Journal of Precision Teaching and Celeration

Volume XIII  Spring 1996  Number 2

The Standard Celeration Society Supports Precision Teachers  John O. Cooper

Experiencing Success in Education and Life: An Intensive Skills-Building Program  Claudia E. McDade & John Brown

The Effects of Using Direct Instruction and a Re-Reading Contingency with Precision Teaching  Ann Blackwell, Sue Stookey & T. F. McLaughlin

The Effects of Praise, Error Drill and Assisted Reading on Oral Reading  Amie Gregori & T. F. McLaughlin

Using Teaching Your Child To Read in 100 Easy Lessons to Teach Letter Sounds  Allison Drago & T. F. McLaughlin

Evaluating the Effectiveness of Home Drill with a Middle School Student with ADHD  Jana Farley & T. F. McLaughlin

Effectiveness of Assisted Self-Recording and Assisted Self-Evaluation on Vocational Welding Skills of a Student with Autistic Behaviors  Marquelle La Porte & T. F. McLaughlin

The Effects of Reading Racetracks on the Fluency of See-To-Say Words in Isolation by a Student with Learning Disabilities  Lisa Rinaldi & T. F. McLaughlin

The Effects of Contingent Consequences with Direct Instruction Reading with a Pre School Child in the Home  Sarah Stenseth & T. F. McLaughlin

Computerized Behavioral-Data Collection and Analysis for Improved Clinical Outcomes in Rehabilitation  Charles T. Merbitz, Rosemarie B. King, Leora R. Cherney, Hanspeter Marqui, Jeffrey C. Grip & Tracy J. Markowitz

Notes From Below the Floor: The National Debt  Abigail B. Calkin

Technical Note: Electronic Behavior and Event Counters  Charles Merbitz & Robert F. Morrell

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

The purpose of the Journal of Precision Teaching and Celeration 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 X, Number 2, Spring, 1993, pp. 79 - 82.)
* 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 and Celeration staff:
Claudia E. McDade, Editor Ann L. Poe, Managing Editor
John M. Brown, Assistant Editor Connie Williams, Editorial Assistant

Board of Consulting Editors:

<table>
<thead>
<tr>
<th>Name</th>
<th>Term</th>
<th>Name</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abigail Calkin</td>
<td>95--98</td>
<td>Chuck Merbitz</td>
<td>95--98</td>
</tr>
<tr>
<td>John Cooper</td>
<td>95--97</td>
<td>April Miller</td>
<td>93--96</td>
</tr>
<tr>
<td>Edward Cancio</td>
<td>95--97</td>
<td>Bruce Schroeder</td>
<td>93--96</td>
</tr>
<tr>
<td>Anne Desjardins</td>
<td>93--96</td>
<td>Clay Starlin</td>
<td>95--97</td>
</tr>
<tr>
<td>John Eshleman</td>
<td>95--97</td>
<td>Bill Sweeney</td>
<td>93--96</td>
</tr>
<tr>
<td>Elizabeth Haughton</td>
<td>95--98</td>
<td>Julie Vargas</td>
<td>95--97</td>
</tr>
</tbody>
</table>

Editor Emeritus
Ogden R. Lindsley

The Journal of Precision Teaching and Celeration (ISSN 0271-8200) is published biannually by the Center for Individualized Instruction, Jacksonville State University, Jacksonville, AL 36265. Reproduction for scientific and scholarly purposes of any material published in the Journal will be permitted following receipt of written request. Address such request to Journal editor at the above address.

A Publication of
The Standard Celeration Society
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editor's Comments</td>
<td>1</td>
</tr>
<tr>
<td>Claudia E. McDade</td>
<td></td>
</tr>
<tr>
<td>Memories of Fred Keller</td>
<td>2</td>
</tr>
<tr>
<td>The Standard Celeration Society Supports Precision Teachers</td>
<td>4</td>
</tr>
<tr>
<td>John O. Cooper</td>
<td></td>
</tr>
<tr>
<td>Call for Papers - 12th International Precision Teaching Conference</td>
<td>6</td>
</tr>
<tr>
<td>Standard Celeration Society Membership</td>
<td>10</td>
</tr>
<tr>
<td>Experiencing Success in Education and Life: An Intensive Skills-Building Program</td>
<td>13</td>
</tr>
<tr>
<td>Claudia E. McDade and John Brown</td>
<td></td>
</tr>
<tr>
<td>The Effects of Using Direct Instruction and a Re-Reading Contingency with Precision Teaching</td>
<td>19</td>
</tr>
<tr>
<td>Ann Blackwell, Sue Stookey and T. F. McLaughlin</td>
<td></td>
</tr>
<tr>
<td>The Effects of Praise, Error Drill and Assisted Reading on Oral Reading</td>
<td>23</td>
</tr>
<tr>
<td>Amie Gregori and T. F. McLaughlin</td>
<td></td>
</tr>
<tr>
<td>Using <em>Teaching Your Child To Read in 100 Easy Lessons</em> to Teach Letter Sounds</td>
<td>28</td>
</tr>
<tr>
<td>Allison Drago and T. F. McLaughlin</td>
<td></td>
</tr>
<tr>
<td>Evaluating the Effectiveness of Home Drill with a Middle School Student with ADHD</td>
<td>33</td>
</tr>
<tr>
<td>Jana Farley and T. F. McLaughlin</td>
<td></td>
</tr>
<tr>
<td>Effectiveness of Assisted Self-Recording and Assisted Self-Evaluation on Vocational Welding Skills of a Student with Autistic Behaviors</td>
<td>37</td>
</tr>
<tr>
<td>Marquelle La Porte and T. F. McLaughlin</td>
<td></td>
</tr>
<tr>
<td>The Effects of Reading Racetracks on the Fluency of See-To-Say Words in Isolation by a Student with Learning Disabilities</td>
<td>44</td>
</tr>
<tr>
<td>Lisa Rinaldi and T. F. McLaughlin</td>
<td></td>
</tr>
<tr>
<td>The Effects of Contingent Consequences with Direct Instruction Reading with a Pre School Child in the Home</td>
<td>53</td>
</tr>
<tr>
<td>Sarah Stenseth and T. F. McLaughlin</td>
<td></td>
</tr>
<tr>
<td>Computerized Behavioral-Data Collection and Analysis for Improved Clinical Outcomes in Rehabilitation</td>
<td>57</td>
</tr>
<tr>
<td>Charles T. Merbitz, Rosemarie B. King, Leora R. Cherney, Hanspeter Marqui, Jeffrey C. Grip and Tracy J. Markowitz</td>
<td></td>
</tr>
<tr>
<td>Notes From Below the Floor: The National Debt</td>
<td>64</td>
</tr>
<tr>
<td>Abigail B. Calkin</td>
<td></td>
</tr>
<tr>
<td>Technical Note: Electronic Behavior and Event Counters</td>
<td>71</td>
</tr>
<tr>
<td>Charles Merbitz and Robert Morrell</td>
<td></td>
</tr>
</tbody>
</table>
Editor’s Comments

Claudia E. McDade

This is the second issue of the Journal of Precision Teaching and Celeration, formerly the Journal of Precision Teaching. We are delighted to showcase Gonzaga University, Washington with seven articles of varying insights into student celerations through Precision Teaching and Direct Instruction. T. F. McLaughlin has been extremely active in Precision Teaching and celeration showing multiple applications of standard measurement in such areas as reading, home drill with an ADHD student, self-recording and self-evaluation in vocational skills, and fluency with students with learning disabilities.

Memories of Fred Keller, our teacher and reinforcer mentor, opens our current issue. Former friends, students, and colleagues recall moments of learning glory and insights of Dr. Fred. John Cooper, President of the Standard Celeration Society, shares an exotic, wildflower article, detailing the Standard Celeration Society and precision teachers. The Center for Individualized Instruction offers an insightful article about Jacksonville State’s University ExSEL program, student successes and retention efforts.

To demonstrate the use of precision measurement in other settings, a special reprint on computerized data collection analysis by Charles Merbitz and colleagues is also included in this issue. Abigail Calkin offers insight concerning the national debt, with accompanying Charts to illustrate. And, finally, Charles Merbitz and Robert Morrell share a Technical Note concerning electronic behavior and event counters.

Also, shared in this issue is news concerning the Precision Teaching conference to be held at the University of Washington, Seattle, October 9 - 12, 1996. It is essential for practitioners and believers in Precision Teaching and Direct Instruction to attend this conference, share PT successes, ask questions, find answers, and celebrate celerations. All PT/DI folks should join the Standard Celeration Society and promote our endeavors, such as those highlighted in the Journal of Precision Teaching and Celeration.

Enjoy this issue of the Journal of Precision Teaching and Celeration! Keep charting and keep submitting.
Memories of Fred Keller

Ogden Lindsley

One of the major reasons I do what I do today is Fred Keller. At my very first ABA (1979) he looked at my poster, told me I had not just used his system--I had improved it; then he kissed me. Later in the conference I told him that I had called my mother to tell her I might never wash my cheek again. He laughed and said, Honey, that's just the beginning of our relationship. As usual, Frances looked on adoringly.

I, Ogden, recall my first reinforcer from Fred Keller: ...It was a rainy Sunday morning at 8:00 AM at the spring 1952 meeting of the Eastern Psychological Association in Brooklyn New York. Sunday morning presentations were the least favorable spots because most attendees were still in bed getting much needed sleep from the late parties the Saturday night before. In the room with seats for fifty were about twelve seated in the first two rows. All of the presenters were graduate students, mostly from Columbia. I was the lone Harvard graduate student and presented cumulative records of our daughter Cathy's panel pressing in her Aircrib on various intermittent schedules reinforced by bells, buzzers, and flashes of colored lights. I was the last speaker, and when I finished, Fred Keller stood up, left his group of Columbia graduate students that were surrounding him, and approached me with his hand out as I was putting my glass slides in their box. As we shook hands, I can still feel the warmth of his left hand covering the back of my right hand as he took it in both his hands, and with a twinkle in his eye said, "Fine work, Ogden. Keep it up! We need more human operant research."

Bob Worsham

My first reinforcer from Fred Keller was in early 1976 when I was preparing to teach a senior seminar at Ramapo College on B. F. Skinner. I had obtained the book "Festschrift for B. F. Skinner," and was captivated by Keller's contribution to the book titled "Psychology at Harvard (1926-1931), A Reminiscence." His writing was like a window on history, and at that time I knew that this was a man I would like to know. In my last two years teaching at Ramapo College I used his PSI system for teaching Psychology of Learning, and Experimental Psychology. I was never fortunate enough to meet him in person.

Charles Merbitz

My first reinforcers from Fred started with reading "Goodbye Teacher..." in 1971 or 1972. Then, in 1973, I wrote a paper for Hank Pennypacker discussing the Jesuit educational system of the 17th century in which I argued that the Jesuits had deployed some of the elements of PSI. Hank suggested that I send the paper to Fred, which I did, never thinking that he would pay any attention to an unpublished paper from an unknown student. I was thrilled when Fred wrote me back a charming letter...and then, when I finally met him in person several years later, he actually remembered the Jesuit paper. Actually, he referred to it on and off for years, as we met and talked at each subsequent ABA. Gracious, polite, sharp, kind, funny, deep...a good model, our Granduncle Fred.
Tom Lovitt

It is sad that he has left us, but my what a life he had! The one and only time I was with him was in Mexico in about 1972. He and I and several others were in Mexico City for a conference that was set up by Emilio Ribes (another great friend of Fred’s). We had several chats about one thing and another while there. Some of our talks might have had something to do with education and psychology. I don’t remember. I do remember him as a thoughtful and charming man. He said something to me about his confidence, that he was not as sure of himself as he once was. At that time he would have been about 73 years old. I couldn’t imagine how he could have felt that way, what with his nature and his record of achievement. I never saw him again but kept up with him through others. This afternoon I intend to read (for the umpteenth time) Summers and Sabbaticals.

Claudia McDade

Fred was the most positively reinforcing person I’ve ever known. I first met him at ABA 1979 in Dearborn, MI when Chuck Merbitz dragged him over to our poster session. He studied our poster carefully, asked several thought-provoking questions, then pronounced his approval by announcing that we in the Center for Individualized Instruction had not just used his approach—we had improved on it. Then he did the most amazing thing—he kissed me on my cheek. I was most awe-struck. Later in the conference I bumped into him and stammered, "Oh, Dr. Keller, I was so excited by your comments about our work that I called home and told my mother I may never wash my face again." He laughed and replied, "Honey, that’s just the beginning of our relationship." As usual, Frances looked on adoringly. He was right because he always checked on our progress at every ABA or SEABA meeting we both attended and kept a lively correspondence of support. Years later, I was privileged to participate in an ABA symposium in Fred’s honor organized by Celia Gershenson. I titled my contribution, "Hello, Teacher..." because Fred Keller taught me how to be a teacher through encouraging students in moving from where they are to where they need to be in a totally individualized, positively reinforcing way. I will truly miss "Mr. Reinforcement."
The Standard Celeration Society Supports Precision Teachers

John O. Cooper

Exotic. a species which has been brought into an area; a non-native (Jones & Foote. Gardening with Native Wild Flowers. p. 9).

Wildflowers. Flowering plants, native to a specific geographical area or habitat, capable of growing in unimproved habitats without the assistance of humans; normally assumed to have attractive, showy flowers. Wildflowers can include naturalized species that coexist with the other plants in the same habitat, but are not aggressively competitive or invasive (The National Wildflower Research Center’s Wildflower Handbook. p. 3).

Claudia McDade, the editor of the Journal of Precision Teaching and Celeration (JPT&C), evoked several thoughts about the history and future of Precision Teaching (PT) when she asked me to write a few words about the Standard Celeration Society. I believe the accelerating mergers of Direct Instruction (DI) (Kinder & Carnine, 1991), and PT represent the major system change within Precision Teaching during the last 10 years. DI and PT independently developed compatible and significant advances in academic instruction. It should not surprise anyone that they eventually united--DI for the development of new academic skills, and PT to build the new accomplishments to a performance standard that produces retention (remembering), endurance, and stability.

These two educational practices are fundamentally different. DI is a “static practice” at the level of the teacher. Of course, DI has changed since its beginning in the 1960s; but, instructional design experts make the instructional changes, and evaluate the effectiveness of their changes with extensive field testing--and this is good. To me, DI seems as if it is a beautifully cultivated exotic flower. PT, in contrast, is a “dynamic practice” at the level of the teacher. PT stimulates many questions and discoveries from students and teachers that result in rapid instructional change--and this is also good. PT seems as if it is an uncultivated lovely WILD FLOWER.

