Precision Teaching: extending the boundaries 53

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EDITORIAL POLICY

The Journal of Precision Teaching is a multi-disciplinary journal dedicated to a science of human behavior which includes direct, continuous and standard measurement. This measurement is composed of standard units of behavior—frequencies—which are collected and recorded on a standard scale—the Standard Behavior (Celeration) Chart. Collections of frequencies are summarized on this Chart using a standard measure of behavior change—celeration. Frequencies and celerations displayed on the Standard Behavior (Celeration) Chart form the basis for Chart-based decision-making and for evaluating the effects of independent variables.

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

Materials submitted for publication should meet the following criteria: (1) be written in plain English, (2) contain a narrative that is brief, to the point and easy to read, (3) use the Journal of Precision Teaching Standard Glossary and Charting Conventions, (4) contain data displayed on the Standard Behavior Chart that justify conclusions made, (5) be submitted in quadruplicate to the editor, and (6) include one set of original charts or hand-drawn copies. Each formal manuscript will be reviewed by one consulting editor and two reviewers, two of whom must approve it prior to publication.

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As part of its goal to disseminate research, the University Affiliated Facility for Developmental Disabilities (UAF) at the University of Missouri in Kansas City, under the direction of Carl Calkins, assisted with the production of this Journal.
Although Precision Teaching was initially used primarily in academic settings, the range of possible behaviors to be measured by Precision Teaching is only limited by our imaginations. Others in the field have demonstrated its applicability outside the school walls or on skills other than basic skills. There have been applications in rehabilitation, in business and in political forecasting. In my Precision Teaching classes here at Western Washington University, I have found some very inventive students. As part of the course requirement, they are asked to take data to chart on a behavior that they would like to see change. Some selected personal behaviors, while others elected to change the behavior of others, pupils or friends. I have been sometimes amused, and usually impressed by their ingenious application of Precision Teaching procedures.

I have selected five projects to illustrate the wide range of behaviors that naive PT students have been daring or crazy enough to try to measure. The first three are self-monitoring projects. The first is a fairly typical self-change project. The student pinpointed an area in her teaching that she wanted to improve—her use of specific praise statements. The second illustrates a change in a more unusual behavior—the deceleration of loss of concentration during a meditation session. The third student identified a skill he wanted to learn—Russian cossack dancing—and used Precision Teaching to monitor his progression as a dancer.

Increasing Specific Praise Statements. Peggy was a junior in Special Education. She found that when she worked with students in her practicum assignments she tended to use repetitive praise statements, such as "good" or "OK". She wanted to become more specific in her praise in hopes that she would be more effective with her students. She elected to monitor this behavior for five minutes each day while she was working with one of her practicum students. After she collected three days of data on this behavior, she began to require herself to think of a new specific praise statement every time she said "good" or "OK" (a little positive practice). As Chart 1 indicates, she did not need to make another intervention. Her specific praise statements rose from a low of 0 to her aim of at least 2 per minute and the number of "good" and "OK" remarks fell to 1 per minute. Her corrects accelerated x1.4 and her errors decelerated /1.5.

Decreasing Loss of Concentration During Meditation. Stephanie decided to take on a challenge while she was taking Precision Teaching. After listening to an inspirational lecture early in the quarter in which her instructor claimed that Precision Teaching could be used successfully to monitor a wide range of behavior, she decided to select the hardest behavior to change she could imagine. She also decided to select one that was well outside the typical educational domain.

Stephanie had been meditating for many years at the time of this project. Over the years she had been disturbed by the number of times she lost concentration during her meditative periods. Her goal for her self project was to reduce these "aware" times from the baseline rate of nearly 1 per minute to no more than 3 in the ten minute meditation period. In order to monitor the concentration losses, she simply made a tally mark with a pencil each time she became "aware" in her meditation.

