehension strategies to students who have learning disabilities (Swanson & Trahan, 1992; Torgesen, Dahlem, & Greenstein, 1987; Box & Anders, 1987; Billingsley & Wildman, 1988; Griffey, Zigmond, & Leinhardt, 1988; Dyck & Sundbye, 1988; Freund, 1988). There is little attention to decoding fluency as a tool skill.

Precision Teaching with repeated readings was demonstrated to be effective in increasing fluency skills in school children (Carroll, McCormick, & Cooper, 1991; Wolking, Harris, Ferro, & Scott, 1990). Standard Celeration Charts showing fluency scores should allow differences between regular education students and students with learning disabilities to be described. Teachers using Precision Teaching and repeated readings are interested in generalization of fluency to novel passages. This information is easy to include on a Standard Celeration Chart.
The purpose of this article is to compare the performances of regular education students and students with learning disabilities at the elementary level on repeated readings using Precision Teaching. Also, performances of all students on a fluency generalization task are presented.

Method

Participants and Setting

Adam, Jess, and Frankie are three fourth grade regular education boys from a rural community in lower Michigan who agreed to participate in the study. They were chosen by their teacher as "average-to-below average overall performers" in their class. Tameca and Nick were fourth grade students with learning disabilities. All students' ages ranged from nine years, two months, to nine years nine months (see Table 1). The students with learning disabilities had attended a resource room, but the semester of this study they were placed in a regular classroom where a special education teacher co-taught with the regular teacher two hours daily. This change from resource room to regular classroom with co-teaching was part of the school's policy on implementing 'Inclusive Education.'

An empty classroom in the school was used for initial assessment. A quiet, designated section of the resource room was used for the study. Starting in September, 1991 the five students attended the resource room three times weekly to do repeated readings with Precision Teaching with the special education teacher, Jean Guldswog. The goal was for each student to complete three reading practice sheets to a fluency aim of at least 150 words per minute and three generalization practice sheets.

Movement Cycle/Measurement Procedure

The movement cycle for oral reading was the number of words read correctly/incorrectly per minute. The learning channel set was see/say. Errors were marked on the teacher's copy of each probe using an acetate sheet. Omissions, mispronunciations, insertions, reversals, and words prompted by the teacher were counted as errors. Skips were not counted, but were marked for subsequent instruction and feedback. Self-corrections were counted as corrects.

General Procedures

Assessment

Prior to passage selection, the five participants were assessed individually using the Word Identification and Reading Comprehension sub-tests of the Woodcock-Johnson Psychoeducational Battery - R (19). Grade and age equivalents are presented in Table 1. On the basis of this assessment, grade level probes were selected.

<table>
<thead>
<tr>
<th>Student</th>
<th>Classification</th>
<th>Age (Y/M)</th>
<th>Woodcock-Johnson Reading Mastery Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Word Identification</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE^c</td>
</tr>
<tr>
<td>Adam</td>
<td>Regular Ed.(^a)</td>
<td>9/8</td>
<td>10-2</td>
</tr>
<tr>
<td>Jess</td>
<td>Regular Ed.</td>
<td>9/3</td>
<td>9-5</td>
</tr>
<tr>
<td>Frankie</td>
<td>Regular Ed.</td>
<td>9/9</td>
<td>8-1</td>
</tr>
<tr>
<td>Tameca</td>
<td>LD(^b)</td>
<td>9/2</td>
<td>7-10</td>
</tr>
<tr>
<td>Nick</td>
<td>LD</td>
<td>9/9</td>
<td>8-11</td>
</tr>
</tbody>
</table>

\(^a\)Regular education student. \(^b\)Student with learning disabilities. \(^c\)Age equivalents. \(^d\)Grade equivalents.
**Probe Selection**
Three school library books with reading grade levels between 4.4 and 4.6 were selected. Passages of approximately 220 words in length were copied from each book using chapter beginnings until three practice sheets and three generalization practice sheets were selected per student. Each student read at least one passage from each book. The passages were retyped with cumulative word totals added at the end of each line. Two copies were made, one for the student and the other for the teacher. Selection of generalization passages from the same texts supports the likelihood they were of comparable difficulty as the other reading passages.

**Precision Teaching Lessons**
Procedures for sessions one and two for each probe were different from those for all other sessions. The steps were identical for all students.

**Session one**
A timing was conducted on a reading practice sheet and a generalization practice sheet for each student. Each child was told to read the passage silently for one minute, then to read it aloud as quickly as possible. The student was required to use a bookmark to keep track of his/her place in the passage while reading. When the practice sheets were completed, the student and the teacher counted corrects and learning opportunities. The student was then given the option of doing a second timing and charting the best result for both practice sheets. Charting was done by the student.

**Session two**
The student reread the practice sheet only, had the second timing option, and then selected an aim. An aim rate was accepted and charted if it was 150 words per minute or higher. Aim was decided on the second day because reading rates tended to improve dramatically the second time, and this prevented aims which were too low from being selected.

**Remaining sessions**
The teacher prepared two teaching sequences for this and every subsequent lesson until aim was reached. Three steps were completed.

1. Flash card phrases of learning opportunities and skips were made and rehearsed orally for one minute by the student.
2. The teacher made a tape-recording of the practice sheet at a rate at least 20 words per minute faster than the student’s previous best rate. The student listened to the tape once, following with the book mark, then read along with the tape once.
3. The timing was conducted as before.

Each day, the last word read by the student was marked on the student’s copy of the practice sheet. This told the student what s/he had to exceed in s/he next reading to make an improvement. When aim was reached, the student reread the generalization practice sheet used on day one.

**Results**

**Practice Sheets**
All students reached the minimum oral reading fluency aim of 150 words per minute. The regular education students achieved higher beginning frequencies per practice sheet and higher aims than the students with learning disabilities. (Charts 1 and 2 display these data.) The regular education students reached aim faster (i.e., took fewer rereadings) than their counterparts with learning disabilities, with one exception. Beginning frequencies for Adam averaged 125 and for Jess 136 words per minute. Frankie, the third regular education student, demonstrated lower beginning frequencies, averaging 89 words per minute. Beginning frequencies for the students with learning disabilities ranged from 61-64 for Tameca, who only completed two practice sheets in the time frame of the study. Nick averaged 63 words per minute in his first timed readings.

The regular education students Adam and Jess took less time to reach aim on successive practice sheets. For example, Adam took six sessions with practice sheet one, five with practice sheet two, and four with practice sheet three, and reached over 195 words per minute each time. Frankie took longer to reach aim, an average of nine sessions, and did not decrease the number of sessions to get to aim across three practice sheets. The students with learning disabilities
CLAILY BEHAVIOR CHART (DOM-SEN)
CYCLE: 160 DAYS (20 WKS)
BEHAVIOR RESEARCH CORP.
1625 WILSHIRE BLVD., SANTA MONICA, CALIF. 90403

SUCCESSIVE CALENDAR DAYS
COUNTING PERIOD FLOORS
MIN HRS

COUNT PER MINUTE

SUPERVISOR
ADVISER
MANAGER

SUCCESSIVE CALENDAR DAYS

ADHS/ADD/TPM/IC
BEHAVIOR
AGE
LABEL
COUNTEC

P. 1 = Practice Sheet 1
Circled data are generalization practice sheets
**DAILY BEHAVIOR CHART**

**CALENDAR WEEKS**

- **Cycle - 140 Days (20 Wks)**
- **Behavior Research Co.**
- **Box 3351 Kansas City, KS 66103**

**MIN HRS**

- **SUCCESSIVE CALENDAR DAYS**

- **P. 1 = Practice Sheet 1.**
  - Circled data are generalization practice sheets.