I emphasize above the merger of DI and PT because I see the merger as the current, dominant thrust of PT. I believe, however, PT will continue to evolve toward Generative Instruction (a garden of multiple exotic flowers and the wild flower), as envisioned by Kent Johnson, and later described by Kent and T.V. Joe Layng (1992). As a precision teacher, I look forward to a future of Generative Instruction.

How do these brief thoughts about the history and future of PT relate to writing about the Standard Celeration Society? The possible future of PT, the wildflower, concerns me. The future of DI, the well-cultivated exotic flower, concerns me less. DI seems more secure and organized than PT. Yet, both are fragile flowers, susceptible to unusual environmental changes. Precision teachers and their behavioral colleagues learned long ago that school systems seldom select instructional practices as a function of improved learner performance. For instance, teachers and administrators do not necessarily select tools that produce the MOST measurably effective instruction. Precision teachers will likely continue to be an independent, small, select group of superior teachers, and our small numbers appear susceptible to extinction. Flowers need environmental supports to survive, (e.g., space, sunlight, water, nutrients), and PT also needs environmental supports to survive, other than successful instruction. Until recently, precision teachers had two formal support systems--JPT&C, and the International Precision Teaching Conference. The Journal archives our accomplishments, and the Conference provides a setting for continued learning and development of
instructional skills. I hope precision teachers today feel obligated to nurture tomorrow's precision teachers by making contributions to the Journal and the Conference.

The Standard Celeration Society, a third support system for precision teachers, also calls for participation. This organization is a new professional society, and just now getting off the ground. In 1995, the society established a "Special Interest Group" (SIG) with the Association for Behavior Analysis. We have scheduled a meeting of the Society at the Association for Behavior Analysis Convention in May 1996. I encourage all to attend this meeting.

The Standard Celeration Society is:

- A collegial organization for all persons who use Standard Celeration Charting in education, human services, business, performance management, parenting or child rearing, and science.

- A society to encourage the science of human behavior and the Standard Celeration Chart.

- A society to create functional applications derived from the science of behavior.

- A network for users of the Standard Celeration Chart.

- A society to create a more loving, less fearful world.

Benefits of membership include:

- A year's subscription to the Journal of Precision Teaching and Celeration.

- Reduced conference fees for emeritus and student members at International Precision Teaching Conferences.

- Periodic communications about developments with standard celeration activities.

- A collegial home for those dedicated to enhancing human behavior.

Dr. John O. Cooper, President of the Standard Celeration Society, is affiliated with Applied Behavior Analysis, The Ohio State University, Columbus, OH.
Twelfth International Precision Teaching Conference
University of Washington, Seattle, WA

October 9 - 12, 1996

PRECISE SOLUTONS
FOR THE NEEDS OF A DIVERSE SOCIETY

Plan on attending a conference presenting solutions to the educational crisis, that increasingly worries American educators and the general public --- Violence, Inclusion, School Improvement and Plugging the Hole in Whole Language

---

Pre-conference workshops: In-depth application training sessions.
Conference: Presentations, mini-workshops, and demonstrations.
Poster Sessions: Informal data share.
Cracker Barrel: Special opportunity to talk with the experts and leaders about specific methods. Lots of ideas and professional contacts.

CEU Credit Available

Increase your effectiveness for developing competent students by attending this conference.

For additional information, write or call:
Claudia McDade, Ph.D., Chair, Publicity Committee
Center for Individualized Instruction
Jacksonville State University
Jacksonville, AL 36265
Fax (205) 782-5321 (205) 782-5570
E-mail CMcDade@jsucc.jsu.edu

Reservations for Conference
Meany Tower Hotel, 4507 Brooklyn Ave. NE
Seattle, WA
1-800-899-0251 or (206) 547-6029
FAX (206) 547-6029
Rates: $72.00 Single, $82.00 Double
Cut off date: September 9, 1996
We invite your participation in the 12th International Precision Teaching Conference to be held at the University of Washington, Seattle, WA, October 9 -12, 1996

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 the following tracks: School Improvement, Inclusion, Violence, Plugging the Hole in Whole Language (and other basic skills). To be considered as a speaker, your proposal must reach the Program Committee no later then June 30, 1996.

‘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 October 10, 1996. One covered table will be furnished for each display. Contact Abigail Calkin, (913) 354-7018 or (913) 575-6834(Fax) or 631 SW Lane, Topeka, KS 66606-1536.

‘Team Presentations: The 12th 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.

Dianne Barr-Cole, Chair
Program Committee
Eatonville School District
P. O. Box 698
Eatonville, WA 98328
(360) 832-3308
(360) 832-3224 (Fax)
dcole@potlatch.esd112.wednet.edu (e-mail)
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.
PROGRAM DESCRIPTION (Please type all information):

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.
SPEAKER INFORMATION (Please Type):

Primary Speaker Name ___________________________ Title ___________________________

Organization ___________________________ Address ___________________________

City ___________________________ State ______ Zip ___________________________

Telephone: Office __________ Telephone: Home __________ E-Mail: __________

Have you presented a session on this topic before? Yes No

If so, when and where? ____________________________________________

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

ADDITIONAL SPEAKERS (Use additional pages if necessary):

Name ___________________________ Title ___________________________

Organization ___________________________ Address ___________________________

City ___________________________ State ______ Zip ___________________________

Telephone: Office __________ Telephone: Home __________ E-Mail: __________

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. School improvement
* 2. Inclusion
* 3. Violence
* 4. Plugging the Hole in Whole Language (and other basic skills).

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 track boards with others.

Poster Session proposals will be accepted up until August 31, 1996

AUDIO-VISUAL EQUIPMENT:

Each meeting room will be set theatre style with a lectern, head table, overhead projector and screen. Speakers are responsible for other audio-visual equipment.
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 Standard Celeration Society provides a "home" for Precision Teachers and others who apply standard measurement. It is a network of colleagues and friends devoted to improving monitoring of changes in performance -- regardless what is counted. A variety of benefits to members includes:

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

History

The Society evolved from a 25-year history, beginning with the founding of Precision Teaching (PT) by Dr. Ogden Lindsley, supported by the Precision Teaching Project in Great Falls, Montana, and maintained with eleven 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 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.

Membership Categories

<table>
<thead>
<tr>
<th>Membership Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charter Member</td>
<td>Membership before March 1, 1993</td>
</tr>
<tr>
<td>Sustaining Member</td>
<td>$100 Membership dues, for those wishing to provide an extra contribution to the success of SCS. Membership includes 2 issues of each <em>Journal of Precision Teaching and Celeration</em> and have a reduced conference fee.</td>
</tr>
<tr>
<td>Regular Member</td>
<td>$50 Membership dues. Member will receive one issue of each <em>Journal of Precision Teaching and Celeration</em> and have a reduced conference fee.</td>
</tr>
</tbody>
</table>
Standard Celeration Society
Membership Application

Name: ________________________________________________________________

Title: ___________________________ Organization: _________________________

Street: __________________________________________________________________

City: ______________________________ State/Province: ______________________

Zip/Mail Code: ______________ Country: _________________________________

Home Phone: (___) ______________ Work Phone: (___) ________________

E-Mail __________________________ Fax ________________________________

Type of membership:

_____ Sustaining Membership $100

_____ Regular Membership $50

_____ Subscriber $25

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

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Make annual dues check in U. S. funds payable to the Standard Celeration Society. Membership dues are renewable September 1 of each calendar year.
Mail application and dues to:

Claudia E. McDade, Treas.
Standard Celeration Society
Center for Individualized Instruction
Jacksonville State University
Jacksonville, AL 36265
Experiencing Success in Education and Life: An Intensive Skills-Building Program

Claudia E. McDade and John M. Brown

The Center for Individualized Instruction at Jacksonville State University offers an intensive six-week summer program to assist poorly prepared high school graduates in developing skills necessary for college success. Students must master Precision-based competencies to earn “A’s” in developmental reading, writing, and quantifying courses. Those who successfully complete the program are far more likely to remain at JSU and to earn higher grades than the entering freshman cohort from 1993. Adaptation of the program to other settings is discussed.

Brief Description of the Institution
Jacksonville State University is a regional, state-assisted comprehensive university serving approximately 7800 students per year, most of whom live in rural northeast Alabama and northwest Georgia. Approximately half of the undergraduates are first-generation college students; about 52% are female; about 34% are over the age of 25; about 18% are minority. A liberal admissions institution, JSU requires an ACT Composite scores of 19 for unconditional admittance and 16 for conditional admittance. Many entering students are underprepared for college, with approximately 70% and 38% placed in developmental quantification and writing courses, respectively.

Description of the Retention Program
To increase the academic competencies of entering college freshmen and improve the probability of success through the freshman year, the Center for Individualized Instruction at Jacksonville State University offers an intensive six-week summer development program for prospective freshmen. While encouraged for any freshman year by strengthening their skills in reading, writing, and studying. While the program specifically targets students with entering ACT composite scores below 16, it has appealed to others who are conditionally admitted, but who recognize their need to enhance their skills.

Extensive evaluation of students' presenting skills in reading, writing, and quantifying lead to individual prescriptions for developing competence. Coached by an instructor, graduate assistants, and undergraduate tutors, students work to reach prescribed competencies each week to make optimal progress toward their goals (McDade, 1993). Between 100 and 240 competencies are required to earn an "A" in courses in technical reading, writing, and pre-algebra skills. The ExSEL instructional team uses Precision Teaching, Direct Instruction, and other individualized strategies to guide learners (McDade & Goggans, 1993). In addition to regularly scheduled class times, students must master between 20 and 50 computer modules in each area and work on their competencies during structured study sessions (McDade, 1992). Weekly data shares keep students motivated by showcasing their progress to others in a socially reinforcing atmosphere. ExSEL students continue to be mentored through the fall semester with both academic advisement and a freshman success course (McDade, Brown, Williams, & Poe, 1994).

Specific Goals and Objectives of the Retention Program
ExSEL exists to prepare students for their freshman year by strengthening their competencies in reading, writing, quantifying, and studying. While the program specifically targets students with entering ACT composite scores below 16, it has appealed to others who are conditionally admitted, but who recognize their need to enhance their skills.

From the institution's perspective, the goal of ExSEL is to increase student persistence. From the student's perspective, the goal of ExSEL is to

Jacksonville State University's ExSEL Program received the 1996 Noel-Levitz RETENTION EXCELLENCE AWARD. Only 9 institutions in the United States received this distinction.
increase their academic and self-confidence. For most students ExSEL is a route toward college graduation, even for those who do not enroll at JSU after the ExSEL experience.

Objectives of ExSEL include the following:
- To develop student competence in basic and study skills.
- To ease students through the transition from high school to college.
- To accelerate student progress through the core curriculum.
- To increase student graduation rate.

Results and Outcomes for Students and the Institution

To develop student competence in basic and study skills.
Assessment of ExSEL includes total competencies reached in each course, ACT retest scores, and tracking of students throughout their years at JSU. Virtually all students complete enough competencies to earn at least a "C" in each course, while significant improvements in ACT subtest scores in reading and writing are seen. Compared with other JSU students, ExSEL students earn more hours and higher grade point averages through the first four semesters.

The first two groups were given a post ACT Assessment after ExSEL. The class of '93 was required to reach a composite of 16 to enter JSU. Seventy-five percent of them did, with a mean improvement of 2.375. Post ACT Assessments were used for placement only on the class of '94, so the motivation to succeed was less. Still, 44% improved with a mean improvement of 2.43. Combining both groups, 38 out of 64 students showed higher ACT Composite scores with improvement ranging from 1--6 points and a mean improvement of 2.3. For the class of '95 COMPASS, an ACT product, was used because of its diagnostic capability. Insufficient data are available from institutional norms or national norms to make pre-post comparisons cross-referencing the ACT.

ExSEL students have a high persistence rate, significantly better than JSU students at large. University-wide persistence rates through the freshman year are 80%; beginning the third semester, 64%. Also ExSEL students' GPAs are higher than average freshman and sophomore GPAs.

To ease students through the transition from high school to college.
Much of the literature on student persistence points to adjustment difficulties of various kinds which cause students to drop-out. While some of these difficulties are academic, most are related to social and personal adjustment. Strong study habits, including SAFMEDS practice, time management skills, and collaborative learning styles are developed during ExSEL. In the fall semester following ExSEL students take LS 102: Freshman Orientation from one of the ExSEL team. There they develop additional skills in the adjustment process, while they continue to be mentored by ExSEL staff and have several classmates from ExSEL. Ninety-one percent of ExSEL students have earned at least a "B" in LS 102.

Multiple converging evidence indicates that ExSEL students adjust well to the college experience. At end of ExSEL evaluations students report positive feelings toward the coming year; on the post-ExSEL College Expectancy Scale, they show fewer apprehensions of college that when ExSEL began. During individual conferences with students each semester at midterm, adjustment difficulties are discussed. In consultation with ExSEL staff students typically report resolution of such conflicts. On essays regarding the freshman experience in freshman composition classes ExSEL students report greater overall satisfaction with JSU than other freshmen.

To accelerate student progress through the core curriculum.
Because progress through the core curriculum is at the student's option, JSU suffers from many students delaying completing tough subjects early in their academic careers. Due to extensive mentoring, ExSEL students are more likely to register for core courses in their first two years and to make satisfactory progress toward completion of the core. By the end of the fourth semester 84% percent have completed the
composition requirements and 55% percent, the mathematics requirements.

Representative Standard Celeration Charts kept by ExSEL students of their LS095 (Reinforcing Communication Skills) SAFMEDS accompany this article. One competency in the course is to master a deck of 90 basic writing terms at a rate of 60 correct per minute. These Charts take on a new meaning in light of the grade students earned in subsequent EH 101 (Freshman Composition). Those students whose celerations were the steepest earned “A” or “B”, compared with those who did not reach mastery at all or whose celerations were less steep.

To Increase Student Graduation Rate
Since the first class of ExSEL students is in its junior year, graduation rates have not yet been affected. Persistence of these students through their sixth semester is 52 percent, however, which is significantly higher than the entering cohort of all full-time freshmen from 1993. Compared with overall university persistence through the freshman year of 80%, ExSEL students stay at a rate of 91%. While 64% of JSU students return for their sophomore year, 75% of ExSEL students do. Those ExSEL students who do leave, do so for personal rather than academic reasons. Four students have left due to illness, but expect to return; one member of the first class has died.