At first the monitoring alone reduced the number of "aware" times to 6 in ten minutes. Two interventions were tried, however, before the final goal of 3 losses in ten minutes was achieved. Both the interventions were antecedent changes. During the first change period she read a short passage before beginning to meditate. She hoped that this inspirational reading would help her focus during meditation and keep her mind from wandering. As Chart 2 indicates, however, the opposite effect was seen. Her concentration losses actually increased.

The second intervention was simply to change the time of day of meditation from the afternoon to the morning hours. The change had the desired effect and concentration losses were reduced.

Learning the Cossack Dance. Ron was a senior in educational psychology when he enrolled in Precision Teaching. He decided to use self monitoring to help him gain fluency in the difficult squat kick that is required in the traditional Russian Cossack dance. He identified a correct movement as one full kick (extension of the leg forward) with the other leg in a full squat position. The movement was completed when both legs had returned to the full squat position. In the correct full squat position, the thigh is parallel to the floor. An aim of 10 successive kicks with no fails in one minute was set.
Chart 1. Increasing Specific Praise Statements
Chart 2. Decreasing Loss of Concentration during Meditation

Reflective reading for 15 min.
prior to meditation

Meditate in the morning

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SUPERVISOR  ADVISER
S. Kidder
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AGENCY

S. Kidder
BEHAVIOR
LOSES CONCENTRATION
DURING MEDITATION
COUNTER

COUNTED
Leg strength was considered very important for developing this skill as an enormous strain is put upon the legs in what would normally be an awkward position. Therefore, an extensive weight training program was introduced as instruction (see Chart 3). In the second phase full front squats were dropped from the weight training because the strain on the knees caused by the Cossack dance was too much when combined with this exercise. In the third phase back squats were added to develop a different part of the leg muscle, and one legged deep knee bends were introduced because the movement is similar to the Cossack dance. In Phases 4 and 5 the assessment was changed to alternate days and the weight training reduced to two days a week because Ron found that overworking his muscles was counterproductive. Although Ron has not yet mastered Russian Cossack dancing, he did learn to do the squat kick with some degree of proficiency as Chart 3 and his demonstration of that skill for me in the hallway outside my office indicates.

The second group of projects used Precision Teaching skills to change the behaviors of other people. In the first example, a student used Precision Teaching to help solve the "damp newspaper syndrome." In the second project, a student helped middle school students learn to behave better in class by monitoring their teacher's behavior.

Increasing the Accuracy of Newspaper Throws. Reuven, a newspaper boy, had difficulty throwing newspapers accurately. He could throw "on target" from short distances, but the style and speed of long distance throws often left the paper in the mud puddle at the bottom of the stairs, in the driveway or the flower garden. Judy, a PT student and newspaper subscriber, was motivated by the loss of several papers to help Reuven increase his accuracy of newspaper throws.

For five days each week, Reuven and Judy met just outside her apartment. Reuven stood at the top of the stairwell (approximately 1 meter high) and 5.5 meters from a target (the doormat). The behavior measured was the number of centimeters from the target on a single throw. During the baseline assessment, Reuven typically was close to 100 cm from the target (see Chart 4). Judy then began practice sessions with Reuven to help him increase his accuracy. These practice sessions had the desired effect of helping him land the newspaper closer to the mat. As Reuven became more accurate, Judy introduced a practice "fake throw." She asked Reuven to visualize how the paper would travel to the mat and to imagine it landing on the mat before throwing. During this instructional phase, Reuven was able to meet his goal of two consecutive mat "hits" in a row and Judy happily read dry papers.

Decreasing Talk-outs. Tom was assigned to a middle school special education class for his Precision Teaching practicum. He was asked to collect data by the teacher on the talk-outs of her students during a thirty minute class discussion period. Chart 5 shows the data from one representative student. Don did have a problem with blurt out the answers and talking out. His hand raises occurred about once every ten minutes and the talk-outs occurred more frequently. Tom noticed however, that often when students blurted out the answer, the teacher responded to them anyway and allowed them to answer the question. He decided that the most effective way to decrease talk-outs would be for the teacher to change her behavior. Fortunately, the teacher held the same opinion and asked Tom to give her feedback each day on the number of times she required students to raise their hands and the number of times she forgot (see Chart 6). As Charts 5 and 6 indicate, as the teacher changed her behavior, the target student also increased hand raising and decreased his talk-out behaviors.