**COUNT PER MINUTE**

- **SUCCESSIVE CALENDAR DAYS**

- **TIMEA**
  - Nick

- **SUPERVISOR ADVISER MANAGER BEHAVIOR LABEL COUNTED**

- **DEPOSITION AGENCY TIMER COUNTER CHARTER**
Table 2

Performance on Generalization Probes

<table>
<thead>
<tr>
<th>Student</th>
<th>First Reading</th>
<th>Second Reading</th>
<th>Frequency Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Corrects/Learning Opportunities</td>
<td>Corrects/Learning Opportunities</td>
<td>Words per Minute</td>
</tr>
<tr>
<td>Adam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>94/4</td>
<td>122/3</td>
<td>+28</td>
</tr>
<tr>
<td></td>
<td>103/1</td>
<td>119/4</td>
<td>+16</td>
</tr>
<tr>
<td></td>
<td>97/4</td>
<td>135/1</td>
<td>+38</td>
</tr>
<tr>
<td>Jess</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>97/6</td>
<td>146/3</td>
<td>+49</td>
</tr>
<tr>
<td></td>
<td>137/2</td>
<td>136/2</td>
<td>- 1</td>
</tr>
<tr>
<td></td>
<td>129/4</td>
<td>138/3</td>
<td>+ 9</td>
</tr>
<tr>
<td>Frankie</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>66/5</td>
<td>93/8</td>
<td>+27</td>
</tr>
<tr>
<td></td>
<td>80/7</td>
<td>73/5</td>
<td>- 7</td>
</tr>
<tr>
<td></td>
<td>89/3</td>
<td>87/6</td>
<td>- 2</td>
</tr>
<tr>
<td>Tameca*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>54/3</td>
<td>76/4</td>
<td>+31</td>
</tr>
<tr>
<td></td>
<td>78/10</td>
<td>79/5</td>
<td>+ 1</td>
</tr>
<tr>
<td>Nick*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>57/5</td>
<td>57/7</td>
<td>-----</td>
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<td></td>
<td>68/6</td>
<td>74/4</td>
<td>+ 6</td>
</tr>
<tr>
<td></td>
<td>56/3</td>
<td>83/6</td>
<td>+27</td>
</tr>
</tbody>
</table>

\*Students with learning disabilities.

Both students with learning disabilities took fewer sessions to reach aim on successive practice sheets. For example, Tameca took 12 sessions with practice sheet one and ten with practice sheet two. There were no appreciable differences in celerations between the two groups of students.

**Generalization practice sheets**

Regular education students had higher oral reading fluency scores during the second reading of at least one generalization practice sheet. Only Adam showed an increase on all three generalization practice sheets. His median fluency improvement score was 28 words per minute. Jess increased his fluency on the first and third generalization practice sheets by 49 and 9 words respectively. He maintained approximately the same fluency on the first and third generalization practice sheets by 49 and 9 words respectively. He maintained approximately the same fluency on the second one. Frankie increased his fluency by 27 words per minute on the first practice sheet only and performed slightly worse on the other two generalization practice sheets.

Both students with learning disabilities demonstrated improved fluency rates on at least one generalization practice sheet also. Tameca increased her fluency by 31 words per minute on the first and maintained her fluency on the second one. Nick increased his fluency by six words per minute on the second generalization practice sheet and by 27 on the third one. He maintained his fluency on the first one.

**Discussion**

Overall, the use of Precision Teaching with repeated readings did distinguish between regular education students and students with learning disabilities in five ways. Regular education students had higher ranges of corrects throughout; they took fewer sessions to reach aim, and had fewer learning opportunities. Students with learning disabilities had higher celerations and higher overall performance changes.

During the course of the study, Frankie was referred by his teacher for evaluation in reading. Frankie's performance looked more like that of the students with learning disabilities in that he took about as long to reach aim as they did. The range of his corrects was higher than these stu-
dents however, but lower than his regular education peers. Review of his school records indicated that Frankie had been referred for assessment previously, but his parents chose not to pursue this as long as he maintained passing grades. The evaluation conducted after this study found him eligible for special education services as a student with learning disabilities. The data from this study were not used in this process.

All students demonstrated increased fluency on the second reading of at least one generalization practice sheet. However, there were too few data to predict whether greater or more consistent increases might have emerged with continuation of the study. Given the larger number of sessions students with learning disabilities took to reach aim, improved fluency on repeatedly read practice sheets should not be expected to generalize to single readings of novel sheets. In other words, students with learning disabilities may be better served by encouraging them to reread every passage whose content they need to comprehend. Whether increasing fluency using repeated readings to aims much higher than 150 words per minute would produce greater generalization to novel reading sheets, should be studied. Johnson and Layng's (1992) research indicates that some students need to become more competent than others in tool skills before performance in complex skills improves.

Whether fluency on a novel probe is an appropriate generalization measure is also open to question. Choosing some measure of comprehension as the dependent variable might be a better way to assess the effects of varied fluency rates using repeated readings. The measurement of the comprehension movement cycle here is critical as too gross a measure, such as ideas or events recalled, may not reflect growth in comprehension skills.

The major weakness of this study was the small number of practice sheets brought to aim. Learning pictures of small numbers of students with learning disabilities across many reading practice sheets need to be accumulated, so that learning profiles of these heterogeneous students can be constructed. Standard Celeration Charting has the potential to be singularly effective in this process and would provide the most instructionally relevant data displays.

References


A "Timely Message"

Precision Teaching Logo Watches are now available. The watch is a full color Chart background with Precision Teaching/ Celerate then Celebrate imprinted on the face. It has a goldtone case, sweep second hand, precise quartz movement, black leather band and two-year warranty. The watch is available in a man's or woman’s style for $37.50 each. Please allow 8 to 10 weeks for delivery.

Make check payable to Jacksonville State University Foundation in US dollars. Mail to address below.

Name

Street address

( ) Phone Number

City State Zip Code

#/Man's _____ #/Woman's _____ Total Enclosed _____

Journal of Precision Teaching
Center for Individualized Instruction
Jacksonville State University
Jacksonville, AL 36265
The Inner Eye: Improving Self-Esteem

Abigail B. Calkin

Wilhelm Wundt is credited with the start of psychology around 1860. About fifty years later, the mainstream of American psychology abandoned the then-current introspective approach for the behaviorism of Watson, then Skinner (Jacob and Sachs, 1971). But when psychology was approximately a century old, Homme (1965) published the first article by a behaviorist on inner behavior. By 1971, when Jacob and Sachs published The Psychology of Private Events, the study of what has been called private, covert, inner events was sufficiently established that the authors were not proving anything, but reporting the most recent research on inner behavior. Indeed, Jacob and Sachs state "...it is unscientific to deny, a priori, that covert responses are by their nature unable to be studied, or do not behave in lawful ways" (p.2). They continued, "Thoughts and feelings may be shaped, reinforced, or extinguished (p.3)." Some elements that make such examination possible today include the development and widespread use of factor analysis, computers (Jacob and Sachs, 1971), and the Standard Celeration Chart.