Potential for Adaptation by Other Institutions

The ExSEL model could be easily adapted in other settings. As to the key variables for the program's success, there are at least three. First, students develop COMPETENCE in the basic skills of reading, writing, and quantifying. If they do not reach a minimum number of prescribed competencies in each course, but are making strong progress, they may be conditionally admitted, but required to continue to work in the skills area. Thus a student who completes ExSEL without mastering all the writing competencies necessary to succeed in EH 101 will earn a "no credit" grade in the course, Learning Skills 095 and retake 095 in the fall semester. That student will begin with the competencies already reached and continue working until the required number are mastered. How do we know what constitutes competency? For years we have tracked student success in subsequent courses to determine exactly what is necessary. Other institutions might set other standards to suit their students' optimal progress through the core curriculum.

Second, each student receives individual attention and mentoring. The ExSEL team designs their fall schedules with teachers who are the best matches for them. As they progress through the university, they continue to meet with ExSEL staff as long as necessary for academic advisement, even after they have a declared major. At midterm each semester, the team checks ExSELlers’ academic progress and assists them with tutors or other support services. ExSEL students bond with ExSEL staff during their summer experience and know where they can turn for true academic support.

Third, students develop close friendships which lead to academic and personal networking. The ExSEL teams show them how to use SAFMEDS, as well as to organize and implement study groups, encouraging them to develop these in all classes. True cooperative learning occurs, encouraging students to continue with the ExSEL motto in the fall: Success Breeds Success.

References

Dr. Claudia McDade is Editor of the Journal of Precision Teaching and Celeration and Director of the Center for Individualized Instruction, Jacksonville State University, Jacksonville, AL. John Brown is an instructor in the Center for Individualized Instruction, Jacksonville State University, Jacksonville, AL.
The Effects of Using Direct Instruction and a Re-Reading Contingency with Precision Teaching

Ann Blackwell, Sue Stookey and T. F. McLaughlin

The purpose of this study was to determine the effectiveness of using re-reading as a consequence for failing to read passages quickly with 3 or fewer errors using the Direct Instruction approach in Corrective Reading, Skill Applications: Decoding C (Engelmann, Meyer, Johnson, & Carnine, 1988). The participant was a senior high school student who read at the 2.0 grade level at the beginning of the study. For reading, his correct rate was low, error rate high, but he read with perfect comprehension. Corrects and errors during oral reading and the number of times the student had to re-read the material to read in 1-minute and 20 seconds were measured. An AB single case design was implemented to examine effectiveness of Direct Instruction and the re-reading contingency. The use of Direct Instruction included a timing for 2-minutes, while the student read his lessons in the Skill Applications Decoding C text. After the first 2-minute timing, the student re-read the passage until he was able to read the same passages at or below 1 minute 20 seconds with three or fewer errors or repeats. The outcomes indicated that Direct Instruction and re-reading were effective in improving correct frequency. The use of re-reading, as a consequence, coupled with Direct Instruction is discussed.

Literacy is a major goal for being successful in school and later in the world or work (Danziger & Gottschalk, 1995; Darby, 1996; Gersten, Keating, & Becker, 1988; Howard, McLaughlin, & Vacha, in press; Sweeney, Omness, Janusz, & Cooper, 1992). It has been suggested that failing to acquire reading skills will adversely affect one's everyday life and may make it highly unlikely that one will enjoy an economically and socially successful adult life (Danziger & Gottschalk, 1995; Darby, 1996; Gersten et al., 1988; Hart & Risley, 1995; Sadovnik, 1991).

Direct Instruction and its skill applications series, Corrective Reading, is a skill-based reading instruction program for older children. Direct Instruction emphasizes frequent teacher-student interaction, guided by carefully sequenced lessons utilizing modern learning principles and advanced programming strategies (Engelmann & Carnine, 1982). The two major rules of Direct Instruction are to “teach more in less time”, and to “control the details of what happens” (Engelmann, Becker, Carnine, & Gersten, 1988). Direct Instruction has been suggested as a way to improve the literacy of all children and adults (Carnine, Silbert, & Kameenui, 1990). Corrective reading materials employs a high rate of student responding while the student is active in the learning and evaluation process. The materials or sequences are scripted; this allows the teacher to know exactly what and how to teach the material (Engelmann et al., 1988). Evaluations of Direct Instruction approaches with young children at-risk for failure in reading have been extremely positive (Becker, 1977; Gersten, 1985, Gersten, Carnine, & Woodward, 1987; Gersten & Keating, 1987; Gersten, Keating, & Becker, 1988; Lloyd, Cullinan, Heins, & Epstein, 1980). However, such evaluations with older children have not been as common.

The purpose of this study was to evaluate the effectiveness of the Direct Instruction Reading, Corrective Reading Skill Applications: Decoding C (Engelmann, Meyer, Johnson, & Carnine, 1988), on acquisition of reading skills, see-say words in context, the frequency of re-reads required to reach criteria of reading the passage in 1 minute and 20 seconds, with 3 or fewer errors, using Precision Teaching with a senior high school student. This case study also attempted to extend the use of Direct Instruction with older students.
Method

Participant and Setting
The participant of this study was an 18-year-old high school senior. Data from the Woodcock-Johnson Psycho-Educational Battery (Woodcock & Johnson, 1977) revealed a grade equivalent of 2.0. He was enrolled in general education classes and attended a special basic skills class. The classroom was located in an adjacent building from the main high school and was staffed by a certified special education teacher and a part-time instructional assistant. The special education teacher volunteered her free period to assist and teach high school students who were judged to be at-risk for dropping out of school because of their below grade level performance in the basic skills.

Dependent Variables and Measurement Procedures
The first dependent variable was the number of words read correctly. Data as to the number of re-readings required to reach the criteria of reading the entire passage with three or fewer errors in 1 minute and 20 seconds were also taken.

Experimental Design and Conditions
An AB single case replication design (Kazdin, 1982) was used to assess the effectiveness of the Direct Instruction-Corrective Reading text, Skill Application: Decoding C (Engelmann et al., 1988).

Before Direct Instruction. The Before Phase consisted of presenting the student with nine sounds that would be introduced in the first 16 lessons and the selected words that accompanied these lessons. The student read each story, and the first author timed him for two minutes for two sessions.

During direct instruction. The first author taught from the Direct Instruction text, Skill Applications: Decoding C (Engelmann et al., 1988). This program is a carefully planned and presented method for teaching reading skills. Each session is approximately 30 to 45 minutes of fast-paced instruction. Review is an important aspect of this series. A detailed description of the procedures can be found in the workbook, Skill Applications: Decoding C (Engelmann et al., 1988). The lessons in the text are scripted for the teacher. Data were collected 2 to 3 times per week for a total of six weeks (13 sessions).

Results
During the Before Phase (Chart 1), the number of correct words read during the timed readings was 216.5 (range 215 to 228). With the implementation of Direct Instruction, there was an increase in the number of words read correctly (Median = 251; range 204 to 293).

The number of re-readings can also be seen on Chart 1. The average number of re-readings per lesson until the student could read the material with three or fewer errors in 1 minute and 20 seconds for before phase was 6.5 (range 5 to 8). For the During Phase, the number re-readings increased for the student to reach the goal of 1 minute and 20 seconds, averaged 8.51 and ranged from 2 to 11.

Discussion
The data showed that Direct Instruction using the corrective reading materials was an effective method for improving the participant’s reading skills. The student did require additional re-reading to reach his goal, but felt this extra work was well worth the effort. The reading coordinator in the school district suggested the use of a reduced time of 1 minute and 20 seconds. The classroom teacher has found this standard to be appropriate for her at risk high school students.

The student stated he enjoyed working with the Direct Instruction materials. He looked forward to using the materials each day and has continued to progress in reading. This spring he is preparing to graduate and plans to attend a local community college.

This case study indicated that Direct Instruction, using Skill Applications, Corrective Reading Decoding C (Engelmann et al., 1988) was
effective in acquisition of reading skills. The classroom teacher and first author also observed an improvement in the student’s attitude towards school, as well as in attending the special class. The student enjoyed the procedure and liked being timed.

The use of frequent measurement and the Standard Celeration Chart allowed for the easy monitoring of student progress. The benefit of using Precision Teaching procedures has been noted elsewhere (Lindsley, 1991; Sweeney et al., 1992). Another positive benefit of employing the Direct Instruction materials with Precision Teaching, is that the teaching procedures are very clear, scripted, and the text is widely available. The measures employed in Direct Instruction are easy to measure and plot.

Providing students with the necessary reading and comprehension skills has been suggested as a way to reduce school failure for many students (Gersten et al., 1987, Gersten et al., 1988; Howard et al., in press; Lloyd et al., 1988; Sadovnik, 1991). Rather than jumping on another unproven bandwagon, such as whole language reading, as we have done so much in the past and continue to do today (Liberman & Liberman, 1990; Stavin, 1989), the use of data-based and empirically verifiable procedures such as corrective reading is recommended. Direct Instruction procedures appear not only to improve the performance of children at risk for school failure, but in the participant’s case, permit a student to graduate from high school.

References

Ann Blackwell, Sue Siokey and T. F. McLaughlin are affiliated with Gonzaga University, Department of Special Education, School of Education, Spokane, WA.
The Effects of Praise, Error Drill and Assisted Reading on Oral Reading

Amie Gregori and T. F. McLaughlin

The purpose of this research was to increase correct frequency and decrease error frequency of see/say words in context (oral reading). The number correct and error words from SRA Power Buildings were counted. The participant was reading 2.0 years below grade level. After Baseline, the effectiveness of error drill and praise and then error drill, praise, and assisted reading, error drill and praise was evaluated. The overall outcomes indicated a decrease in errors and a slight increase in correct responses with error drill and praise. A significant decrease in errors was found when assisted reading was added. The benefits for teachers and students as to the procedures are provided.

Reading continues to be the most important academic skill taught to children in schools today. Research in reading indicates that the child who reads well, has a very high probability of achieving success in school (Slavin, 1989, 1991; Slavin, Madden, Dolan, Wasik, Ross, & Smith, 1994). If these reading skills are not established, the child has a greater chance of later dropping out of school as well as being incapable of performing successfully in today’s society (McLaughlin & Vacha, 1992a, 1992b; Slavin et al., 1994; Vacha & McLaughlin, 1992, 1993).

Error drill, where students practice the words, phrases, or sentences on which they are making mistakes, has been an effective intervention procedure, for improving reading skills with high school students (Freeman & McLaughlin, 1984), and increasing the legibility of handwriting (Brunner, McLaughlin, & Sweeney, 1993).

Assisted reading has been employed under a variety of forms and called a variety of names, such as “imitative reading” (Leinholt, 1989), “neurological impress” (Heckelman, 1969), “reading by immersion” (Hoskisson & Krohm, 1974) “repeated reading” (Sweeney, Omness, Janusz, & Cooper, 1992), “taped words” (Freeman & McLaughlin, 1984) and “talking books” (Carbo, 1978). Although each form may vary in degree, the general purpose of each technique is to expose the child to accurate reading patterns either with the teacher modeling through reading or by playing teacher made or commercially available tape recordings of the reading passage as the child simultaneously reads orally the same passage. The students, with “assistance” of the teacher, are given, according to Hoskisson (1975, p. 313), “...the experience in reading they need in order to acquire the visual or graphic features that will allow them to use their knowledge of the natural way they have learned their spoken language.” Assisted Reading has been used to build reading rate and fluency in oral reading and to decrease the number of errors (e.g., Cox & Shringly, 1980; Gilbert, Williams, & McLaughlin, in press; Holmes & McLaughlin, 1987; Smith, 1979; Van Wagenen, Williams, & McLaughlin, 1994; Williams & Gilbert, 1984).

The purpose of this study was to implement and evaluate two teaching techniques (error drill and assisted reading) to increase correct frequency and decrease error frequency for see-to-say words in the context of a 12-year-old male elementary student with learning disabilities.

Method

Participant and Setting
Pat, the participant in the study, was a 12-year-old-male elementary student. Pat was assigned to a regular sixth-grade classroom and received a daily one hour and 30-minute session in the
resource room of spelling and reading. Pat was
selected for this study because he was reading at
the fourth grade reading level, and had problems
in the area of decoding and word recognition.
Pat met the state and federal requirements as
learning disabled, and received 90 minutes of
instruction in the resource room each day.

The study took place in Pat's resource room
located in an elementary school in the Pacific
Northwest. The research was conducted by the
first author as part of her course requirements for
a local university.

Dependent Variables and Measurement
Procedures
The behaviors measured were the number of
correct and error words read aloud by the
student. During the 30-minute reading session,
Pat read the lesson from his SRA Power Builders
(Parker, 1989). Pat was timed for 2-minutes on
a section from his reading. The number of
words Pat read each time varied, due to the
different length of lessons. During the second
assessment, the behavior measured was also the
number of corrects and errors the subject read.
After each lesson was completed, Pat answered
questions about the material in a supplementary
workbook. Pat's scores for comprehension were
not measured in this research.

Experimental Design and Conditions
An ABC single case design (Kazdin, 1982) was
used to evaluate the rate of see-to-say words in
context from SRA Power Builders.

Baseline. Baseline consisted of a two minute
timed reading. Pat's see/say words in context
correct and error rate frequencies) were charted.
Pat’s tool rates for correct and error frequencies
were also obtained from the reading passage.
These data were taken from the student's SRA
Power Builders.

Error drill + praise. During each session, Pat
read a passage from his SRA lesson book. As
Pat read the passage, he was timed for two
minutes, while the number of correct and error
responses were recorded. A word was
considered incorrect if it was incorrectly read,
omitted, or substituted. The errors were
recorded by the experimenter on a separate sheet
of notebook paper. After the student completed

the selected reading passage, Arnie Gregori
reviewed the errors made. Error drill was then
implemented. Error drill procedure involved the
following steps: (1) correctly modeling the
words read incorrectly by the student; (2) having
Pat reread each word correctly several times and
then read the sentence completely, including the
correct word; (3) after the error drill practice, Pat
would read the entire passage again. During the
second reading, incorrect and correct responses
were recorded. These data were later transferred
to a 6 cycle Standard Celeration Chart. This
phase included eight recorded days during almost
four weeks of school.

Error drill, praise, and assisted reading. During
this phase, assisted reading was added to praise
and error drill. Pat would read the passage while
corrects and errors were recorded. Before Pat
was allowed to reread the passage, assisted
reading was implemented. During assisted
reading, Arnie read the passage aloud while Pat
followed along. Arnie would pause at each
incorrect word Pat read earlier, and he filled in
with the correct word. This technique was also
used to ensure Pat actually following along.
After assisted reading, Pat read the passage
aloud, and his corrects and errors were recorded.
Praise was contingent on increasing corrects and
reducing errors. His efforts to pronounce error
words was followed by praise. This condition
was in effect for 6 recorded days and lasted for 3
weeks of school.