These examples are just a few gleaned from the years of Precision Teaching classes. They are intended to stimulate students and practitioners alike to think about areas outside the domain of simple academic skills that would benefit from careful definition and monitoring.

Marie Eaton is a member of the special education faculty at Western Washington University, Bellingham, Washington 98225. The remaining authors are her students.

ALL THE KNOWN PRECISION TEACHING REFERENCES

John W. Eshleman
West Virginia University

In this article I describe the results of a two-year-long literature search, where the object of the search was to track down and obtain all of the Precision Teaching and/or Standard Celeration Chart references.

I conducted this search mostly out of interest. For me it proved to be a rather entertaining enterprise. The strategy in doing it was not to acquire the most salient references, but rather to try to get all of them. The resulting compilation holds considerable practical utility as well--one reason why I use the term "data-base."
**Chart 3. Learning the Cossack Dance**

- **1.** Weight training.
- **2.** Discontinue front squats.
- **3.** Add back squats.
- **4.** Every other day assessment.
- **5.** Leg workouts 2x/week.
- **6.** Reset aim.

**Successive Calendar Days**

- **R. Storaasli**
  - **Behavior:** Performs squat kicks correctly or incorrectly.

**Count Per Minute**

- **M. Eaton R. Storaasli**
  - **Agency:** Western Washington University, Bellingham, Washington.

**Counter**

**SUPERVISOR**

**ADVISER**

**MANAGER**

**BEHAVIOR**

**AGE**

**COUNTED**

**Western Washington University - Bellingham, Washington**

**Incorrectly**

**Correctly or Counted**

**The boundaries, Reeves, Pegay and Storaasli, Ron, precision teaching; extending.**

**Eaton, Marte: Anderson, Tom; Jones, Judy; Kidder, Stephanie.**
Chart 4. Increasing the Accuracy of Newspaper Throws

Practice sessions
"fake throws"
Chart 5. Decreasing Talk-outs: Student Behavior

Count per minute

Conference with teacher

Days

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

0 5 10 20 50 100 500 1000

Weeks

The boundaries:

Eaton, Marie; Anderson, Tom; Jones, Judy; Kibler, Stephanie; 
Rees, Peggy and Storacell, Ron. Precision teaching: Extending...
Chart 6. Decreasing Talk-outs: Teacher Behavior

Conference with teacher
You have at your fingertips a fairly thorough listing of what has been done in the field. This sort of data-base comes in handy when doing research, a literature review, when finding works by a certain author, or works in a particular subject.

On a floppy disk I have over 700 references pertaining to Precision Teaching and/or Standard Celeration Charting. At the present there are 715 references. These span the years 1965 through 1982.

Search for the References

I began the search with the references that I had already (e.g., books and all the issues of the Journal of Precision Teaching). Next, I did some of the search in the university library, looking through the card catalog by the last name of "chart people" (people active in the field), and doing an ERIC search the same way. Also, once I obtained a book or journal article my next step was to look at the references listed in their reference section and note the Precision Teaching references they referred to. When possible I tried to get ahold of such works so I could see whether they were indeed ones that deserved inclusion. This portion of the search was probably inexact since judgment calls had to be made, especially if the work referred to was not available. Fortunately, quite a few Precision Teaching works contain cues in their titles that made classification easier.

As another part of the search I went through all of the Association for Behavior Analysis convention program guides and the Winter Precision Teaching Conference program guides. I included every presentation in the latter, but with the ABA guides some judgment calls again had to be made. Generally, I cued in on the names of "chart people" in the index first, then went through the program guide carefully, looking for chart-oriented symposia and poster sessions, and finally looking closely at titles. Again, many titles contained cues that simplified classification.