Ogden Lindsley founded and, in a team effort with graduate students and teachers, developed the Standard Celeration Chart in 1964 and 1965. A.D. Duncan (personal communication, March 28, 1992) did the first inner project using the Standard Celeration Chart in 1965, presenting the data at the American Psychological Association Convention in 1968. Haughton and Kunzelmann (E.C. Haughton, personal communication, February 10, 1981) independently and simultaneously began to use the one minute timing with student learning in 1967. Duncan (1971) published the first article using Precision Teaching to manage inner and outer behaviors. Student nurses in the Mt. Hood (Oregon) Community College nursing program counted and charted positive and negative feelings in different practicum settings to help them formulate which area of nursing they wished to pursue (Dean, 1973). Abigail Calkin (1980) compared first grader, teenager and adult perceptions of facts learned, fun had, and freedom felt, finding inner behavior occurred within two cycles, was able to be validly and reliably counted, and celeration, bounce, and correlation were functionally and statistically independent.

In 1977, Calkin (1981) used, for the first time, the one minute timing with inners, counting four pinpoints--positive and negative thoughts and feelings. In 1981, Conser counted positive and negative thoughts and feelings, monitoring the effect that events in her life had on her thoughts and feelings. McCruden (1990) counted positive and negative feelings all day for 15 weeks. Cooper (1991) used the one minute timing when counting destructive and loving thoughts and feelings. Lindsley (1990) stated "The spring 1971 Teaching Exceptional Children Precision Teaching issue had two (13%) of its 15 articles on inner behaviors. The spring 1990 Teaching Exceptional Children issue had none" (p.12). In the same article, "Our aims, discoveries, failures, and problems," Lindsley cited Duncan's and Calkin's work with inners, and stated, "Worked but has lost ground" (p.12).

From 1977 to 1990, I collected 45 projects from people who had counted inner behavior, specifically, positive and negative thoughts, pleasant and unpleasant feelings. Thirty-five of the people used a one minute timing as the intervention. This article reports the results of the thirty-five people who used the one minute timing to shape positive thoughts and pleasant feelings about oneself, and in some cases, to extinguish the negative thoughts and unpleasant feelings.

Methods

Each person was asked to count all day positive/negative thoughts and/or pleasant/unpleasant feelings about him/herself. The individual chose and further defined the pinpoint. He/She defined
the inners as: positive/negative (self-) thoughts; positive/negative (self-) feelings; feelings about marriage; contented/depressed feelings; self-confidence/frustration about job; pleasant/unpleasant (self-) feelings; pleasant/unpleasant (self-) thoughts; and positive/negative attitude. Some examples of positives/pleasants included smart, good, professional, doing well in relationship, finishing assignments, friendly, hard working, supportive, energetic, good parent, good son, perceptive, physically fit, patient, well-dressed, honest. Negatives/unpleasants included not up to personal standard, inadequate, dependent, don't work hard enough, correct children too often, bad mother, indecisive, wony too much, existential emptiness.

Three of the people were teenagers--one young woman and two young men. Of the remaining 32, 21 were women, 11 men. Twenty-six people did the project as a part of a class; nine were not doing the project for class credit.

The methods of counting varied. Some used a bead counter; some a golf counter. Others tallied, or wrote each specific inner on paper. Each time a person had an inner, she recorded it. At the end of the daily counting period, each person entered the data on the Standard Celeration Chart. For those using the Chart for the first time, the data from the Before Phase was recorded, then used to teach charting and was charted at one time.

After the Before Phase, approximately 10 days of counting, the person began to do the one minute timing once per day. During the one minute timing, the person recorded as many good, positive, pleasant things about himself/herself as possible. If an item were repeated, although not in sequence, that was judged all right. The purpose of the timing was to think freely as many good attributes about oneself as possible. I told the people to use not only those items they believed or thought about themselves, but also to use any that others had told them, even if they did not believe them at that time. Thirty-four used a think/write initially; one used think/count. In During 2, one person used two daily one minute timings and two people used think/say.

Statistical analyses included frequency distributions, frequency changes, frequency and celeration variability, celeration changes, and correlations of the positive/pleasant with the negative/unpleasant, and of each of those to the one minute timing. The phases used for the analyses were the Before and the first During because each project had both of those phases. Ten projects had more than one During; seven had an After Phase. Variability analyses used all phases.

Two Projects

Diane began her project by counting for 30 minutes a day to help her define the positive and negative inner behaviors about herself. Once she perceived she understood what she wanted to count, she began to count positives and negatives about herself all day. Chart 1 shows that Diane's all day positives and negatives were close in frequency during the Before Phase. In During 1, they separated with the positives stepping up, the negatives decelerating slightly, and both positives and negatives narrowing in total range. In During 2, she set aims, reached the goal for the positives, but did not reach the goal for the negatives. Based on that, in During 3, she decided to focus on specific positives, ones that were the opposite of the negatives she kept having. In During 3, she maintained or exceeded her positive aim over two-thirds of the time and reached her aim for the negatives. The After Phase showed that the behavior maintained approximately a month later.

In Barbara's Before Phase (Chart 2), her positive thoughts and feelings were decelerating and her negatives maintaining. In the first During, they both accelerated. When she switched from a think/write to a think/say during the one minute timing, her positives accelerated, although they did not reach her goal, and her negatives decelerated to below her goal.

Results

Validity
The validity of these inner data is well-established by the validity of the Chart. We know the Chart is valid because of the consistency of data from the tens of thousands of different charted projects we have, including at least two hundred inner projects. The frequency envelopes of inners tend to be broader than those of the outer behaviors of regular education students'
academic projects. Their bounce within those envelopes, however, is still consistent. Further, self-charting has more validity than charting by a second person (Lindsley, 1991). In these thirty-five projects, of course, each person counted and charted his/her own data.

**Frequency Changes**

**Frequency Distributions**
The all day behavior counts had a frequency range from 0 to 82, the bottom two cycles of the Chart. A semi-interquartile range was computed for each project. The smallest frequency range was from 10 to 13, or x1.3. The smallest semi-interquartile range was x1.0. The greatest frequency range was from 1 to 48, or x48.0. The greatest semi-interquartile range was x15.0. The frequency steps of the middle of the semi-interquartile ranges of the positive/pleasants projects from the Before to During 1 were from +1.2 to x7.8, with a middle of x1.6. The frequency steps of the middle of the semi-interquartile ranges of the negatives/unpleasants from the Before to During 1 were from x1.6 to +11, with a middle of +1.3.

**Frequency Step Change**
The three methods for looking at frequency step changes were: 1) the step from the last day of the Before to the first day of During 1; 2) the first day of the Before to the last day of During 1; and 3) the middle of the first three days of the Before to the middle of the last three days of During 1.

This frequency step change is the frequency value from the last day of the Before Phase to the first day of the During Phase. The range of the all day positives/pleasants was from x2.5 to +1.2 with a middle step-up of x1.4. The range of the all-day negatives/unpleasants was from x7.0 to a +2.0, with a middle step-down of +1.2.

The frequency step change from the first day of Before to the last day of During 1 for the positives had a range of x16.0 to +1.7 with a middle of x2.2. The frequency step change range for the negatives was x5.0 to +20.0 with a middle of +2.0.