Results

The overall results revealed a decrease in errors
and a slight increase in correct responses (See
Chart 1). During baseline, Pat read 115.0 words
correct with 18.0 errors. During error drill and
praise, the number of correct responses ranged
from 73 to 165, with a mean of 121.

The number of errors decreased during this
phase, with a mean of 7.0, range 3 to 18.
During error drill, praise, and assisted reading,
the number of correct words read increased with
a mean of 134, range 98 to 157. The number of
errors also declined during error drill, praise,
and assisted reading. Errors ranged from 0 to 6,
with a mean of 2.8.
The single data point only allowed a statistical comparison to take place between the error drill and praise phase and the error drill, praise and assisted reading. A Wilcoxon signed ranks test (Siegel, 1956) was significant (Z=-2.201; p=.027) for errors, but not significant for corrects (Z=-1.363; p=.173; NS).

Discussion

The results of this study indicated the effectiveness of error drill and assisted reading with see/say words context (oral reading). As the outcomes revealed, Pat’s errors decreased, but the corrects were variable across sessions. This outcome may be a result of the different number of movements used for each assessment, as well as the lack of daily measurement and instruction with Pat in his Power Builders. Pat would complete a lesson each day, so the number of movements was never the same. Although the error rate did decrease, it did not decrease successively. Because of the days that assessment occurred and the different spring breaks of Amie Gregori and Pat, no day-to-day data were taken. This did appear to affect the student’s error frequencies which finally reached 0.0 during the last phase.

Pat’s error frequency was difficult to maintain. This may have been a result of assessment days only on Tuesdays and Thursdays. These procedures may have been more effective, if they were implemented on a daily basis. Error drill, praise, and assisted reading can be helpful for students who are reading below their grade level. Error drill, along with assisted reading, decreased the amount of errors Pat made while reading orally. Results of these techniques may increase if the techniques are implemented on a daily basis.

The cost of this research was minimal. The actual outlay of tutor time could be reduced if commercially available “talking books” were employed, or one could tape the various Power Builders. If the instructional staff did not have the time, volunteers could be employed. Others (Freeman & McLaughlin, 1983; Gilbert et al., in press; Holmes & McLaughlin, 1987; Van Wagenen et al., 1994) have commented on the large amount of time required to tape materials for students.

References


26


Amie Gregori and T. F. McLaughlin are affiliated with Gonzaga University, Department of Special Education, School of Education, Spokane, WA.
Using Teaching Your Child to Read in 100 Easy Lessons to Teach Letter Sounds

Allison Drago and T. F. McLaughlin

The purpose of this research was to evaluate the effectiveness of Teaching Your Child to Read in 100 Easy Lessons (Englemann et al., 1983) and contingent access to movie videos in the home. The number of corrects and error responses was the performance measure. The child was a 4-year-old male preschool child. The effectiveness of the lessons in Teaching Your Child to Read in 100 Easy Lessons was the focus of the intervention phase. The overall outcomes indicated a large increase in correct response and a decrease in errors when high levels of attention were required during the lessons. The benefits, as well as the difficulties, for persons implementing Teaching Your Child to Read in 100 Easy Lessons and consequences are discussed.

Illiteracy is a significant problem in today's society. Lack of prereading and reading skills is a problem that will inhibit normal functioning in one's everyday life and often impacts a person's socio-economic status (Hart & Risley, 1995; Howard, McLaughlin, & Vacha, in press; Sadownik, 1991). Providing children with a great deal of literacy and social experiences can improve the probability that students will be successful during and after schooling (Hart & Risley, 1995, Howard et al., in press). The lack of emphasis placed on reading skills, in the early years of school, can contribute to significant academic difficulties. This in turn places our society at risk economically and socially (Hart & Risley, 1995; Slavin, 1989b, 1991; Slavin, Madden, Dolan, Wasik, Ross, & Smith, 1994).

There have been many reading programs and approaches developed to help improve reading skills. Many school districts have adopted whole language approaches. Whole language approaches involve emphasizing learning reading in a similar manner to spoken language (Goodman, 1986, 1989). Recent evaluations using the whole language approach with children have been disappointing (Liebberman & Lieberman, 1990; Stahl & Müller, 1989).

In contrast, skill based reading instruction, where skills are taught directly with data-based and effective teaching procedures, have been shown to be an effective approach to improve the literacy of all children and adults (Carnine, Silbert, & Kameenui, 1990). This approach has been labeled Direct Instruction (Becker, 1977). Direct Instruction emphasizes frequent teacher-student interaction guided by carefully sequenced lessons utilizing modern learning principles and advanced programming strategies (Englemann & Carnine, 1982). The two major rules of Direct Instruction are to "teach more in less time", and to "control the details of what happens" (Engelmann, Becker, Carnine, & Gersten, 1988). Direct instruction employs an increase in opportunity to respond. The pupil is active in the learning and evaluation process. Evaluations of Direct Instruction and skill based approaches with children at-risk for failure in reading, have been extremely positive (Becker, 1977; Gersten, 1985; Gersten, Carnine, & Woodward, 1987; Gersten & Keating, 1987; Gersten, Keating, & Becker, 1988; Lloyd, Cullinan, Heins, & Epstein, 1980).

Pairing the data-based and effective strategies of Precision Teaching with its emphasis on fluency and daily measurement with Direct Instruction has proved useful to practitioners and others who work with young children (Lindsley, 1990; Johnson & Layng, 1994; Sweeney, Ornness, Janusz, & Cooper, 1992).

The purpose of this study was to evaluate the effectiveness of the book, Teach Your Child to Read in 100 Easy Lessons (Englemann, Haddock, & Brunner, 1983) on acquisition and
maintenance of prereading and reading skills using Direct Instruction and Precision Teaching methodologies.

**Method**

**Participant and Setting**
The participant of this study was a four-year-old female, a bright girl who showed interest in learning to read. The experiment took place in the Gonzaga University Preschool which enrolls 10 students for 60 minutes per day, four times a week. The study took place in two different settings. Data were gathered in the preschool class for approximately 15-20 minutes. Teaching and data collection also took place in another classroom at Gonzaga University after the preschool class was dismissed. Others present during the study were the 10 other preschool students, other teachers, university students, and a Gonzaga University professor. When data were taken outside the preschool, persons present were the child, the experimenter, and parent. The study took place on Tuesday and Wednesday afternoons for approximately 20 minute sessions. The study was held over eight weeks with one week off for Thanksgiving. The study was also carried out outside the preschool every other Monday during the same eight week period.

**Dependent Variables and Measurement Procedures**
The dependent variable was the number of sounds pronounced correctly prior to Direct Instruction. The sounds that the child was tested on were the nine sounds taught in the first 16 lessons. The sounds that the child would learn during the lessons were also assessed. These sounds were assessed during baseline and Direct Instruction. Each sound was written on a 3 x 5 inch index card and presented to the participant. Correct responses were recorded if the child pronounced the sounds in the way that was modeled. An error was recorded when the child's pronunciation was different from the model provided by the teacher following the scripted lesson. An error was also scored if the child did not respond.

**Experimental Design and Conditions**
An AB single case replication design (Kazdin, 1982) was used to assess the effectiveness of Direct Instruction.

**Baseline.** Baseline consisted of presenting the child with nine sounds that would be introduced in the first 16 lessons and the selected words that accompanied these lessons. Each sound or word was presented to the participant. During baseline, the child's corrects and errors were recorded.

**Direct Instruction.** Direct Instruction was then carried out for the remaining six weeks of the study. It consisted of using the first 16 lessons from Teach Your Child to Read in 100 Easy Lessons (Englemann et al., 1983). This program is a carefully planned and presented method for reading acquisition. Each session is approximately 20 minutes of fast-paced instruction. In the early lessons some important prerequisite skills were introduced. The program stresses reading from left to right and associating letter sounds with symbols. The names of the letters were not taught at all in this program. Sounds are presented one by one until the child has learned enough sounds to make a word. All previously learned sounds are reviewed in the following lessons. Review is an important part of this method, as the child builds on the sounds that she has previously learned. This program also employs rhyming which is related to sequencing sounds of the word. A detailed description of the procedures can be found in the text, Teach Your Child to Read in 100 Easy Lessons (Englemann et al., 1983).

**Results and Discussion**

During baseline (See Figure 1), the number of correctly pronounced sounds was 0.0 with 9.0 errors. With the implementation of Direct Instruction, there was an immediate increase in the number of sounds pronounced accurately. The number of correct letter sounds and words ranged from 3 to 9, with an overall mean of 6.62. The number of errors was low, mean of 1.0, range 0 to 3 sounds.
The data showed that Direct Instruction was an effective method for teaching the letter sounds in the first 16 Lessons.

During Baseline and when the study was first started, the participant had a tendency to say the letter names rather than the sounds. The child was familiar with the names for some letters, particularly those that were in her name. When she was asked the sounds of the letters on the flashcards, she would answer with the letter name. The parent of the child was frustrated because she felt she had worked hard to teach the concept of the letter sounds. After just two weeks of Direct Instruction the child was retaining the letter sounds of five letters, M, S, A, E, and T. In addition, she was writing the letters and enjoying the rhyming activities. This sense of accomplishment was very rewarding to the child. As she began to recognize more and more letter sounds and words, she became more excited about the reading program and teacher lead instruction. It was noted by other teachers in the preschool that when the child would write her name during group time, she would also say the letter sounds that were in her name.

When the instruction took place during preschool class, the child was occasionally distracted. The constant activity in the room made it hard to focus the child's attention. Also, the child worked better when sitting at a table rather than at a small stool that was low to the ground. These are minor issues, but ones that should be addressed when working with children.

This case study indicates that Direct Instruction using Teach Your Child to Read in 100 Easy Lessons was effective in acquisition of letter sounds. The performance levels improved, and correct frequency were higher. The error frequency also decreased during intervention. It appears that using Direct Instruction with preschool children and providing them with the necessary prereading and reading skills can do much to improve the child's attitudes and behaviors towards school. The use of daily measurement and the Standard Celeration Chart allowed for data-based decisions to be made regarding the child's progress. Another benefit of using Teach Your Child to Read in 100 Easy Lessons (Engelmann et al., 1983) is that the teaching procedures are clearly detailed and scripted, and the text is widely available to the public.

Providing children with the necessary prerequisite skills and mastery of letter sound/symbol relationships has been suggested as a way to reduce school failure in America's schools (Gersten et al., 1987, 1988; Howard et al., in press; Lloyd et al., 1988; Slavin, 1989b, 1991, 1994; Sadovnik, 1991). Rather than jumping on the unproven whole language bandwagon, teachers should embrace the Direct Instruction and Precision Teaching practices that have proven effective for children at risk for difficulty in school (Becker, 1977; McLaughlin, Williams, Howard, & Reyes, 1995; Sweeney et al., 1992). The present case report confirms the effectiveness of Direct Instruction and Precision Teaching with a single child. Also, Direct Instruction and Precision Teaching procedures can improve the performance of children at-risk for school failure by giving them sufficient educational capital and skills (Howard et al., in press). This is especially important since these children and their parents typically lack appropriate levels of social and cultural capital to be successful in school (Colemen, 1989; Lareau, 1987; Vacha & McLaughlin, 1992, 1993). Additional research with different types of children over longer periods of time appears warranted.

References


Allison Drago and T. F. McLaughlin are associated with Gonzaga University, Department of Special Education, School of Education, Spokane, WA.
Evaluating the Effectiveness of Home Drill with a Middle School Student with ADHD

Jana Farley and T. F. McLaughlin

The purpose of this research was to determine the effectiveness of skill-based instruction and home drill with a middle school student with Attention Deficit Disorder (ADHD). An AB single subject design was used to evaluate the impact of skill-based instruction on the student’s math performance. During Baseline, the student completed his math work sheets and was provided with instruction by the first author. During home and school instruction, the student was provided with drill and practice sheets that were to be completed at home. The overall outcomes indicated significant increases in correct rate and a small non-significant deceleration in errors. The benefits of home drill and skill-based instruction for students with ADHD are discussed.

The term “attention deficit” has been recognized for at least the last fifty years. Although the terminology has changed, descriptions of behaviors associated with the condition have remained fairly consistent (Barkley, 1990). In addition, these children were described as impaired in attention and quite overactive. The primary symptoms of ADHD have changed very little since 1902, as was evident in the DSM-IV Diagnostic Criteria for Attention Deficit Disorder (ADHD) with and without hyperactivity published by the American Psychiatric Association in 1994.

Various procedures have been used in attention deficit, such as: self-management training (Edwards, Salant, Howard, Brougher, & McLaughlin, 1995; Stewart & McLaughlin, 1992), token economies (Ayallon, Layman, & Burke, 1972; Ayllon & Roberts, 1974), stimulant medication (Barkley, 1990), or combining stimulant medication and behavioral interventions (Abramowitz, Eckstrand, O’Leary, & Dulcan, 1992). Though research in this area is promising, there are few studies demonstrating their efficacy for middle school students with ADHD.

The use of drill and practice procedures has been suggested to increase the academic skills of students with disabilities (Heward, 1994). Such procedures are response cards (Heward, 1994), guided notes (Lazarus, 1983), class-wide peer tutoring (Delquadri, Greenwood, Carta, & Hall, 1986), and daily practice sheets (Miller & Heward, 1992), have been shown to improve student achievement in their basic skills. Several authors (Epstein, 1987; Thurston & Dasta, 1990), have suggested using home tutoring and home work to assist students with their academic performance.

The purpose of this study was to determine the effectiveness of a home drill and practice program with a middle school child with ADHD, to increase the correct rate and decrease the error rate in mathematics. A second purpose was to determine if home drill could generalize to the same instructional outcomes as school, with a middle school student.

Method

Participant and Setting
The subject of this study, a 13-year-old male enrolled in the eighth grade, had medical diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). Reports of the previous year’s teachers and the school-based team indicated that the student experienced difficulty in working with other children. Easily frustrated and distracted, he had difficulty working independently. Also, the student did not complete much of his work. The student had
attended a private school for children with learning disabilities and was enrolled half-time in a resource room and spent his afternoons in the general education program. The study took place in a large middle school district in the Pacific Northwest.

**Dependent Variables and Measurement Procedures**

The dependent variables were correct and error digits. The 22 to 25 minute math sessions were held three times each school week. Worksheets contained from 15 to 25 long division problems with and without remainders and decimal points. Correct rate was calculated by counting each digit and decimal point, with error rate determined in the same manner.

**Baseline.** During Baseline, the student completed his worksheets, received instruction and feedback from the first author. The student was timed for 1-minute on his work and his data taken for three weeks. If the student was attentive and improved correct rate during the lesson, he was allowed to talk with the first author about sports.