Finally, I rounded out the search by including references from lists compiled previously by others. I had a listing of Lindsley's references through 1972 (Lindsley, 1976) and a Precision Learning Bibliography compiled by Ann Rutherford (n.d.), and a Precision Teaching/Standard Chart bibliography put together by Abigail Calkin (Calkin, 1976).

In November 1982 I began putting the references on floppy disk, using Applewriter II Word Processing software. By January 1983 the data-base was complete through 1982. In April 1983 I updated it to include 1983 references.

When doing the search an arbitrary decision became necessary. The current end point in time of the data-base is easily defined. It is the present. But when did Precision Teaching begin? In some respects the field had no exact beginning. It evolved out of the experimental analysis of behavior and the early human operant work done by Lindsley and others. We do not find a significant number of explicitly Precision Teaching references until 1967 (when there were 9). The data-base, however goes back a couple of years before that to 1965 as an arbitrary starting date. The reason is that in 1965 Lindsley invented the Standard Behavior Chart—the one with six cycles, although he was using summary charts with logarithmic axes as far back as 1956 when he was at Metropolitan State Hospital (Lindsley, 1983). Anyway, 1965 makes for a convenient starting date. There could not have been references with Standard Behavior Charts before this time, and Standard Behavior Charts are one of the primary distinguishing features of Precision Teaching. Again, though, the roots of Precision Teaching go back to 1938 to Skinner's The Behavior of Organisms. This implies that Precision Teaching can be thought of as part of the larger field of human operant behavior analysis.

A Brief History on Yearly Charts

Charting practices can be applied to the data-base. Since all but a few references contained a publication date a yearly count of them can be taken. Once done various celeration trends in the data can be observed. These measures do give us a pictorial representation of the history of Precision Teaching. Chart 1 presents the overall picture, the frequency of references per year from 1965 through 1982. The picture depicts the overall growth and trends in our field, and should be reasonably accurate.

From 1965 through 1982 there has been a x1.5 overall celeration. The growth has not been steady, however. The overall celeration ignores substantial trends. Trend-following celerations present a better picture. Three major trends characterize the history. During the early years from 1965 to 1971 there was a x14 acceleration. Then, significantly, the celeration turned down to a /1.7 from 1971 to 1978. Recently, 1978-1982, there has been a x12 resurgence.

The decline in Precision Teaching during the 1970's is especially interesting. According to Lindsley (1983) this deceleration was the cost of having Precision Teaching go from being just in special education and moving into regular education. This move did not bring about an immediate celeration turn-up because "it took
Chart 1. Precision Teaching/Standard Celeration Chart References per Year in the Data-base (May 1983 Tally)
about five years for regular education people to get hatched and grown" to borrow Lindsley's expression.

That they have begun to hatch and grow is clear from the data in Chart 1. From the data-base we can analyze and at least partially account for the most-recent trend. If we chart references appearing only in the ABA program guides, the issues of the Journal of Precision Teaching, and the Winter Precision Teaching Conference guides all taken together we get the picture shown in Chart 2. These three vehicles for publication and presentation together have a x17 celeration covering 1975 through 1982. If these references are subtracted from the totals, there is a /1.8 celeration from 1971 through 1982. The data in Chart 2 demonstrate that over the last several years more and more documented communication about Precision Teaching has been increasingly confined to three channels. The data also indicate that these three communication channels have served as a necessary although not sufficient condition to explain the recent celeration turn-up. For one thing they have made communication easier. They have opened up channels that previously did not exist, thereby making reliance on other channels less needed. Of course, the creation of communication vehicles dedicated wholly or in part to Precision Teaching cannot be the sole reason for the recent turn-up. The people who entered the field during the later '70s are maturing with the field, are becoming more established, and are doing more. And more people are entering the field. Moreover, other necessary conditions must include the fact that Precision Teaching works and accomplishes more, at least in terms of student learning, than other systems do. As the "high technology" of education evolves the field is becoming more scientific (success is measured) and product-oriented (the focus is on better learning).