In order to avoid the influence of an aberrant frequency, a frequency outside the envelope, it is perhaps better to use the three frequencies, rather than just one when comparing the beginning and ending frequencies. The range of the positives/pleasants before viewed this way was x7.5 to x1.0 with a middle of x2.1. Of the negatives/unpleasants, the range was x4.0 to +5.6 with a middle of +1.5.

**Variability**

To look at the variability, or bounce, of the data, I analyzed the frequency relationships of all data points in all phases and the celeration relationships of all phases. This included the Before and During 1 as well as the During 2, During 3, and After Phases. Did the data co-bounce (change in the same direction), counter-bounce (change in the opposite direction), or bounce independently (one maintain while the other went up or down)?

**Frequency Variability**
I used 3,486 frequency relationships to compare the positive/pleasant to the negative/unpleasant, the positive/pleasant to the one minute, and the negative/unpleasant to the one minute. Table 1 shows the frequency variability.

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Variability</td>
<td>1343</td>
<td>1118</td>
<td>1025</td>
</tr>
<tr>
<td>Percent</td>
<td>38.5%</td>
<td>32%</td>
<td>29.5%</td>
</tr>
</tbody>
</table>

**Celeration Variability**
I used 91 pairs of all-day celeration lines and 49 pairs of all day and one minute celeration lines to analyze the celeration variability. If celeration lines moved in the same direction, they co-celerated; if they moved in opposite directions, they counter-celerated; if one was x1.0, the variability was independent. Table 2 shows the results of the positive/negative, pleasant/unpleasant all day celeration lines.
Table 2
Celeration Variability: All Day

<table>
<thead>
<tr>
<th>Co</th>
<th>Counter</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>33%</td>
<td>25%</td>
<td>42%</td>
</tr>
</tbody>
</table>

Table 3 compares the celerations of the all day frequencies with the one minute timings. Almost three-fourths of the all day positive/pleasant celerations and the one minute timings co-celerate.

Table 3
Celeration Variability: All Day and One Minute Timing

<table>
<thead>
<tr>
<th>Co</th>
<th>Counter</th>
<th>Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>71%</td>
<td>6%</td>
<td>23%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Positive/pleasant &amp; one minute:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>Percent</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Negative/unpleasant &amp; one minute:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>Percent</td>
</tr>
</tbody>
</table>

The celeration variability, Calkin (1980) found when looking at facts, funs, and frees was Co: 43%; Counter 17%; and Independent, 40%.

Variability Measures
Variability measures indicate that inner behavior co-bounces one-third to two-fifths of the time; counter-bounces one-fifth to one-third of the time; and is independent, one-third to two fifths of the time. O.R. Lindsley (personal communication, May 4, 1992) suggested we could consider independent bounce a sub-category of counter-bounce because the behaviors are not bouncing in the same direction. The data viewed this way shows that inner behavior co-bounces 33% to 43% of the time and counter-bounces 57% to 67% of the time.

When using a one minute timing, the co-bounce of the celeration of the one minute timing and the all day positive/pleasants increases dramatically, to almost three-fourths of the time. Again, if I follow Og's suggestion to look at independent bounce as a sub-category of counter-bounce, the one minute timing and the all day negatives/unpleasants counter-celerate 78% of the time.

Celeration Changes
I looked at the ranges and middles of three kinds of celeration changes: 1) celeration collections; 2) celeration multipliers; and 3) celeration steps.

Celeration Collections
Chart 3 is the celeration collection for the all day and the one minute positives/pleasants. The range of celeration multipliers for the all day celerations in the Before was x3.4 to +3.5 with a middle celeration of x1.2. The range of celeration multipliers in During 1 was x2.3 to +1.4. Again, the median was x1.2. Figure 3 also shows that the range of the celeration multipliers in the one minute timing for During 1 was x2.5 to +1.2, and the middle celeration multiplier was x1.2.

Chart 4 shows that the range of celeration multipliers for the negatives/unpleasants was from x3.7 to +15.0. The middle celeration was x1.0 in the Before and x1.0 in During 1 with a +2.0 step-down from the Before to During 1. The range of celeration multipliers in During 1 was x3.5 to +3.0. (The celeration maintained at x1.0 in Durings 2 and 3 and the After Phase.)

Celeration Multipliers
The celeration multiplier for the positives/pleasants ranged from x3.0 to +3.0 with a middle of x1.0. The range of the celeration multiplier for the negatives/unpleasants was x39.0 to +11.0; the middle celeration multiplier for each was x1.0.

Celeration Steps
The celeration step for the positives/pleasants from the Before to During 1 had a range of x3.5 to +3.0 with a middle of x1.0. The celeration step change for the negatives/unpleasants was x2.2 to +7.5, again with a middle of x1.0.
All other middle celeration values, no matter what the range or the statistic, was x1.0. The steepest middle celeration, x1.2, does not meet the Precision Teaching minimum acceptable celeration standard of x1.25, or +1.25. Thus, in these 35 projects, celeration does not identify change in behavior.

**Correlation Coefficients**

The number of phases for the correlation coefficients was 37 because two people counted thoughts and feelings separately. The correlations show the relationship between the positives and negatives, the positives and the one minute timing, and the negatives and the one minute timing. Table 4 gives the distribution, the middle correlation coefficient, significance levels, and the shared variability.

The middle correlation coefficients show that the positives/pleasants and negatives/unpleasants correlated somewhat, +.46, prior to the use of the one minute timing. There was no correlation (+.06) between them when the one minute timing was used. There was also no correlation (-.07) between the negatives/unpleasants and the one minute timing. The middle coefficient for the positives/pleasants and the one minute timing was +.52 and this particular coefficient was significant at the .005 level.

Almost every phase had a different number of frequencies, so it was most important to look at the critical values of r, to compare the correlations across people and phases. Looking at the levels of significance of the correlations between the positives/pleasants and the negatives/unpleasants in During 1, 9 of the 12 (out of the 37 total) had relationships significant at the -.44 level or greater. The correlation of the positives/pleasants in During 1 and the one minute timing was the greatest. Eighteen of the 37 coefficients were significant, 16 of those at the .005 level. This indicates a relationship between the one minute timing and the number of positives/pleasants a person had each day.

The shared variability percentages indicate that almost a third of the variability between the one minute timing and the positives is shared. To visualize this, the reader can picture a Venn diagram in which approximately one third of the two circles overlap. This is another indication that there is a relationship between the frequency of the one minute timing and the all day count of positive thoughts/pleasant feelings.

**Summary**

The greatest changes in these projects were related to frequency, not celeration. Middle frequency step changes for the positives/pleasants and for the negatives/unpleasants showed that the one minute timing produced changes in the inner behavior. These projects also showed the inner frequencies were in the bottom two cycles of the Chart.

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Correlation Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B +/-</td>
</tr>
<tr>
<td>Distribution</td>
<td>-.73 to +.82</td>
</tr>
<tr>
<td>Middle</td>
<td>+.46</td>
</tr>
<tr>
<td>Significant r</td>
<td>.025</td>
</tr>
<tr>
<td></td>
<td>.005</td>
</tr>
<tr>
<td>Shared Variability</td>
<td>16%</td>
</tr>
</tbody>
</table>
Variability was consistent with the other data—facs, funs, and frees (Calkin, 1980)—indicating that inner behavior co- and independently bounces more than it counter-bounces. The shared variability between the one minute timing and the all day positive/pleasant frequencies was high. Middle celeration changes for the positives/pleasants and for the negatives/unpleasants were not sufficiently steep to consider that celeration was an important factor. Celeration variability is the exception to this: the all day and one minute positives/pleasants had a significantly high co-variability; the one minute negatives/unpleasants had significantly high counter-variability.