**Home drill sheets.** The student was given drill and practice sheets for his multiplication tables which he was to complete over the weekend. The same instructional strategies employed in Baseline were also in effect.

**Results and Discussion**

The number of corrects and errors per minute can be seen in Chart 1. During Baseline, the number of corrects ranged from 29 to 48 digits (M = 36.11; range 29 to 47). The number of error movements was low but variable (range 0 to 2; M = .89). With the introduction of skill-based instruction and drill and practice sheets, the number of corrects increased, (range 52 to 69; M = 59).

A Mann Whitney U Test (Siegel, 1956) between Baseline and skill based instruction and home work drill was significant for corrects (U = 0; p = .0008), but not for error rate (U = 22; p = NS).

The study indicates that the home drill procedure holds promise for use with middle school students with ADHD. For the student with ADHD, a marked improvement was observed. Future use of providing additional drill and practice techniques should be implemented with other individuals in order to enhance the strength of the outcomes.

The authors felt that other factors contributing to the differential improvements might have been variability in subject-matter problems, attention from the first author, and the individualized nature of the instruction.

The other students were aware of the participant’s difficulties and accepted the contingencies provided for him in the resource room. On occasion, the non-experimental students also participated, by receiving drill and practice sheets for addition.

The findings of the present study appear to support the notion that home drill can increase opportunities to respond. By providing additional drill and practice, the student is allowed to improve his performance. This finding has been replicated by work of several authors (Delquadri et al., 1983, 1986; Heward, 1994; Sweeney, Omness, Janusz, & Cooper, 1992).

**References**


Jana Farley and T. F. McLaughlin are associated with Gonzaga University, Department of Special Education, School of Education, Spokane, WA.
Effectiveness of Assisted Self-Recording and Assisted Self-Evaluation on Vocational Welding Skills of a Student with Autistic Behaviors

Marquelle La Porte and T. F. McLaughlin

The purpose of this research was to determine the effectiveness of an assisted self-recording and self-evaluation program with a student with autistic-like behaviors in welding class. The participant's correct bead making in welding was measured. Each weld was evaluated by the participant and first author by using a ruler, as well as mutually agreed upon criteria. The effectiveness of self-recording and self-evaluation and a change in medication was examined using an ABCD single subject replication design. Rewards, in the form of verbal praise, were also given for correct welds. The outcomes indicated an increase of the length and number of correct welds when behavioral self-management procedures were in effect. There was also a decrease in the number of error welds and incomplete welds. There was a slight decrease in correct as well as error welds when the student was placed on Ritalin by his parents. The number of incomplete welds also decreased for assisted self-recording, evaluation, and praise. This finding was replicated when medication was added to the procedures. The use of assisted self-management procedures in prevocational settings is discussed.

Self-management has always been an important goal for students in schools (McLaughlin, 1976; O'Leary & Dubey, 1979; Wilson, 1984; Workman & Katz, 1995). Behavioral self-control can be defined as a procedure in which children are taught to manage their own behavior in the absence of supporting adults and to take responsibility for their own behavior (Workman & Katz, 1995). The components of behavioral self-control, such as: self-recording, self-evaluation, self-determination and self-reinforcement have been widely researched and examined (Brigham, 1978; Mace & Kratochwill, 1988; Nelson, 1977; Workman & Katz, 1995). Self-control procedures have also been effective with children with various disabilities including learning disabilities, (Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979), behavioral and emotional disorders (McLaughlin, 1983, McLaughlin, Sackvile-West, & Burgess, 1981), attention deficit hyperactivity disorder (Edwards, Salant, Howard, Brougher, & McLaughlin, 1995; Stewart & McLaughlin, 1992), and mental retardation (Boyle & Hughes, 1994; Shapiro & Cole, 1994).

Even with the wealth of data on the use and successful implantation of self-control, the use of behavioral self-control with more involved children needs further analysis. This study extends the use of assisted self-recording and self-evaluation with a student with autistic-like behaviors enrolled in a regular high school, and in a vocational school for all students. The purpose was to determine the effectiveness of assisted self-evaluation and self-recording plus praise on correct bead making. This was made the priority because the participant displayed such a shakiness, making it difficult for him to construct a correct bead in welding.

Method

Participant and Setting

The participant, a 17-year-old male senior high school student, was enrolled at a local high school for academics and attended the District's Skills Center Welding program for vocational schooling. The student was also working towards a vocational degree in welding. The participant displayed severe shaking and emotional outbursts which required him to have individualized tutoring. During his first days in the welding lab, before a tutor had been assigned to him, the participant had become aggressive,
lost his temper, and welded an iron to one of the walls in the shop. It was at this point that the participant was assigned a tutor (the experimenter).

**Dependent Variables and Measurements**

There were three dependent measures. The first was the length of each weld, where the participant and researcher measured the length of each weld. The second measure was frequency of correct and error welds. A correct weld was defined as a bead that was smooth and continuous without ridges, bumps or bits, lacking wagon tracks (parallel indentions along the width), and even thickness. If any of these characteristics were missing, the weld was marked as an error. The final measure was the number of incomplete welds, defined as a weld less than an inch in length.

**Experimental Design and Conditions**

An ABC design (Kazdin, 1982), was used to evaluate the effects of assisted self-recording, plus ruler, and assisted self-evaluation, praise, and follow up. A description of each follows.

**Baseline.** The baseline consisted of two, 3-hour lab class periods during one week. During this time, the first author measured and recorded the student's correct bead. The participant was allowed to observe this scoring, but his input was kept to a minimal. For example, the participant requested the researcher use inches instead of metric measurement to record the bead lengths because he was more familiar measuring objects in inches. Data were also recorded on the number of correct and incorrect beads made during the lab period in welding.

**Assisted self-evaluation and self-recording, plus praise.** The intervention of assisted self-evaluation and assisted self-recording was implemented for two lab periods the second week of the program. The participant was instructed to notice the qualities of correct and incorrect beads and to determine where, if any, measurable areas (at least one inch in length) were done according to the correct definition. During this procedure, the participant had to confer with the researcher and mutually agree as to accuracy and length of each weld. This was required because the participant would occasionally refuse to evaluate the bead correctly, by declaring "It's perfect", when in fact, the bead did not meet the criteria for a correct bead. When the participant responded in such manner, the researcher would first ask why it was "perfect" and then guide the student through the evaluation process and assist the student to determine the correct and incorrect qualities which the weld contained. The first author and the participant would place the ruler on the bead and measure each weld.

**Assisted self-evaluation and self-recording, praise, plus medication.** The participant was placed on Ritalin (5 mg./kg. of body weight) at the request of the participant's parents. The addition of medication was in effect for 4 sessions.

**Results**

**Length of Welds**

The number and length of correct welds can be found on Chart 1. The participant showed marked increase with the self-recording, self-evaluation. The participant’s mean number of corrects rose from 6.0 to 10.5. The average length of welds rose from 2.71 inches during Baseline, to 3.12 inches during assisted self-recording and evaluation. The length of the participant's welds also increased to 3.24 inches when medication was given.

**Make Welds**

The number of correct and error welds can be seen in Chart 2. During Baseline, the number of correct welds ranged from 4 to 8, while error welds averaged 3.0. During assisted self-recording and evaluation, the number of correct welds increased, range 10 to 11, mean 10.50. The number of error welds decreased, range 1 to 2, mean 1.5. When medication was added, the number of correct welds decreased, range 7 to 10, mean 8.25. The number of error welds also decreased, range from 2 to 0, mean of .75.

The number of incorrect welds can be seen in Chart 3. During Baseline, the number of incorrect welds averaged 3.0. The number of incorrect welds during assisted self-recording evaluation, and praise ranged from 1 to 2, mean 1.5. During the last phase, medication was
added, and the number of incomplete welds decreased, range 2 to 0, mean .75.

Discussion

The results show that assisted self-evaluation and self-recording did increase the subject's performance. The present outcomes extended the efficacy of self-management procedures with children with severe behavior disorders (Boyle & Hughes, 1994; Shapiro & Cole, 1994; Willis et al., 1995). Which aspects of the self-management package (assisted self-recording and self-evaluation, or praise) contributed to the changes in student performance cannot be determined. Additional research which would evaluate the various components of the interventions could be done. Since the package of procedures did not cause undue burdens on the staff, researching such an issue may be unneeded.

The impact of medication on the participant’s behavior has been widely documented (Barkley, 1990, 1995). Combining medication therapy with behavioral interventions has lead to even greater improvements in social and academic responding with children experiencing attention deficit hyperactivity disorder and attention deficit disorder (Abramowitz, Eckstrand, O’Leary, & Dulcan, 1992; Hoza, Pelham, Sams, & Carlson, 1992).

According to teacher reports, the medication also appeared to help control the student’s emotional outbursts. Additionally, the teachers felt that the medication may have made the participant shaky. The teachers also suspect that the participant was not ingesting the medication regularly on weekends, and as a result, the participant appeared more emotional and shaky on Mondays (See Dates 10/2 and 10/9). These results were still above the Baseline. It appeared that assisted self-recording, plus ruler, and assisted self-evaluation, and praise, increased number and length of the student’s correct beads. The participant progressed to the next skill on the last day of this study.

Following the termination of formal data collection, the participant was allowed to work without the assistance of a tutor except when the participant was learning a new task; however, the student has not been taking his medication regularly and so on days when participant arrives moody and irritable, direct signs of not taking the medication, the student is not allowed to do lab work and is instead sent to the Learning Opportunity Center (LOC) to study his welding book. The instructors of the welding lab and the LOC felt that the participant had been absent from school at least one day a week and that this was severely affecting his progress. However, the student did well when he is in attendance and taking his medication.

The participant had a very difficult time with the first author during the study. He said the researcher often embarrassed him because he was the only one in the class with a tutor. His ultimate goal was not to do well, but be able to work without the researcher. The researcher’s response was that when he did well, he would no longer have to have a tutor. The participant was unhappy with the answer because he wanted a specific date which the researcher and classroom instructor were unable to give. The participant was very negative throughout the study although he did occasionally enjoy “high-five’s” and verbal praise for his good beads. Another use of self-management is to increase the independence of students (L. Dunlap, K. Dunlap, Koegel, & Koegel, 1991), which was a goal in the research but not fully achieved.

References


Marquelle La Porte and T. F. McLaughlin are affiliated with Gonzaga University, Department of Special Education, School of Education, Spokane, WA.
The Effects of Reading Racetracks on the Fluency of See-to-Say Words in Isolation by a Student with Learning Disabilities

Lisa Rinaldi and T. F. McLaughlin

The purpose of the present study was to determine the effectiveness of using the “reading racetrack” and Precision Teaching techniques to increase the fluency of reading Grade Two Priority Words in isolation with a 10-year-old boy with learning disabilities. Use of the reading racetrack is a novel approach which employs the aspects of Direct Instruction procedures, as well as Precision Teaching techniques. This strategy also uses drill and practice probe sheets that resemble an automotive racetrack. During the reading racetrack intervention, the participant more than doubled his rate for reading see-to-say words in isolation. There was also a marked decrease in the number of errors the student made while reading see-to-say words in isolation.

Regardless of the pedagogical stance taken, educators seem to agree that literacy is one of the most important skills a student can apply to functional living in our society (Sweeney, Omness, Janusz, & Cooper, 1992; Weaver, 1990). Research in reading indicates that the child who reads well has a very high probability of achieving success in school (Slavin, 1989, 1991; Slavin, Madden, Dolan, Wasik, Ross, & Smith, 1994). If these reading skills are not established, the child has a greater chance of later dropping out of school as well as being incapable of performing successfully in today’s society (Howard, McLaughlin, & Vacha, in press; McLaughlin & Vacha, 1992a, 1992b; Slavin et al., 1994; Vacha & McLaughlin, 1992, 1993). Unfortunately, there is a great deal of disagreement as how to increase the likelihood that all students will leave our current educational system fluent in their ability to read.

School districts have adopted a somewhat laissez faire approach to teaching reading, labeled as whole language (Weaver, 1990). With this approach, students are said to acquire literacy in much the same way as they acquire oral language naturally (Altwerger, Edelsky & Flores, 1987; Goodman, 1986, 1989). While some students still seem to adapt to reading in this manner, an increasing number of instructionally naive students appear to require a more structured and systematic approach to attain this skill, which can be as complex to teach as it is to learn (Carnine, Silbert, & Kameenui, 1990). Finally, recent scholarship and analysis have called into question the efficacy of employing some of the whole language strategies with students at risk for school difficulties (Liberman & Liberman, 1990).

According to the current research literature, two of the most effective and efficient teaching strategies to improve reading fluency are Direct Instruction and Precision Teaching (Carnine et al., 1990; Lindsley, 1991; Sweeney et al., 1992). The following study is a novel approach which implemented aspects of Direct Instruction procedures, as well as Precision Teaching techniques; this strategy uses drill and practice probe sheets called reading racetracks to improve reading fluency.

The purpose of the present study was to determine the effectiveness of using the “reading racetrack” and Precision Teaching techniques to increase the fluency of reading Grade Two Priority Words in isolation by a 10-year-old learning disabled male.
Method

Participant and Setting
The participant of this study was a 10-year-old-fourth grade boy. According to scores obtained from the Wechsler Intelligence Scale for Children-Revised (WISC-R), the student had a full scale IQ of 78 and had been labeled as learning disabled. He also had a speech impediment and received services from a school district speech pathologist for 40 minutes per week. According to the student’s individualized education program, he was achieving at the 2.5 grade level and needed improvement in the areas of language, readazg, spelling, and math, for which he received 60 minutes of special education services.

This study took place in the resource room of an urban elementary school in a low socioeconomic area in a large urban city in the Pacific Northwest. The first author, a graduate student at a local university, worked with the participant one-on-one, with one other student (a ten-year-old girl with a learning disability). The primary teacher in the resource room had five years of teaching experience and had an instructional aide and volunteer researcher who carried out the implementation of the present study. The first author worked with the child for five minutes daily in the morning.

Movement Cycles
There were two pinpoints evaluated in this study. The first pinpoint was the number of words read correctly from the reading racetrack during a one-minute timing. The second pinpoint was the frequency of errors during a one-minute timed reading. An error was defined as a word being read incorrectly, and omission or addition of a word, or any words that were read out of order. An error was not counted if the participant made a self-correction before going on to the next word.

Upon the completion of each one-minute timing, the student counted the number of words that he read and self-recorded these data on the lines provided along the bottom of the racetrack (see Figure 1). The first author would tally the number of errors, give this number along with specific feedback to the subject, who would then record these data below the number correct. These data were then collected and documented by the researcher on Standard Celeration Chart.