As Chart 3 shows, the inception of the Journal of Precision Teaching in 1980 and the Winter PT Conference in 1981 taken together, account for a substantial part of the recent acceleration trend: Over the past three years this combination of purely Precision Teaching oriented publications and presentations has had an astounding x67 celeration (one that will most likely not be maintained).

Chart 4 shows the increasing frequency of chart-based and/or Precision Teaching presentations at the ABA conventions. The overall celeration of X9 is consistent with data reported by Graf (1982), who counted "chart people" per year in the ABA program guides.

Pictures of the changes in growth of references cannot serve as the total picture of the growth of the field. Other measures, perhaps equally or more difficult to obtain, would also show the history of Precision Teaching. These other measures might include: (1) the number of schools/year where charting occurs, (2) the number of students/year who chart, (3) the number of behavior change projects/year (as were recorded in the Behavior Bank), and (4) the number of graduate student theses and dissertations/year (partially represented in the data base).

Much of the growth of Precision Teaching may not be captureable. The field is notorious for its informal communication. A great deal of communication occurs over the telephone rather than through conferences or journals. These interactions occasionally get cited as "personal communications" in reference notes.

A SUGGESTION. With the influx of microcomputers, information will increasingly be communicated by floppy disk. And this raises a couple of germane issues heretofore not considered. First of all, how does one cite in a reference note a computer program or text file? The APA Publication Manual makes no proviso regarding such citations because it came out before the microcomputer boom. Therefore, I recommend that the style be according to the following form: "Author. Title of Program. Created on Floppy Disk for the (brand name) computer, in (computer language or word processing software), Date."

Availability of the Data Base

Because the search in some cases included judgmental decisions there are bound to be errors in the data base. Two kinds of errors are possible: incorrect inclusions and omissions. There probably are some references in the listing that most of us would agree are not, properly speaking, Precision Teaching or Chart references. With regard to errors of omission, I may have overlooked articles in journals I would not think of looking in, or presentations at conferences I am not familiar with. That there are omissions I am certain. Omitted items will be added as they become known. Given that the overriding strategy was to get all references, hopefully omissions have been minimized.

I hope that by disseminating this data-base of references our field will be assisted, our science advanced. For one thing, making the data base available seems to be a way to clean up the data. Regarding errors of omission, if you get a copy of the data and see that something you published or presented has been left out, then let me know and I will put it in. If you find a reference that probably should not be there then let me know as well.
Chart 2. Precision Teaching/Standard Celeration Chart references from the ABA conventions, the Journal of Precision Teaching, and the Precision Teaching winter conferences (1975-82)
Again, the data are on two disks (the front and back of one disk will work too). The disks are not protected, nor will they be. The data are available to everyone. For the time being, I am willing to be the manager of the data base—to update it. If you want a copy of the disks, here is the arrangement I am making. If you have a blank disk send it along with a self-addressed, stamped envelope and I will gladly make a copy free of charge. The disk should be a soft-sector, 5 1/4 inch, single density floppy disk (designated for the Apple Computer).

Again, if you have any suggestions or contributions to submit to the data base (additions or deletions) please send them along. Again, the data are free and available to anyone.

REFERENCES


Lindsley, O. R. Personal communication, February, 1983.

Rutherford, A. (Compiler). *Precision learning bibliography*. No publication data. No date (although no reference in the list is later than 1975).

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About PT

NOTES FROM THE EDITOR

Patrick McGreevy

Susan Ryberg and her colleagues are working very hard to prepare for the 1984 National Precision Teaching Conference. The conference brochure is included in this issue. Please photocopy this brochure and share it with your colleagues. Encourage them to attend. It is important to emphasize that a conference like this is not designed just for experienced Precision Teachers. Many of the sessions will be helpful for beginners and those who have been using the Chart for a short period of time.