Correlation coefficients showed significant relationship and good shared variability between the all day positives/pleasants and the one minute timing. When all the frequency measures—frequency, variability, and correlations—are viewed together, the evidence is even stronger to support that the one minute timing can change all day frequencies of positive and pleasant thoughts and feelings about oneself.

Conclusions

1. Clearly, inner behavior can be validly and reliably counted and charted.

2. Frequency of thoughts and feelings per day in 45 projects is consistently at 0 to 82. Demographic factors are irrelevant.

3. The one minute timing has a much greater effect on the frequency of inners than on the celeration of them.

4. The variability of frequency and celeration, whether viewed as co-, counter-, independent, or just co- and counter-, shows that inner behavior contradicts the see-saw theory. This means that the behaviors are independent of one another, i.e., an increase in pleasants does not indicate a decrease in unpleasants; or, to state it another way, as one behavior goes up, the other will not, by necessity or definition, go down. Further, the one minute timing shows high co-celeration with the all day positives/pleasants and high counter-celeration (combining the counter-and independent) with the all day negative/unpleasants.

5. Correlations of pleasant and unpleasant inners and the one minute timing show that the timing is most effective in increasing all-day pleasant thoughts/feelings.

6. Behavior changes are attainable when using a one minute timing with inners. It works. Why aren't we using it more? Why aren't more people charting inners?

Future Needs

1. We need to chart more inner behavior using not only thoughts and feelings about self, but also a variety of pinpoints, individuals, and age groups.

2. To get more improvement, the projects may need closer supervision and more individualization.

3. We need to investigate the use of other interventions: rewards, think/say instead of think/write, etc.

4. Total project length should probably be at least five weeks.

5. Does the growth in frequency, not celeration, occur only with inner behavior, or is it a function of project supervision or some other variable? Does it also occur with other inner behavior? Does it occur with some outer behaviors?

6. We need frequency, celeration, variability, correlation analyses of outer behavior to compare inner and outer behaviors.

7. An analysis of the relationships of frequency, variability, celerations, and correlations within each project might show some relationships that we may not be presently seeing.

8. We should probably use step changes in celeration and frequency more commonly than we do when we analyze our Charts, no matter what the pinpoint.
References


Dr. Abigail Calkin is Principal, Quinton Heights Elementary School, Topeka, KS. For further information, contact her at 631 Lane, Topeka, KS 66606.
Behavioral gerontology is the study of biological states and environmental conditions affecting behavior of elderly persons (Burgio & Burgio, 1986). It is a developing area of the applied science of behavior. Behavioral gerontologists study several classes of problem behaviors - for example, incontinence (Burgio, Engel, McCormick, Hawkins, & Scheve, 1988; Grosicki, 1968; Mitteness, 1987); self-injury (Mishara, Robertson, & Kastenbaum, 1973); recreational skills (Pierce, 1975); eating, dressing, elimination, and walking (Kanfer & Karoly, 1982; Burgio, Whitehead, & Engel, 1985); and communication skills (Bourgeois, 1990).

Moreover, behavioral gerontologists have analyzed the effects of several interventions to improve the general functioning of the elderly and persons with Alzheimer’s disease; including: the, design of living environments (Bayne, 1971; Hussain, 1981; Kastenbaum, 1968); foster grandparent programs (Fabry & Reid, 1978); home based family treatment (Pinkston, Linsk, & Young 1988); self-management (Kanfer & Karoly, 1982; Burgio, Whitehead, & Engel, 1985); caregiver training (Linsk, Pinkston, & Green, 1982); and performance management (Burgio & Burgio, 1986). Most systematic treatment of the elderly is in psychiatric hospitals or long-term nursing facilities.

Authoritative opinions of behavioral deficits and excesses are common in the gerontology literature, but data on specific incidence of behavior problems is sparse. Zimmer, Watson, and Treat (1984) surveyed 42 nursing homes and found significant behavior problems among 64% of the 3,456 residents. Ninety-five percent of persons 65 or older live in private housing, either alone or with relatives. Ten to 20% of the elderly living in private housing have significant behavior problems such as memory deficit, disorientation, or decline in intellectual performance (Current Population Reports, 1984).

Ten percent of persons over 65 years of age and nearly 50% over 85 may have Alzheimer’s disease. The National Institute on Aging (Gelman, Hager, & Quade, 1989) estimates 4 million elderly with Alzheimer’s nationwide. With the number of persons over 65 years of age multiplying each year and the expected quadrupling of people over 85, the National Institute on Aging projects 14 million persons with Alzheimer’s by the year 2050. Alzheimer’s disease is a major issue in public-health.

Alzheimer’s disease, a progressive illness involving the deterioration of brain cells, ultimately leads to severe intellectual and physical impairment and finally death. The cause is unknown. The length of illness afflicted before death is usually 7 to 10 years. The afflicted experience memory loss, confusion, and a decrease in using simple thought processes during the early stage of Alzheimer’s disease. They have difficulty making decisions and using daily living skills and language during the middle stage. They require maximum supervision and total care (e.g., must be bathed, dressed, groomed) during the last stage. Eventually these persons become incontinent. Death usually results from infections or pneumonia because of being in bed for long periods of time.

Commonly held assumptions concerning (a) the degenerative nature of Alzheimer’s disease, (b) the limited ability of patients to learn new information, and (c) the gradual decreases in patient self-management have discouraged systematic behavioral interventions for persons with Alzheimer’s (Bourgeois, 1990). Yet the uses of behavioral interventions with the elderly suggest application for persons with Alzheimer’s. For example, Burgio and Burgio (1986) and

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The Office of Special Education and Rehabilitation Services, US. Department of Education supported this research with a Leadership Training Grant (#G008715568-88). Address correspondence to John O. Cooper, Applied Behavior Analysis program, The Ohio State University, 356 Arps Hall, 1945 N. High St., Columbus, OH 43210.
I Carstensen (1987) found measurably effective positive environmental treatments for behavioral deficits and excesses during their reviews of applied research with elderly dementia patients.

Persons with Alzheimer's disease progressively experience difficulties in making appropriate decisions and judgments regarding their own personal physical care. Persons with Alzheimer's disease will not maintain self-help behaviors over an extended time. These practical concerns may cause some service providers to avoid or abandon the area of behavioral gerontology. A modified perspective on treatment procedures and treatment goals is necessary for persons working with Alzheimer's disease. For example, improved functioning will likely worsen as the disease progresses. It is, however, possible and important to provide these persons with sufficient skills for independent functioning for as long as possible.

Independence in dressing is a major concern by the middle stage of the disease. Dress is often inappropriate for the season, the time of day, or the occasion. Characteristically these persons forget how to dress, have difficulty with buttons, snaps and zippers, and "layer" clothes (e.g., putting on six pair of underpants). Often they do not change their clothing. We used least-to-most response prompts (Cooper, Heron & Heward, 1987) and picture cues (Park, Smith, Morrell, Puglisi, & Dudley, 1990; Wacker & Berg, 1983) to develop and maintain dressing skills of Alzheimer's participants in the middle stage of the disease.