Experimental Design and Experimental Conditions
This study used an ABCDEF design (Kazdin, 1982) to evaluate the effectiveness of using reading racetracks and Precision Teaching techniques to increase the fluency of reading see-to-say words in isolation.

Baseline: The Baseline consisted of having the participant read the list of Grade Two Priority Words orally as they normally appeared (see Figure 2). The researcher had an exact replica of this list and recorded whether or not the subject had read each word correctly using the + - system; the only addition to the regular program was the presence of a timer. The participant was given the list of words and was told to read them as quickly and as accurately as he could. The participant was aware that he was being timed, and he began reading when the researcher cued him to start. At the end of one minute, the first author said “stop,” praised the subject for his hard work and cooperation and then recorded the data for errors and corrects. Baseline consisted of five one-minute timings over the course of three sessions. Days consisting of more than one timing were averaged together for a total of one data point representing the student’s average.

Reading racetrack interventions. The procedures used during the intervention were somewhat similar to those during the Baseline condition; however, the words were placed in the individual cells of the Reading Racetrack before having the subject read them (see Figure 1). The words read from the racetrack were taken from the second grade priority word list that was commonly used district wide. The words taken from this list were carefully selected as to avoid having any two words on a particular racetrack that were either auditorily or visually similar. This measure was taken not only to help avoid student confusion, but also to aid the researcher in the ability to discriminate between words read correctly and errors.

There were two different types of racetracks, each containing 28 cells. The first type of racetrack consisted of seven words that were
### Grade 2 Priority Words

<table>
<thead>
<tr>
<th>after</th>
<th>ever</th>
<th>home</th>
</tr>
</thead>
<tbody>
<tr>
<td>all</td>
<td>every</td>
<td>horse</td>
</tr>
<tr>
<td>am</td>
<td>father</td>
<td>house</td>
</tr>
<tr>
<td>an</td>
<td>fell</td>
<td>how</td>
</tr>
<tr>
<td>and</td>
<td>find</td>
<td>if</td>
</tr>
<tr>
<td>are</td>
<td>fire</td>
<td>I'm</td>
</tr>
<tr>
<td>at</td>
<td>fish</td>
<td>in</td>
</tr>
<tr>
<td>away</td>
<td>five</td>
<td>is</td>
</tr>
<tr>
<td>be</td>
<td>food</td>
<td>it</td>
</tr>
<tr>
<td>bed</td>
<td>for</td>
<td>just</td>
</tr>
<tr>
<td>been</td>
<td>found</td>
<td>know</td>
</tr>
<tr>
<td>best</td>
<td>four</td>
<td>land</td>
</tr>
<tr>
<td>big</td>
<td>from</td>
<td>last</td>
</tr>
<tr>
<td>book</td>
<td>fun</td>
<td>let</td>
</tr>
<tr>
<td>boy</td>
<td>game</td>
<td>like</td>
</tr>
<tr>
<td>brother</td>
<td>gave</td>
<td>little</td>
</tr>
<tr>
<td>but</td>
<td>get</td>
<td>live</td>
</tr>
<tr>
<td>by</td>
<td>girl</td>
<td>long</td>
</tr>
<tr>
<td>called</td>
<td>give</td>
<td>look</td>
</tr>
<tr>
<td>came</td>
<td>go</td>
<td>lot</td>
</tr>
<tr>
<td>cam</td>
<td>going</td>
<td>love</td>
</tr>
<tr>
<td>car</td>
<td>gone</td>
<td>made</td>
</tr>
<tr>
<td>cat</td>
<td>good</td>
<td>man</td>
</tr>
<tr>
<td>come</td>
<td>got</td>
<td>may</td>
</tr>
<tr>
<td>day</td>
<td>had</td>
<td>me</td>
</tr>
<tr>
<td>did</td>
<td>happy</td>
<td>men</td>
</tr>
<tr>
<td>do</td>
<td>has</td>
<td>more</td>
</tr>
<tr>
<td>dog</td>
<td>have</td>
<td>most</td>
</tr>
<tr>
<td>door</td>
<td>he</td>
<td>mother</td>
</tr>
<tr>
<td>down</td>
<td>her</td>
<td>my</td>
</tr>
<tr>
<td>eat</td>
<td>here</td>
<td>name</td>
</tr>
<tr>
<td>end</td>
<td>him</td>
<td>need</td>
</tr>
<tr>
<td>even</td>
<td>his</td>
<td>never</td>
</tr>
</tbody>
</table>
nice
do
not
now
off
on
one
or
other
our
out
play
put
ran
red
ride
room
run
said
saw
school
see
she
sister
small
so
some
soon
still
summer
swimming
take
tell
ten
that
the
them
then
there
they
thing
this
three
time
to
too	took
two
up
us
very
walk
want
was
water
way
we
well
went
were
when
will
with
work
year
yes
you
your
repeated in random order. The random order was an attempt to avoid the occurrence of patterns which may have interfered with the participant learning the words, and instead focusing on the learning the pattern in which the words appeared. Every fifth racetrack was a review racetrack containing the accumulation of the 28 different words that had been introduced in the four previous racetracks.

At the beginning of each intervention session, the participant was given the particular racetrack that he was working on. The participant was then instructed to inform the researcher giving the cue, "On your mark, get set, go!" The researcher would then keep track of the number of words read by placing a tally mark each time the participant completed a full circle around the track. At the end of the one-minute timing, the researcher would say, "Stop!" The participant would then mark the word that he had just read. The participant, aided by the researcher, would then compute the number of words read and record his score along the bottom of the racetrack. The researcher would then give the participant the number of errors and specifically point out words that he had trouble with. Finally, the participant would self-record the number of errors.

Reliability. Interobserver reliability checks were taken once during Baseline and once during the intervention. The researcher and another observer would independently tally the number of words read and the number of errors made during the one-minute timing. The researcher then compared the data to find the overall agreement. The percent of interobserver agreement was calculated by dividing the smaller number recorded by the larger and multiplying by 100. The overall percent of interobserver agreement was 100%.

Results and Discussion

The number of words read correctly, and the number of errors during Baseline and reading racetrack sessions are shown on the Chart. The mean number of words read correctly during Baseline was 25.0 (range 21.5 to 32). The mean number of errors made during Baseline was 6.0 (range 6 to 7). With the implementation of the reading racetracks, there was an immediate increase in the number of words read correctly by the participant. The mean number of words read correctly during the reading racetrack intervention phases was 74 (range 45 to 86). The number of errors markedly decreased. The mean number of errors made during the intervention phases was .63 (range 0 to 9).

The intervention was effective not only in terms of a marked increase in the number of words read in a one-minute timing, but also in the elimination of nearly all errors. The first author felt that the increase in corrects, which more than doubled the highest score during Baseline and more than tripled the low score, was very significant for this student. The decrease in errors during the phases of this intervention were equally significant. The participant's regular classroom teacher as well as his resource room teacher were also highly impressed with his performance in reading see-to-say words in isolation during this program.

Another exciting outcome of this procedure is that employing reading racetracks appeared to have a positive effect on the reading fluency of the participant while reading orally during his regular reading group. Further investigation will be needed to substantiate this claim, as there may be other confounding variables that have been overlooked.

The reading racetracks procedure was practical. The first author spent a minimal amount of money implementing this intervention--the only outgoing funds were for making photocopies of the racetracks. On the other hand, the initial time involved in making the racetracks was considerable. This, however, can be warranted because of the permanence of the racetracks once they have been initially made. The success of the participant also eased the burden of time involved in making the racetracks.

While implementing this program, the first author discovered that the review racetracks not only served as the cumulative review they were intended to, but they also served as an efficient and effective initial assessment tool. Following the Baseline session, the researcher presented the participant with the review racetracks; if the student was able to read the words on the given
review racetrack at the target rate, then he would move on to the next review racetrack until reaching one that the student was unable to read through at an acceptable rate. At this point, the researcher was able to determine the appropriate starting point for the participant.

Another aspect of this program that made it very attractive to both the school and researchers is the fact that the initial session, subsequent daily sessions lasted a maximum of five minutes. It is our opinion that this program, in conjunction with class-wide peer tutoring, could offer individualized instruction for an entire classroom in less than 10 minutes of daily classroom time. This could be especially valuable in grades one and two when students are expected to learn and remember sight words that do not follow the phonetic rules that are being taught.

The present outcomes suggest the use of data based procedures such as repeated readings (Sweeney et al., 1992), assisted reading (Van Wagenen et al., 1994), tutoring by trained adults (Slavin, 1989; Slavin et al., 1994), Direct Instruction (Carnine et al., 1990), and Precision Teaching (Lindsley, 1991). It appears to assist children at-risk for difficulty in reading, active approaches such as Direct Instruction, teaching code-based reading, and active student responding should be implemented. Reading racetracks are straightforward, effective, and make use of both Direct Instruction and Precision Teaching techniques. Additional research may wish to determine which components of reading racetracks produce the greatest improvements in children’s reading performance.

As mentioned previously, the resource room teacher was very impressed with the reading racetrack procedure on improving the reading fluency of see-to-say words in isolation with this student. She also plans to implement this procedure with several other students who receive special services in her classroom. Although this research project was prepared to reflect the outcome of this program with one student, the researcher was simultaneously implementing the same procedure with another student (a 10-year-old girl with a learning disability) and had similar effects. The first author plans to continue working with the participant and will continue to collect data on the effectiveness of this program in the future.

References


Lisa Rinaldi and T. F. McLaughlin are affiliated with Gonzaga University, Department of Special Education, School of Education, Spokane, WA.
The Effects of Contingent Consequences with Direct Instruction Reading with a Preschool Child in the Home

Sarah Stenseth and T. F. McLaughlin

The purpose of this research was to evaluate the effectiveness of Teaching Your Child to Read in 100 Easy Lessons (Engelmann et al., 1983), (referred to in this article as Teaching Your Child) with and without a parent selected consequence (watching a child video each day) for attending during reading lessons in the home. The number of corrects and errors made during the lesson were measured. The participant was a 4-year-old preschool male. Materials and teaching were conducted by the parent across the first 10 lessons. During the first three lessons of Teaching Your Child, baseline data were gathered. After baseline, Teaching your Child was implemented. Due to small increases in correct rate, access to a child's video was used as a consequence for increased attending to the reading by the child during the reading lessons conducted by the mother. The overall outcomes indicated an increase in correct response and a decrease in errors when a child’s home movie was made contingent on attending during lessons. The benefits, as well as the difficulties, for parents and others implementing Teaching Your Child with and without specific consequences, are discussed.

Providing young children access to language and letter symbols places them at an advantage when they enter school and even in later life (Hart & Risley, 1995). It has been postulated that the lack of emphasis placed on reading skills in the early years of school, can make children suffer academically (Hart & Risley, 1995; Madden, Dolan, Wasik, Ross, & Smith, 1994) and later economically (Darby, 1996; Gersten & Keating, 1987). Parents and other caregivers, regardless of their socioeconomic background, want their children to be successful in school and life. Using language-based instruction in the home, may do much to assist parents in their wishes for their children’s success in school.

Skill-based reading instruction, where skills are taught directly with data-based and effective teaching procedures, has been found to assist children and youth in language and reading (Carnine, Silbert, & Kameenui, 1990). One such approach has been labeled Direct Instruction (Becker, 1977). Direct Instruction emphasizes a high rate teacher-student interaction, guided by carefully sequenced lessons utilizing modern learning principles and advanced programming strategies (Engelmann & Carnine, 1982). Two tenants of Direct Instruction continue to be “teach more in less time,” and to “control the details of what happens” (Engelmann, Becker, Carnine, & Gersten, 1988). The developers of Direct Instruction have created a set of materials to assist parents and other caregivers to teach young children the skills to be needed when they enter school, Teaching Your Child to Read in 100 Easy Lessons (Engelmann, Haddox, & Brunner, 1983). The child is active in the learning and teaching process. The text and program stress reading from left to right and matching letter sounds with symbols. Sounds are presented one by one until the child has been taught enough sounds to make a word. All previous sounds that were presented are reviewed in the next lessons. Review remains a critical component of this method, since the child builds on the sounds that he/she has previously learned. This program also employs rhyming which is related to sequencing sounds of the word. A detailed description of the procedures can be found in the text, Teach Your Child to Read in 100 Easy Lessons (Engelmann et al., 1983).

Paring another data-based and effective strategy, Precision Teaching (Lindsley, 1990; Johnson & Layng, 1994), with its emphasis on fluency and daily assessment in reading (Sweeney, Orihness, Janusz, & Cooper, 1992), with contingency
management in the home (Witt, Hannafin, & Martens, 1983), along with Direct Instruction (Carnine et al., 1990) should be of interest. The purpose of this study was to evaluate the effectiveness of the book *Teach Your Child* (Engelmann et al., 1983), with and without consequences in the home on acquisition of prereading skills of a preschool child.

**Method**

**Participant and Setting**

The participant of this study, a four-year-old male, was verbal but unable to read letter names or sounds. Instruction and data collection took place in the child's home. The child's mother, enrolled in a local university teacher training program, was the first author and had the primary responsibility for data instruction, data collection and analysis.

**Dependent Variables and Measurement Procedures**

The dependent variable was the number of sounds pronounced during the 20-minute reading lesson. Correct responses were recorded if the child pronounced the word or sounds in the manner that was modeled. An error was recorded when the child's pronunciation was different from the model provided by the parent, following the scripted lesson, or if the child stated he did not know the answer.

**Experimental Design and Conditions**

An ABC single case replication design (Kazdin, 1982) was used to assess the effectiveness of *Teaching Your Child* (Engelmann et al., 1983) and the addition of allowing the child to view home videos based on his attending during lessons as the independent variable.

**Baseline.** Baseline consisted of presenting the child with the material from the section review for each of the first 3 lessons of *Teaching Your Child*. Each sound or word was presented to the participant with no feedback provided. Correct and error rates were taken.

**Teaching your child to read in 100 easy lessons.** Direct Instruction with the first 5 lessons from *Teach Your Child* (Engelmann et al., 1983) was employed. First, the child was shown a specific sound, the parent then modeled the sound, and then the child and parent said the sound together. The child was then required to say the sound in isolation. Finally, the child would practice tracing and writing the sound. After the end of each lesson, the child was asked to produce and pronounce the sound presented from the materials in the sound review section of the materials. Each session lasted approximately 20 minutes. A detailed description of the procedures is in the text, *Teach Your Child* (Engelmann et al., 1983).