If you are planning to attend, please send in your registration and make hotel reservations as soon as possible. This will help Susan and her staff with conference planning and organization.

This issue marks the beginning of two new columns: Around the Chart and Teacher to Teacher. These columns are designed for teachers and other practitioners who are new to the Chart.

We are in the process of arranging for the indexing of JPT in one or more publications. We will keep you posted.

Several subscribers have suggested that we offer 2-year subscriptions. Beginning with Volume V (April, 1984), 2-year subscriptions will be offered.

I think all Precision Teachers owe John Eshelman a debt of gratitude. His was truly a labor of love. John and I are currently working out the details of making the data-base available in print form through Plain English Publications. More on this in the next issue.

TEACHER TO TEACHER

Caryn Robbins

I remember when Pat Flanagan began to teach me to chart, she would patiently correct me when I talked about "graphing my data." There is a transition period in learning to use the Chart, when you aren't yet thinking like a
When most of us started using the Standard Celeration Chart, we were accustomed to setting goals (aims) for our students and reporting their performance in terms of percent correct. Our "Chart parent" (to my knowledge, Steve Graf coined this term at the 1980 ABA Conference) tried to convince us of the wisdom of using frequency (number correct and incorrect during a certain time interval). Being new to frequency (sometimes called rate), we were somewhat apprehensive. No one else in our building was using frequency, let alone this strange and complicated looking chart. The other teachers were still using their old friend, percent correct. Since percent correct was our old friend too, we were somewhat unwilling to leave it behind.

When our "Chart parent" was not looking, we converted our student's correct and incorrect frequencies to percent correct, snuck a piece of plain (equal interval) graph paper and "plotted" our old friend. We then compared our new Chart with our old friend to see if they looked the same. To our surprise, they were very different. After several days of "courage collecting," we tiptoed up to our "Chart parent" and asked him why our new Chart looked so different from our old friend. He gave us an answer that sounded something like this, "... when correct and incorrect frequencies are collected and charted on the Standard Celeration Chart, we have a more sensitive and useful measure of student progress than is possible with percent correct and equal interval charts... keep counting and charting; you'll see what I mean. ..." Even though this answer was correct, it was not very helpful or satisfying. However, since our "Chart parent" was a nice person and sounded very convincing, we decided to give frequency and the Chart a fair chance.

After several months (by this time, we were beginning to see the value of frequency), our supervisor came by and noticed our students' new Charts. She also noticed that we had modified our students' goals (we were now calling them aims). Instead of stating the aims in terms of percent correct, we were now stating them in terms of frequency (e.g., 70 problems correct in one minute with 2 or less errors). Our supervisor was horrified! She asked us where our percents were and why we were using this strange new Chart. As luck would have it, our "Chart parent" was off at some behavior mod convention and we were left alone to answer our
supervisor's questions. We stumbled through an explanation of who our "Chart parent" was and that he would be better able to explain what was going on as soon as he returned from the convention.

When our "Chart parent" returned, he apologized for leaving us defenseless and proceeded to construct Chart 1. According to our "Chart parent," this Chart was designed to help us show our supervisor (or anyone else who was interested, including ourselves) that just because we were now collecting correct and incorrect frequencies and charting them on the Standard Celeration Chart, we were merely ignoring percent correct, but not leaving it completely behind.

Our "Chart parent" explained to us that since the Standard Celeration Chart was a multiply-divide (ratio) chart, percent correct was always visible on the Chart. He used Chart 1 to show us that percent correct can always be seen as the distance between the correct and the incorrect frequency (experienced Precision Teachers often call this the accuracy ratio and express this distance as a \( \frac{x}{y} \) if the dot is above or on top of the "x", and \( \frac{y}{x} \) if the dot is below the "x"). He then "went over" several pairs of correct and incorrect frequencies displayed on Chart 1 and pointed out their percent correct and accuracy ratio values (see Chart 1).