Method

Participants and Setting
Three women with Alzheimer's disease served as participants. Florence, Mary B., and Mary P. were respectively 88, 74, and 66 years of age. Florence and Mary B. lived with their daughters, and Mary P. lived with her husband. Each (a) had the motor and physical dexterity to dress, (b) self-dressed, but did it infrequently or inappropriately, (c) read written instructions (e.g., Please put on the underclothes. Please put on the shirt.), (d) described the physical movements shown on a picture (e.g., photograph of the participant putting on a shirt), and (e) identified themselves in a photograph. Each had a history of progressive intellectual decline without neurological or psychological illness.

Florence, the oldest of the three participants, regularly awoke two or three times during the night and often wandered around the apartment hiding objects. She exhibited extreme confusion, with severe short and long-term memory loss. Florence's medications included vasatec, micro-K, chlorthalidone vitarine, and feldene. These medications were prescribed because of high blood pressure, arthritis, and agitated behavior. Mary P. exhibited extreme disorientation and confusion. Related symptoms of the Alzheimer's disease produced vision difficulties. She took tegretol, for a thyroid condition and low sugar. Florence and Mary P. were rapidly entering the last stages of Alzheimer's disease. Mary B's. behavior was characterized by excessive memory loss, confusion, and non-adaptive daily routines (e.g., dressing, eating). She dressed independently; however, she changed clothing often during a day. Her clothing preference was slacks and blouses, but she only wore dresses to church. Mary B. did not take medication. The use of medication did not change for the three participants during the three months of the study.

Two observation sessions before the beginning of data collection verified the independent dressing skills of the participants. This condition was identical to response prompts and self-recording condition described below except for the absence of response prompts and self-recording. Also, caregivers provided assistance to the participants during the pre-observations, but not during training.

The setting was the participant's bedroom. Florence's bedroom was 15 ft. by 15 ft., contained a bed, a cabinet, and a dresser. The barren walls were white. Mary P.'s bedroom was 12 ft. by 12 ft., with a bed, a dresser, and a chair. Mary B's bedroom was 12 ft. by 15 ft. with a bed, a dresser, a television set, a stereo, a cabinet, and a night stand. Radios, stereos, and televisions were off during training to eliminate distractions.
Definition and Measurement of the Dependent Variable

Dressing patterns of elderly persons provided the movements used for our task analyses of dressing. Caregivers gave comments on realistic physical expectations. Carolyn timed herself dressing to determine the instructional aims for the task analyses. The five task analyses identified including the instructional aims were: (a) Underwear (e.g., brassiere, undershirt, slip), 32 steps with an instructional aim of 45 movements per minute; (b) Top layer (e.g., shirt, blouse, sweater), 17 steps with an instructional aim of 40 movements per minute; (c) Bottom layer (e.g., skirt, pants, slacks), 16 steps with an instructional aim of 40 movements per minute; (d) Under layer for feet (e.g., socks, stockings, knee highs), 14 steps with an instructional aim of 35 movements per minute; and (e) Outer layer for feet (e.g., slippers, shoes), 5 steps with an instructional aim of 10 movements per minute. An example from these task analyses is presented in Table 1.

<table>
<thead>
<tr>
<th>Step</th>
<th>Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>&quot;Select&quot; the written instructions (or picture cues).</td>
</tr>
<tr>
<td>2.</td>
<td>Sit on the bed.</td>
</tr>
<tr>
<td>3.</td>
<td>Pick up the brassiere.</td>
</tr>
<tr>
<td>4.</td>
<td>Hold onto the right end of the brassiere.</td>
</tr>
<tr>
<td>5.</td>
<td>Bring the right end to the front.</td>
</tr>
<tr>
<td>6.</td>
<td>Bend the left arm and grab the left end from the back.</td>
</tr>
<tr>
<td>7.</td>
<td>Bring the left end to the front.</td>
</tr>
<tr>
<td>8.</td>
<td>Pull the two ends together.</td>
</tr>
<tr>
<td>9.</td>
<td>Snap the hooks together.</td>
</tr>
<tr>
<td>10.</td>
<td>Move the brassiere to the correct position.</td>
</tr>
<tr>
<td>11.</td>
<td>Grab hold of the right strap.</td>
</tr>
<tr>
<td>12.</td>
<td>Put the right arm through the right strap.</td>
</tr>
<tr>
<td>13.</td>
<td>Grab hold of the left strap.</td>
</tr>
<tr>
<td>14.</td>
<td>Put the left arm through the left strap.</td>
</tr>
<tr>
<td>15.</td>
<td>Pick up the underpants.</td>
</tr>
<tr>
<td>16.</td>
<td>Bend over with the underpants in your hands.</td>
</tr>
<tr>
<td>17.</td>
<td>Lift right leg and put it into right hole of underpants.</td>
</tr>
<tr>
<td>18.</td>
<td>Put the right leg down.</td>
</tr>
<tr>
<td>19.</td>
<td>Lift left leg and put it into left hole of underpants.</td>
</tr>
<tr>
<td>20.</td>
<td>Put the left leg down.</td>
</tr>
<tr>
<td>21.</td>
<td>Bend over and pull the underpants up to the knees.</td>
</tr>
<tr>
<td>22.</td>
<td>Stand up.</td>
</tr>
<tr>
<td>23.</td>
<td>Pull the underpants up to the waist.</td>
</tr>
<tr>
<td>24.</td>
<td>Sit on the bed.</td>
</tr>
<tr>
<td>25.</td>
<td>Pick up the undershirt (or full slip).</td>
</tr>
<tr>
<td>26.</td>
<td>Hold up the undershirt (or full slip) over the head.</td>
</tr>
<tr>
<td>27.</td>
<td>Pull the undershirt (or full slip) down over the head.</td>
</tr>
<tr>
<td>28.</td>
<td>Look for the tag inside the undershirt (or full slip).</td>
</tr>
<tr>
<td>29.</td>
<td>Turn the tag to the back.</td>
</tr>
<tr>
<td>30.</td>
<td>Put the right arm through the right sleeve (or strap).</td>
</tr>
<tr>
<td>31.</td>
<td>Put the left arm through the left sleeve (or strap).</td>
</tr>
<tr>
<td>32.</td>
<td>Pull the undershirt (or slip) down over the stomach.</td>
</tr>
</tbody>
</table>
Independent performances of the steps within the task analyses were counted correct. All steps evoked by verbal or physical prompts were also correct. In addition, responses were correct if the participant completed a task in a functional manner, but the performance was less than perfect (e.g., has shirt on, but missed buttoning a button). Responses occurring out of sequence or not completed following a response prompt were counted incorrect.

**Procedural Reliability**

A procedural outline for each condition of the study aided monitoring of the integrity of our training. The caregivers recorded the sequence of each step of task analyses and number of response prompts on the procedural outline. They observed the application of our training procedures twice weekly. No deviations from the procedural outline occurred during 10 sessions with response prompts and written directions and during 12 sessions with response prompts, written directions, and picture cue.