**Results and Discussion**

During Baseline (Chart I), the number of corrects was low, 0.0. With the implementation of *Teaching Your Child to Read* (Engelmann et al., 1983), there was a small increase in the number of corrects (range 1 to 2; \( M = 1 \)), while errors remained low (0 to 2; \( M = 1.6 \)). When viewing a favorite child's home video was made contingent being attentive during the lessons, corrects increased (range 4 to 8; \( M = 5.4 \)), and errors remained low (0 to 1; \( M = 0.6 \)).

A Friedman Analysis of Variance (Siegel, 1956) approached significance for corrects \( (\chi^2 = 5.636; p = .0597) \), but not for errors \( (\chi^2 = 5.0; p = .1225) \).

The data showed that using *Teaching Your Child to Read*, when paired with an effective consequence, was effective method for acquiring skills needed for reading. During Baseline and when the study first began, the participant had a tendency not pay attention and guess. The child was familiar with the names for some letters, particularly those that were in her name.
This case study indicates that Direct Instruction using *Teach Your Child* was effective in acquisition of reading skills. However, pairing Direct Instruction with the effective use of contingencies was the more effective strategy. It appears that using Direct Instruction with preschool children and providing them with the necessary prereading and reading skills can do much to improve the child’s attitudes and behaviors towards school. The use of daily assessment of progress and the Standard Celeration Chart allowed for data-based decisions to be made regarding the child’s progress. A very important aspect of using *Teach Your Child* was that the teaching procedures are clearly detailed and scripted, and the text is widely available to the public.

The program was very easy for the parent to carry out in the home. The procedures were not expensive, and many parents already have videos for children in the home. Additional research may wish to evaluate whether or not the materials taught using the Direct Instruction materials would maintain over time. The parents enjoyed using the reading materials and were pleased with the outcomes, especially after the contingency for attending was added.

**References**


Sarah Stenseh and T. F. McLaughlin are affiliated with Gonzaga University, Department of Special Education, School of Education, Spokane, WA.
Computerized behavioral-data collection and analysis for improved clinical outcomes in rehabilitation

CHARLES T. MERBITZ
Illinois Institute of Technology, Rehabilitation Institute of Chicago and Northwestern University Medical School, Chicago, Illinois

ROSEMARIE B. KING
Rehabilitation Institute of Chicago, Chicago, Illinois

LEORA R. CHERNEY
Rehabilitation Institute of Chicago and Northwestern University Medical School, Chicago, Illinois

HANSFETER MARQUI
Rehabilitation Institute of Chicago, Chicago, Illinois

JEFFREY C. GRIP
Rehabilitation Institute of Chicago and Chicago School of Professional Psychology, Chicago, Illinois

TRACY J. MARKOWITZ
Illinois Institute of Technology, Chicago, Illinois

Medical rehabilitation seeks change in patient behavior. Because of the variability in behavior across individuals and the uncertainty of clinical outcomes, an appropriate model for clinical intervention across the rehabilitation disciplines is single-case design. Therefore, the rehabilitation process can be facilitated by data collection and analysis tools similar to those used in the experimental analysis of behavior. We describe a system of computerized tools for the measurement and control of parts of this clinical process.

Increasing resources are devoted to the rehabilitation of persons with physical disabilities. Etiology, loci, and extent of impairment vary, and many persons have multiple concurrent medical problems. Severity ranges from mild to very severe.

Medical-rehabilitation professionals seek to improve the functioning and prevent further impairment of these persons. Since “improved functioning” means “improved behavior” (Kaplan, 1990), “learning” is a key construct in rehabilitation treatment and a large proportion of effort goes to changing behavior (Bleiberg & Merbitz, 1983). Similarly, patients exhibit the range of personality variables found in the general population, possibly exacerbated in many cases by other variables, such as medication side effects, brain damage, the circumstances of suddenly being treated dependent, labile, and irresponsible, and so forth. Thus, a broad range of goals and interventions is required to meet the breadth of patient needs, and fitting interventions to patients is an ongoing challenge.

Areas of deficit for an individual are delineated by diagnostic assessment, and then interventions are prescribed. The large individual differences between patients cited above have impeded the use of traditional group-oriented statistical designs in the development and validation of effective interventions, and single-subject designs are often used to support claims of effectiveness of interventions. Single-subject designs are also recommended as the model for daily management of behavior-change processes.
in rehabilitation, since there are few powerful interventions with precisely known desirable outcomes. A medical model of such designs is the system of empirical medicine (Bernard, 1865/1957). The basic principle is that of experimental analysis frequently measure the behavior and modify the treatment according to its success. In rehabilitation nursing and the allied health disciplines such as occupational therapy, physical therapy, psychology, and speech-language pathology, the interventions (from which the patients are to learn better performance) are themselves often composed of behaviors emitted by the clinician. Thus, the clinician ideally provides a behavioral environment within which the patient learns at an optimum rate; often multiple clinical goals are pursued. From the present point of view of the individual professional, effective deployment of this system requires measures that can distinguish between improved, unchanged, or deteriorating functioning for each targeted behavior. Also, as the treatments are to be finely adjusted, the measures must be convenient to frequent reapplication. Logically, the system rests on projections of the expected performance of each behavior if treatment is unchanged, so measures should also provide for predictions. These are stringent requirements. Deploying measurement and graphing for experimental analysis of five or six behaviors per patient per discipline would substantially increase the cost of services.

While such graphing is used in some situations, for ongoing management "clinical judgment" is more common, supplemented by periodic testing and informally developed measures. Also, rehabilitation organizations have developed some interval and ordinal measures of general functioning for program evaluation; however, these are of little use in managing the treatment of individuals (Morris, 1989).

**PRECISION REHABILITATION**

The Precision Rehabilitation System (PRS) is a microcomputer-based system for inexpensive, data-based, feedback-driven management of the rehabilitation process. Data in this system are recorded and reported as events in time (Johnston & Pennypacker, 1986), yielding ratio-quality measurement across a variety of behaviors. Typically, both patient and clinician behaviors are recorded so that the clinician can examine his/her implementation of the planned intervention and correct flaws or otherwise modify the approach when progress is not satisfactory. Thus, the system resembles a laboratory data collection and analysis system optimized for single-subject designs and the clinical setting.

Figure 1 shows the system design. The PRS runs currently on the Apple Ile, IIc, or Igs under ProDOS. To provide good performance, the PRS was programmed in assembly language. Applications in PRS have three parts: a generic data-analysis module (DADS, or Data Analysis/Decision Support), a data-file management module (MOMS, or Master Organizer, Manager, Saver), and an application module. The application module and MOMS are customized for the specific data-collection and stimulus display requirements of each clinical situation. The former collects data and provides stimuli during data collection; MOMS is used off line to set up for the session. Each clinical session is saved as a separate disk file; DADS is then invoked. Several clinical applications are discussed below, followed by brief descriptions of data-file structure and DADS.

**Applications**

Earlier versions of some system applications have been demonstrated elsewhere. We here describe two of the more mature applications in some detail and briefly mention two more.

The CAS (Communication Analysis System) provides ongoing measures of 21 client and clinician communicative behaviors during speech-language treatment (Merbitz, Cherney, & Marpili, 1991; 1992; Merbitz, Grip, et al., 1989). During the clinical session, the CAS runs in an Apple and the clinician presses keys to record the occurrence of critical behaviors. Figure 2 shows data from a person with aphasia performing an oral reading exercise. The cumulative record shows words correctly read. The record resets with each new sentence. The event records show emissions of two classes of error responses. Figure 3 shows the change in frequencies of correct and incorrect emissions over 4 months of rehabilitation treatment.

Another application, the TLC (Timer-Logger-Commu- nicator) is a battery-powered CMOS single-board 32K microcomputer that provides remote 24-h mobile recording of behavior for persons in wheelchairs (Grip & Merbitz, 1986; Merbitz, King, Blabberg, & Grip, 1985). In rehabilitation, a goal is to teach patients with spinal-cord injury to emit a pressure-relief behavior (PRG) once every 10 min while seated in the wheelchair. Such behavior is thought to prevent expensive and health-threatening pressure sores. Figure 4 shows frequency (counts per minute) of PRGs over the course of hospitalization for one patient. Figure 5 is a plotter-drawn graphic designed for clinical
Data from the first session of the treatment phase of the patient in Figure 3. The subject has aphasia and is reading sentences. The top tracing shows words read correctly. The record resets with each sentence. Ticks indicate errors. Event records show two classes of errors.

Figure 2. Sample cumulative and event records generated by the system. The cumulative record reset is controllable. Phase lines and comments can be placed anywhere on the screen. The file name is listed at the bottom of the figure, and the event numbers and labels are at left.

use that shows a single day of wheelchair use and the patient’s PRBs. Patients and staff discuss the data each day to support appropriate performance.

Other applications that have been tested provide simplified data recording for clinical analysis of gait rehabilitation progress (Roth et al., 1990) and cognitive retraining games for training persons with brain injury.

Accuracy, Validity, and Reliability

Accuracy (Johnston & Pennypacker, 1980), validity, and reliability are addressed separately for each application, but some commonalities apply across the system. Validity is generally not a major issue, since system applications are not designed to measure internal psychological constructs. Instead, they measure overt behaviors that are themselves important and whose change is desirable. Reliability is usually not a major theoretical problem of the system as long as transduction of the behavior remains reliable, and physical reliability of the commercially purchased elements of the system has been excellent. However, the TLC and gait applications are implemented on a custom board, and physical reliability of these elements

Figure 3. Change in frequency of correct and incorrect word emissions over 4 months of rehabilitation treatment. The dashes indicate the reciprocal of time observed reading each day. This five-cycle semilog display was adapted from the six-cycle Standard Celeration Chart because of the screen-display limitations.
has been an issue. In particular, the TLC application has a design goal of continuous, unattended operation for 2 weeks, while monitoring four switches with a temporal resolution of 1 sec and capability of 10K events, powered only by small batteries. Approximately 40 prototypes have been built and tested in pursuit of this goal. While the system is still in development, selected prototypes have been deployed in data collection for research projects. Preliminary reliability data based on experience with 76 patients are available; data from additional patients have yet to be analyzed. In field tests, the TLC system overall has demonstrated a 74.6% data-recovery rate, based on collecting an average of 34 days of data each out of an average of 46 days attempted. Best results were found when resources allowed TLCs to be serviced every 24 or 48 h, as opposed to attempting 1 or 2 weeks of continual data collection. While these results are encouraging, further work on operational reliability is needed.

Accuracy has been addressed on several levels. During development, applications are repeatedly tested by applying known behaviors at specified intervals and verifying system output against the known inputs. When application software yields inappropriate outputs, it returns to the programmer for further attention. Because assembly language is global, a complete test cycle is needed every time any change is made. Testing and debugging is thus a labor- and time-intensive process. However, applications have not been released until all testing is completed with perfect accuracy. Hardware is similarly tested and recycled; the TLC system in particular has benefited from extensive field testing, although two problems persist. First, during long data-collection sessions, persons other than the subject can create a spurious record by sitting in an instrumented wheelchair. Second, the exact time and pressure parameters minimally required to induce a sore or to prevent one are unknown; therefore, we set the TLC’s transducers to record PRBs that reflect a clinical judgment of safety.

**Data Files**

All data files have a name, a header, a comment, and a data stream. Any legal ProDOS file names can be used. Sorts and searches can be performed on five different fields in the file name, so file names are controlled by MOMS. Each application is coded to the 11th character in the file name. The system uses the file date as kept in ProDOS. and files can also be sorted by date. The header contains a reference time of day, patient and clinician names, and pointers to the end of the comment and the end of the data stream. Applications have a predefined temporal resolution (ranging from 1 to .001 sec) for events, and an identity byte for temporal resolution is also kept in the header. The comment is a text area for clinical notes. The data stream is a series of three byte words in which one byte is devoted to a numeric code for an event and two bytes keep the time of day at which it occurred as an offset from the time in the header. An application also has a dictionary that contains labels of up to five characters for each event code. During data analysis, the labels are displayed with the numeric codes.

**Data Analysis with DADS**

Figure 6 shows the DAOS main menu and first-level submenus. Many items are self-explanatory; selected menu functions are discussed below, followed by selected command-mode functions.

The basic data listing is the time of day, the numeric event code, and the alphabetic label for the event. Two data editors are supported; data entries can be modified,
Figure 5. Pressure-relief behavior (PRB) over a 24-h period for the person shown in Figure 4. The center tracings of the Daily TLC Report show left and right buttock pressure. This subject began sitting just before 9:00 a.m. (tracings together) and was out of the wheelchair from about 9:10 to 9:45 (tracings apart). The spikes (such as those between 11:10 and 12:20) each indicate a PRB greater than 5 sec in duration. Shorter spikes indicate less pressure relief. Asymmetry indicates pressure relief on one buttock but not the other. The "Distribution of Downs" in the upper left shows the number of episodes of sitting at each indicated duration. Only one episode exceeded our criterion of at least one PRB every 20 min and made the "Worst Push-Up Periods" list; "Best Periods" was not implemented when these data were collected.

DADS also has a "command prompt mode" from which all functions are available, and switching between functions is more rapid. The basic data listing of time of day, numeric code, and alpha label can be expanded to include the latencies between events. The command mode also supports macros. The user can write a macro in Apple-Works (or a similar word processor) containing a series of DADS commands and print it to disk. Then a batch of files can be selected and the macro called. DADS will step through the files, executing each command. This feature is useful for printing summaries of a series of data files and other repetitive tasks.

Two general forms of graphic data analysis are supported. One graphic provides for cumulative and event records of a single session of data (Figure 2). A "layout" screen allows the user to specify what classes of behavior should be displayed, how they will be plotted, which segments of the file to plot, and so forth. Event and cumulative records can be mixed on the screen as desired. Data are automatically presented at a resolution that fills the screen, but the display can be adjusted from 7 sec to 24 h per screen and data can be scrolled in both directions. A plotter is also supported (Figure 5) for event records of 24-h patient-behavior monitoring.
The other graphic, a modification of the Pennypacker, Koenig, and Lindesley (1972) Standard Celeration Chart (SCC) provides between-sessions data analysis. The user selects which sessions and behaviors to plot and may plot data from only selected portions of the sessions or limit the eligibility of data for analysis in several ways. DADS compiles the data into a table by accessing the disk files for each session. DADS then generates the plot (see Figures 3 and 4). Labels, experimental phase lines, lines of best fit, and overplots with other behaviors are supported. The SCC was chosen because of its psychometric properties, including direct display of acceleration and deceleration of behavior, wide applicability, uniform display of variability, rational prediction of behavior, and rapid, efficient communication to the viewer (Johnston & Pennypacker, 1980).

Several printers are supported. Both list-type and graphic analyses are easily printed. With the exception of Figure 5 (done on a plotter), other data illustrated here were printed on an Apple ImageWriter II.

**Plans**

As currently implemented, PRS runs on the Apple IIe, IIc, and IIgs family, a platform that is no longer manufactured. After finishing the applications for the Apple platform that are in final stages of development, transferring the system to the IBM PC and Macintosh operating systems is the next step. Improved capability to analyze data collected by other systems and import/export of data to other systems is also planned, following Schneider (1991). Ultimately, commercial release of the PRS modules is desirable so that user resources can support distribution and improvement.

One PRS application, the CAS (distributed by Parrot Software, State College, PA) is now commercially available and has been competitively recognized; it was a
Regional Finals in the 1991 Johns Hopkins University National Search for Computing to Assist Persons with Disabilities. Thus within this venue it was rated one of the 10 best computer applications in the U.S.

Implications

Behavioral treatment in rehabilitation is a task of great magnitude. The PRS is a beginning that provides a model for absolute measures of a range of behaviors. In addition to its direct benefits to patient outcomes, the PRS has broader implications.

First, because all PRS data collection and analysis uses an absolute time-based system, it can provide clinicians from different disciplines that are responsible for an individual with a ratio-quality data language with which to describe patient behavior and responses to intervention. Wide usage of these modules and this sort of communication may foster better staff coordination of interventions and improve rehabilitation efficiency.

Second, routine usage of the PRS will provide each clinician with an accessible personal database of outcome, of clinical procedures. Such data can be used as a training aid for self-improvement and for training other clinicians and students.

Third, since PRS measures are absolute, they could be used to determine cost-effect relationships for rehabilitation procedures. To the clinician, such data could be used administratively to better align institutional resource allocation with patient progress. At the level of the institution and third-party payer, such data could also be used to construct a "pay-for-outcome" reimbursement system. For the field, such data can provide more efficient and effective interventions by improving the evaluation of interventions; also, since the system is feedback driven and self-correcting, better interventions will evolve as the system is more widely deployed.

Ultimately, the PRS individual measures can be arranged into a curriculum that includes all important human functions and activities. Such a curriculum would be an improved model of human behavior for psychology as well as for rehabilitation.

REFERENCES


To preserve the integrity of this article, it is reprinted in its original form. Reprinted with permission from Behavior Research Methods, Instruments, & Computers, 1992.
Notes From Below the Floor

The National Debt
Abigail B. Calkin

We hear much about the national debt. For decades, Democrats and Republicans have sparred over it. Since 1929, the United States has had eight years of a budget surplus and 50 years of a budget deficit. To see the problem clearly, we must look at yearly data on standard multiply/divide charts across a long period of time.

To chart the budget receipts and outlays, the budget surplus and deficit, and the gross national product across years gives the clearest picture. Further, we know that interest grows by multiplying, not by adding. Perhaps because of what we learned as children: Put money in the bank and each month, they give a statement that shows the interest added--some think assets and debts grow by adding. The statement never says, however, that the interest accumulates by multiplying. And the same is true of a debt.

A Few Definitions
The United States gross national product, the GNP, is the value of all goods and services produced in the country, from socks and ceilings to surgery and social work services.

The budget receipts are the monies the government receives, usually through taxes. The budget outlays are the monies it spends on highways, disasters, education, welfare, art, health, etc.

A budget surplus occurs in a year when the receipts are greater than the outlays—when the money earned is greater than the money spent. A budget deficit occurs when the outlays are greater than the receipts—when the government spends more than it has.

Using the World Almanac, I charted these five items across 50 years.

A Few Observations
• The national debt in September 1992 was four trillion dollars ($4,000,000,000,000,000). In June 1993 it was 4.3 trillion ($4,300,000,000,000).
• For the last 45 years, the gross national product has grown at x1.6 per five years. On the Standard Celeration Chart, x1.0 would be maintaining; x2.0 would be doubling every five years.
• The budget receipts are now growing at x1.4 per five years, the budget outlays at x1.7 per five years. This means that we the people, through the federal government, are spending more than we earn. (As an individual or as a family, how long would we allow that to go on?)
• For the past twenty-five years, the budget surplus has maintained at zero while the budget deficit grows at x2.3 per five years—more than double.
• Our last budget surplus was in 1969. I read somewhere that President Johnson and Congress, anticipating the continuation of the Vietnam War, had budgeted for it. 1969 saw a slowing of the war and therefore an overdubbing, or a surplus.
• The party of the president or of the congress is irrelevant to the increases and decreases of the surplus and deficit. Not surprisingly, the Great Depression and World War II are the two events with the greatest financial impact in the last 50 years.
• Most surprising and alarming, there has been little variability in the deficit since 1969, and our receipts and outlays have even less bounce. It is easier to change the behavior of a person when the behavior bounces a lot—more opportunity to reward the desired behavior and punish the undesired. The same may be true of the budget surplus and...
deficit—the behavior of millions of people. Little variability may make this very difficult to change.

Using the yearly Standard Celeration Chart for these data, makes it clear we are in a crisis—we spend more than we earn and the difference between the two continues to increase. Meager steps, such as cutting the very small NEA budget, are laughable. Cutting a million here, a million there, will do, as the British say, damn all. It is directly analogous to a family saying, “We owe $100,000. We better start a penny jar to pay it off.” To save the financial life of this country, we must bite the bullet and take billions of dollars of cuts. Now.

In future articles, I shall look at different parts of the federal budget and at the data back to 1776.

References

CALENDAR DECADES

YEARLY BEHAVIOR CHART (YCM-1EN)

6 CYCLE

100 YEARS

(10 DECADES)

BEHAVIOR RESEARCH CO

CALL 3351 - KANSAS CITY, KANS. 66103

1 Trillion

100 Billion

1 Billion

100 Million

10 Million

1992 Almanac, p. 139

1995 Almanac, p. 108

A.B. Calkin
Electronic Behavior-Event Counters

Charles Merbitz and Robert Morrell

Use rate of response (frequency, or count per unit time) as a dependent variable is one of the essential features of behavioral analysis (e.g., Glenn & Madden, 1995). Lindsley (1992) and others (e.g., Johnston & Pennypacker, 1980; Johnston & Pennypacker, 1993) have also extensively discussed frequency and celeration (count per unit time, the derivative of frequency). Selectionism views of life as series of behavioral events in time, making frequency a convenient and natural metric for the measure of any class of behaviors, and celeration the simple measure of change in frequency. Frequency rests on counts and measures of time. The present paper discusses some inexpensive electronic frequency counters suitable for personal, clinical, and experimental use to help measure frequencies and change behaviors.

In 1968, Lindsley reported the use of a mechanical "wrist" counter designed for golfers as a behavioral counter. While these counters remain in use, some problems have surfaced with some varieties of mechanical counters. First, the counters offer only two digits, incrementing up to 99 and then rolling over to 0. Second, the operational quality of mechanical counters varies; some samples do not increment reliably with each push of the plunger. Finally, the design of the case does not allow easy attachment to every wristband. Recently, digital electronics have become available as consumer products that offer the counting function. Several of these products are discussed below. An advantage of the digital counter is that different variations of switches can be easily attached to increment the counters.

Sports Counters
An inexpensive ($20) digital counter designed for sports use has recently become available (Sport Counter Sportline, 847 McGinty Ln., Campbell, CA 95008). This instrument is designed to be worn on the index finger and operated with the thumb, but it can easily be mounted on a watch band or belt. It measures approximately 2 x 2 x 2 cm. The SportCount also incorporates a digital watch. A more expensive model (approximately $35) also includes a stopwatch and will track some summary statistics (including total elapsed time, longest IRT, shortest IRT, and average IRT) although it unfortunately does not calculate frequency. Both SportCount models feature a larger "count" button and a smaller "reset" button that can be distinguished by touch. A firm press "bottoms out" the "count" button giving tactile feedback for each count.

Pedometer conversion. An inexpensive digital pedometer (Radio Shack #63-682, approximately $10) can easily be converted into a convenient and accurate counter. Procedures for conversion of the Radio Shack model into one of four types of counters are given below.

Radio Shack Catalog #63-682 measures approximately 3 x 4 x 1 cm. The case is secured with a small Phillips head screw. To open the case, follow directions given for changing the battery. Inside the case (see appendix A), one finds a pendulum in the form of a weight on the end of a pivoting arm, and a contact point connected to the battery that just touches the weight at the full excursion of the pendulum. The display increments each time the pendulum weight touches the contact point. To convert the pedometer into a digital counter, one may simply arrange to control the movement of the pendulum arm to open the contacts, and pushing in on the rods moves the
pendulum to close the contacts, incrementing the counter. The rod protrudes through a hole melted or filed in the case. Fortunately, the pendulum arm is manufactured with a hole for a spring near the free end; this spring anchor hole is conveniently placed and sized to accept a common straight pin with a right-angle bend near the sharp end that will function as the L-shaped push rod. One may measure the appropriate length for the pin by holding the pendulum in the "contact" position and laying the pin across the counter, with the pin's top protruding over the display and across the edge of the counter. The sharp end crosses the pendulum at the hole. Bend the pin at a right angle where it crosses the hole in the arm. Then insert the sharp (bent) end of the pin into the hole in the pendulum arm. When the pin is pushed along its axis toward the center of the counter, the pendulum is forced down to make contact. A mark should also be made in the counter's case where the pin crosses the case wall. Then, melt or file a notch in the case wall to allow egress of the pin when the top of the case is replaced. Pins with globular plastic heads seem to work well.

Spring-loaded Push Counter. Same as the Push-pull counter, except that a spring arrangement is added to hold the pin in the outer or "ready" position. Thus, it is operated by a push and the spring returns it to a ready position. To make this variant, simply cut the pin to length so that it protrudes about 6-8 mm from the case. A section (about 4 mm) of the spring from a retractable ball-point pen seems to work well to return the pin to the "ready" position. To prevent the spring from slipping over the pinhead, a washer may be fashioned by using a hand punch to punch a hole in a discarded credit card or similar thin plastic object. Then, take the circular punched-out piece and melt or drill a small hole in its center to accommodate the pin. Place the washer, then the spring, on the pin and insert the short arm of the L into the pendulum. When the pin is pushed in, it will move down to make contact; when released, the spring returns it to the fully extended position. Check carefully and adjust the pin length and washer so that counting is reliable; with some counters modified in this way, the count is accurate if one depresses and releases the pin, but a double count may be registered if one depresses and holds the pin, then releases it due to "bounce" or multiple contacts.

General counter - any switch. A wide variety of single-pole single throw (SPST) switches can easily be wired to this pedometer to make a self-powered, unobtrusive counter. The use of a magnetic reed switch would allow non-contact switching, such as for counting bicycle or wheelchair spoke rotations (Halstead, 1973, 1976). For a wrist counter, an attractive arrangement could involve cementing a dome-type switch to the surface of the pedometer. For all of these applications, simply open the case and clip the weight off of the pendulum arm. When the pin is pushed through the case, it will make contact and activate the switch, thus counting the press. Pins with globular plastic heads seem to work well.

Micro-switch wrist belt counter. At least one momentary contact switch is small enough to be mounted in the cavity that remains after the pendulum weight is removed, but the switch can be left protruding from the case. Follow directions above and clip off the weight. Then, file or melt a hole into the cavity that houses the weight from the edge of the case. A small circle can be cut into both the top and the bottom edge of the case, such that the case can almost be closed around the switch (the switch is just a bit too large for a perfect closure). Then, the lead of the switch are bent, such that one can be soldered to the stub of the pendulum arm and one to the battery case contact. The commercially available switches generally have a better "feel" and give distinct feedback when the make contact, as compared to some "homemade switches". Commercial switches are also generally engineered to have no "bounce" in the contacts that can lead to double-counting.

Reliability Of The Counters
All of the counters were systematically assessed for reliability. Each was pressed 100 times, while the second researcher counted numbers out loud while looking away from the counter. After 100 presses, the number on the display was recorded. 100 more presses were counted and again the number on the display was recorded. All of the counters proved to be reliable in the testing period. If the plungers on the counters are pressed solidly, the reliability is very good.
The Micronta and the Borm showed accuracy ratings greater than 97%. The accuracy of the Sport Counter was greater than 99%. When using any of the counters, the accuracy can be increased by pressing the buttons firmly and slowly and releasing the plunger completely. If this is not done, the accuracy may be reduced.

References
Pedometer to Counter Conversion

- Plunger Knob
- Spacer
- Coil Spring
- Make Hole Here
- Battery
- Electrical Tape over circuit board
The multidisciplinary journal of standard behavior measurement published by the Standard Celeration Society.

**Volumes I and II** (April, 1980--January, 1982)
Available only as reprints of individual articles

<table>
<thead>
<tr>
<th>Volume</th>
<th>For libraries</th>
<th>For individuals and agencies</th>
<th>For full-time students</th>
<th>Single issue price</th>
</tr>
</thead>
<tbody>
<tr>
<td>III - VIII</td>
<td>20.00</td>
<td>16.00</td>
<td>12.00</td>
<td>15.00</td>
</tr>
</tbody>
</table>

**Volume IX** (Spring, 1992 only)

<table>
<thead>
<tr>
<th>For libraries and agencies</th>
<th>For individuals</th>
<th>For full-time students</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.50</td>
<td>10.00</td>
<td>8.00</td>
</tr>
</tbody>
</table>

OUTSIDE USA

<table>
<thead>
<tr>
<th>For libraries and agencies</th>
<th>For individuals</th>
<th>For full-time students</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.00</td>
<td>12.50</td>
<td>10.50</td>
</tr>
</tbody>
</table>

**Volumes X (Fall, 1992--Spring, 1993); Volume XIII (Fall, 1995--Spring, 1996)**

<table>
<thead>
<tr>
<th>For libraries</th>
<th>For individuals and agencies</th>
<th>For full-time students</th>
<th>Single issue price</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.00</td>
<td>25.00</td>
<td>16.00</td>
<td>15.00</td>
</tr>
</tbody>
</table>

OUTSIDE USA

<table>
<thead>
<tr>
<th>For libraries and agencies</th>
<th>For individuals</th>
<th>For full-time students</th>
<th>Single issue price</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.00</td>
<td>30.00</td>
<td>20.00</td>
<td>20.00</td>
</tr>
</tbody>
</table>

Please send me:

**Journal of Precision Teaching and Celeration** (prices include postage/handling)

- Library
- Individual/Agency
- Full-time Student

- Reprints from Volume I or II (Title: ) $________
- single issues of Volume: ________________
- copies of Volume: ________________

**TOTAL** (Please enclose a check in US funds made out to Standard Celeration Society.) $________

Name: ________________________________________________

Mailing Address: __________________________________________

___________________________________________ Daytime Phone: (____) ________