**Procedures**

**Response Prompts and Self-Recording**

Training began as the participant awoke during weekday mornings, between the hours of 6:00 a.m. and 9:00 a.m. Least-to-most response prompts and self-recording assisted all steps of task analyses. The response prompts included verbal instruction, gesture, and verbal instruction with graduated physical guidance. A verbal prompt told the participant what to do. The gesture prompt pointed to a piece of clothing. During the verbal and graduated physical guidance prompt, Carolyn told the participant what to do and gave physical assistance as needed. If one level of prompt failed to produce the correct response within 10 seconds, the next level of prompt occurred. Carolyn waited 10 seconds after the initial statement, "Name, it is time to get dressed." She did not intervene as long as the participant responded independently to the steps in the task analyses within 10 seconds. A verbal response prompt (e.g., Name, pick up the shirt.) occurred when the participant failed to respond within 10 seconds of the initial statement or after the previous task. The gesture response prompt was the second level of prompt. For example, Carolyn pointed to the specific piece of clothing. The combined use of a verbal prompt and physical guidance formed the third level of prompt. She said, "Name, let's do it this way," and physically helped the participant complete the task.

After completing task analysis #1, the assessment on task analysis #2 immediately continued. Carolyn told the participant to continue dressing only if a response to the next task analysis did not occur. This prompt procedure applied to each task analysis.

The bedroom closet door contained a card for self-recording. The card listed the five task analyses and the items of clothing used for each task. For example, the card for underwear included the written names of brassiere, underpants, undershirt, slip, and panty hose. The categories "yes" and "no" were next to each item of clothing. The participant, with assistance, checked "yes" for the clothing items she put on during training.

Correct responses were praised. If the participant was non-cooperative or refused to comply, Carolyn discussed the behavior problem with the participant in a quiet and gentle voice. The caregiver helped if discussion failed. One time Carolyn ended a training session because of continuous noncompliance by Mary B.

**Response Prompts, Self-Recording, and Picture Cues**

This condition used response prompts, self-recording and picture cues. Picture cues were photographs of the participant in various stages of dress that illustrated the specific task analysis. For example, the photograph for task analysis #1 showed the participant in her underclothes. Five separate photographs illustrated each of the task analyses. The photographs were introduced sequentially during training. For example, the first photograph was attached to the bedroom closet door during picture cue training for task analysis #1, photographs one and two during picture cue training for task analysis #2, and so on. The 8 1/2 in. x 11 in. pictures were laminated. The photograph size was 5 in. x 7 in. Also, the picture cue included a written instruction (e.g., Put on the underwear.). The participant looked at the photograph when she did not complete a step following the least-to-most response prompts. The participant self-recorded (i.e., marked a
checklist) whether she (a) looked at the photographs, (b) looked at the appropriate photograph in sequence, or (c) started and completed dressing as shown in the photographs within the criterion time limit. A card for self-recording was placed after the last picture illustrating task analysis #5. Finally, the participant received verbal instructional feedback while looking at the photographs (e.g., "Name, please look at the picture. You have your shoes on the wrong feet.").

**Programming for Maintenance**
To program for maintenance, the caregivers received instruction on the use of least-to-most response prompts, self-recording, and picture cues. The procedures for the caregivers were identical to those used by Carolyn during training. For two participants, we checked for maintenance once weekly for three weeks after the completion of training; for Florence the three checks spanned two weeks.

**Results**

Data obtained from each of the three participants during response prompts and self-recording and picture cue conditions are presented in Figures 1 through 13.

**Instructional Aims**
All participants improved their fluency of self-dressing during response prompts and self-recording or during picture cues. Florence and Mary B. reached aim on most items of clothing used for training. Florence put on her underclothes, dresses, stockings, and shoes; Mary B. put on her shirts, slacks, socks, and shoes. Mary P. reached instructional aim with slacks, socks, and shoes. She came close to the instructional aim with her underclothes and shirt. The participants made improvements in self-dressing during training. These improvements maintained during our three weeks of follow-up assessments with the caregivers providing the response prompts and picture cues.

**Celeration Courses**

**Florence.** Florence’s celerations for corrects ranged from a x1.25 to 1.5 with picture cues and the response prompts. Florence had no learning opportunities during training.

**Mary B.** Mary B’s celerations for corrects ranged from a +1.1 to a x1.7. Her most recent celeration (i.e., 3 to 4 weeks) for corrects x1.0 or 1.1 except for putting on socks that x1.2. No learning opportunities occurred during training.

**Mary P.** Mary P.’s overall celerations for corrects ranged from a x1.25 to 1.6. Her most recent celeration (i.e., 3 to 4 weeks) for correct steps x1.0 except for the shirt that multiplied by 1.25. Celerations of learning opportunities remained low and flat throughout training with only a few exceptions. Mary P.’s learning opportunities with underclothes x1.4 before the use of picture cues. Her learning opportunities with underclothes during the picture cue condition +1.3. Mary P.’s celerations for underclothes during the picture cue phase displayed a "Jaws" learning picture.

**Jumps and Turns**
Florence’s frequencies of putting on her shoes x1.0 during the first 4 weeks of training followed by a jump up of x1.8 then a celeration x1.25. Her frequencies of putting on her dress +1.3 followed by a jump up of x2.8 and a celeration x1.3 when picture cues were introduced. Florence’s frequencies of putting on her underclothes were +1.1 with an immediate turn up celeration course x1.25 during the picture cue condition.

Mary B.’s frequencies of putting on her socks +1.1 before the picture cue phase. Her frequencies jumped up by a x2 with the picture cues.

**Discussion**
We assessed the effects of least-to-most response prompts and picture cues on the self-dressing of persons in the middle stages of Alzheimer’s disease. All participants made improvements in self-dressing and reached most instructional aims in a relatively short time. Occasionally, their frequencies of self-dressing exceeded our fluency aims.

We anticipated picture cues to be effective with our participants. There is a growing body of re-
search on the use of picture cues to develop and maintain behaviors of older adults. For instance, Bourgeois (1990) found that the conversational skills of Alzheimer’s participants improved with the use of picture cues. Hanley and Lusty (1984) taught patients with dementia to maintain orientation skills using memory aids. Picture cues have been more effective in occasioning memory with older individuals than verbal instructions.

Mary B.’s mental and physical capabilities were stable during our training. She maintained several independent skills. Florence and Mary P., however, were rapidly progressing to the final stage of Alzheimer’s disease. There was a noticeable difference in Florence’s and Mary P.’s ability to walk. Their gait became increasingly unsteady. They were easily agitated. Their sleeping patterns were dramatically changing. They were becoming less and less sensitive to their environments. With this background information on the mental and physical functioning of our participants and the growing interest in the use of picture cues with Alzheimer’s patients, the high number of dressing skills that reached or approached the instructional aims with only the simple, unobtrusive least-to-most response prompts was a surprise. The picture cues were important only for Florence. We found no other research specifically using least-to-most response prompts to develop or maintain self-help skills with Alzheimer’s patients or the elderly.

The caregivers used a 10-item check list to assess the mealtime behaviors of the participants. They daily rated eating skills during breakfast or during the dinner meal. This "untreated baseline condition" indicated the general stability of self-help skills other than self-dressing. These evaluations showed that as Florence, Mary B., and Mary P. improved their dressing skills during our interventions, they regressed in other self-help skills. For example, they increasingly spilled food, confused the identification of food items, and experienced more episodes of incontinence. This finding is relevant because again it shows the independence of behaviors; meaning, dressing skills improved, but other self-help skills (e.g., self-help at mealtime) worsened.

All the caregivers responded positively toward our study. It was beneficial to them because the caregivers could (a) maintain a morning schedule and attend to other tasks such as preparing breakfast, (b) receive a brief respite period, and (c) maintain a loving relationship with the person with Alzheimer’s who was neatly and appropriately dressed and groomed for breakfast.

There is a need for continued research on response prompting techniques to develop self-help skills with persons who have Alzheimer’s. Another possible area for future research is self-dressing during the evening hours. It would be interesting and helpful to study "sun downing." Sun downing describes some persons with Alzheimer’s and some elderly who increase in agitation during the late afternoon and evening hours. Still two other possibilities included (a) discrimination training for the acquisition of clothing selection (e.g., different and appropriate clothing) and (b) procedures to maintain or develop often neglected grooming skills (e.g., brushing teeth, washing face, combing hair). Clothing selection is an essential instructional area for persons with Alzheimer’s, disease since clothing selection is often a complicated and difficult task.

Families are the primary caregivers of persons with Alzheimer’s. Roughly 70% of persons with Alzheimer’s live with relatives. The caregivers in our study expressed need and concern for assistance in care giving. Even though the participants attended a day care facility, our caregivers lacked the skills, patience, and energy for such intense care giving. As a final suggestion, we need to investigate ways to help caregivers extend and maintain treatment gains.

References


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. Dr. Carolyn Tolbert-Johnson is an Assistant Professor of Special Education at the University of Dayton.
Figure 2

Successive Calendar Days Chart

Cooper
T-Johnson

Supervisor
Advisor
Manager

Depositor
Ohio State University
Agency

Timer
Counter

Behavior
Age
Label
Counted
Task Analysis
Steps
Figure 3

SUCCESSIVE CALENDAR DAYS

SUPERVISOR: Cooper
ADVISER: T-Johnson
MANAGER: Cooper

Florence
SS: Alzheimer
AGE: Stockings
COUNTER: Task Analysis

Figure 3
DAILY BEHAVIOR CHART (DCM-17EN)

CALENDAR WEEKS

CYCLE 840 OATS (10 WKS)

Response Prompts & Self-Recording

Picture Signs Added

Caregiver Manager

SUPERVISOR
Cooper

MANAGER
Ohio State University

BEHAVIOR
T-Johnson

T-Johnson Cooper

Mary B.
74

Alzheimer
LABEL
COUNTED
Task Analysis
Steps

SUCCESSIVE CALENDAR DAYS

Cooper
T-Johnson

DEPOSITOR
AGENCY
TIMER
COUNTER
CHARTER

Figure 5
Figure 8
**DAKY BEHAVIOR CHART (DCM-OEN)**

**CALENDAR WEEKS**

**SUPERVISOR ADVISER MANAGER**

Cooper, T. Johnson, John P.

**DEPOSITOR AGENCY**

Ohio State University

**TIMER COUNTER CHARTER TASK ANALYSIS**

Johnson/Cooper

**SUCCESSIVE CALENDAR DAYS**

**Mary P. 66**

**Alzheimer Socks**

**COUNTED**

**COUNTING PERIOD FLOORS**

**Figure 12**
Figure 13
A. Jane Barnes: Precision Learning a Collegiate Vocabulary

Claudia E. McDade

Learning Skills 102: Freshman Orientation is taught within the Center for Individualized Instruction at Jacksonville State University. Designed to assist entering freshmen in adjusting to college, to managing their own behavior, to handling the freedom issues that threaten their remaining in college, LS 102 also addresses study skills. Since the average college bound high school graduate reads at the tenth grade level, faculty in the Department of Learning Skills are dedicated to enhancing the vocabulary skills of students in four courses. In some courses students learn word parts—prefixes, suffixes, and root words; in others, they learn to discriminate easily confused words. Several Precision Teaching techniques used include SAFMEDS, practice sheets, and the Computer-Based Precision Learning System™ (McDade, 1992).

In LS 102 students are given a pretest on 300 words that were found from surveying freshman level textbooks. Then they are given the list of words to make SAFMEDS of them. They are taught to chart their progress on a daily Standard Celeration Chart and encouraged to study, practice, and chart at least three times a week. Words are discussed in class in the context of examples and appropriate sentence usage. Students then take written tests of five minutes duration over the full list of 300 words.

Kevin was an 18 year old college freshman in LS 102 in Spring Semester, 1992. His pretest score was zero, while his posttest was 130. Over seven weeks' duration Kevin maintained his high rate on the written test.

Notes from Below the Floor

I am interested in more Charts of pleasant and unpleasant feelings and positive and negative thoughts, especially those using of the one minute timing with inners!

My request includes:
projects using a one minute timing,
projects of counting only,
Charts with all-day or partial-day record floors,
projects you begin today as a result of reading this ad, and any other variety of Charts in which you or someone you supervise counted a pair of inner behaviors.

Please send to: Abigail B. Calkin 631 Lane Topeka, KS 66606-1536 (913) 354-7018
Pre Test 0
Post Test 130
Written Test: 5 min.
SATURDAY: 1 min.
In Memoriam

Addie Jane Barnes
March 6, 1941 to June 21, 1992

Managing editor of the Journal of Precision Teaching from its resurrection in 1990, A. Jane Barnes also served as the Assistant Director of the Center for Individualized Instruction at Jacksonville State University from 1989 until her death. Working her way through the Center as a student client, student worker, Tutorial Services Coordinator, and instructor, Jane contributed more than seven years of her life to the Center’s mission. Jane became enamored with Precision Teaching by the late 1980’s, receiving her first formal training at the Ninth International Precision Teaching Conference in Boston, MA in 1990. At the time of her death she was developing multiple routes to instructing with Precision in the Center’s courses in freshman orientation and quantification skills. She was also writing a text for the Center’s course in employability skills. A data share she made at the Tenth International Precision Teaching Conference, Park City, UT in 1992 is included in this issue of the Journal.

A graduate of Jacksonville State University with a baccalaureate in Criminal Justice, Jane was twice nominated as the Outstanding Staff Member of the College of Letters and Sciences. She endowed a teaching chair in the College in memorium to her mother, a life-long teacher.

A native of New Orleans, LA, Jane lived all over the world as she traveled with her first career and first love—the United States Army. A veteran of the Vietnam War, she retired for health reasons after twenty years’ service. Jane earned the National Defense Service Medal, Good Conduct Medal, Army Commendation Medal, Joint service Commendation Medal, Army Service Ribbon, NCO Professional Development Ribbon, Overseas Service Ribbon, and Meritorious Service Medal.

One of the first women to achieve the rank of Sergeant Major in the US Army, Jane taught at the Sergeant Majors’ Academy. She also served as an aide to General Al Haig at NATO Headquarters in Brussels, Belgium. At the time of her death Jane was Vice-President of the local chapter of the Women’s Army Core Veterans Association which had just sponsored a reunion at Ft. McClellan, AL to celebrate fifty years of the Core’s existence.

Jane died of brain cancer at her home in Weaver, Alabama.

--Claudia McDade

“Granted, this second career is not the same as running a resort; however, I can say that it is probably more rewarding, in that I see an academic success story almost on a daily basis. I have seen so many underprepared students come to the CII for assistance and leave, after a period of time, fully prepared and looking forward to graduation. If someone would have told me four years ago that I would be doing what I’m doing today, I would have said that they were “nuts” - but here I am, involved, involved, involved . . .”

--Jane Barnes
(from a letter found on her Mac file)
Journal of Precision Teaching

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Jacksonville State University  
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