Finally, our "Chart parent" cautioned us again about using percent correct, emphasizing that it confuses people and "hides" information about student performance. These final comments were meant to tease us into an additional lecture on the evils of percent correct to be conducted at a later date.

**CURRICULUM**

Marie Eaton and Peggy Albrecht

Although many of us who use Precision Teaching in the classroom are beginning to be comfortable with proficiency standards in math and reading, we lack clear aims for other academic and life-skill areas in the speech and language area. There are some practitioners in Iowa who have been doing quite a bit of work toward developing standards.

David Schoemer and Susan Thomsen from the Mississippi Bend Area Education Agency in Clinton, Iowa, have been incorporating Precision Teaching in their clinical work. Recently they sent me some proficiency standards for speech and language areas: speech, word meaning, syntax and morphology, and articulation. Within each of these areas they have also identified some specific pinpoints and activities which could be used to measure skills in those areas.

The proficiency standards were determined by assessing 10-15 second and third grade children with no noted speech or language problems. These ranges may vary for older or younger children as well as children with motor, auditory discrimination or processing difficulties.

Following are suggested proficiency standards for Speech Pinpoints, Syntactical and Morphological Tasks, Word Meaning Tasks and Articulatory Tasks. Remember, these are "suggested frequencies" and may need to be adjusted for child's age and ability, as well as difficulty level of the task. Other lower and higher level input/output channel combinations are possible. It is not necessary to limit assessments to these sampling procedures.

**PROFICIENCY STANDARDS FOR SPEECH PINPOINTS**

1. think/say sound 
   180-240/min.*
2. think/say word (1 syll.) 
   90-110/min.
3. think/say word (2 syll.) 
   80-100/min.
4. think/say simple sent.
   (4-word) 
   40-50/min.
5. hear/point to picture 
   25-35/min.
6. hear/say word 
   45-55/min.
7. hear/say word twice 
   70-80/min.
8. see picture/say word 
   45-55/min.
9. hear sentence/say sentence 
   30-35/min.
10. see picture/say 4-word sent. 
    45-50/min.
11. see picture/say own sent. 
    25-30/min.
12. see picture/say word pairs 
    35-40/min.

*less than 10 children assessed

**PROFICIENCY STANDARDS FOR SYNTAX AND MORPHOLOGY**

Level 6 CONVERSATION
5 minute sample once per week.
AIM: 1 or 0 errors for 5 minutes.

Level 5 CARRYOVER
5 minutes question and answer interaction. Instructor asks questions to elicit target responses.
AIM: 1 or 0 errors for 5 minutes.

Level 4 MIXED SENTENCES
1 minute task. Child says 4 to 5 word sentence using target and non-target mixed pictures for stimulus.
AIM: 25 to 30 sentences per minute with 1 error or less.
Chart 1. Pairs of Correct and Incorrect Frequencies and their Accuracy Ratio and Percent Correct Values
Level 3 COMPOUND SENTENCES
1 minute task. Child says 5 to 7 word compound sentences using pictures for stimulus.
AIM: 25 to 30 sentences per minute.
Subtask—
   Imitation—Compound sentences
   AIM: 20 to 25 sentences per minute.

Level 2 SHORT SENTENCES
1 minute task. Child says simple 4 to 5 word sentence using pictures for stimulus.
AIM: 45 to 50 sentences per minute.
Subtasks—
   A. Imitation—Short Sentences
      AIM: 30 to 35 sentences per minute.
   B. Completion—Fill in target word.
      AIM: 25 to 30 words per minute.
   C. Imitation Words—Child repeats target words.
      AIM: 45 to 55 words per minute.
   D. Discrimination—Child judges if sentence or word is "right or "wrong."
      AIM: 25 to 30 responses per minute.

PROFICIENCY STANDARDS FOR WORD MEANING

Level 5 CONVERSATION
5 minute sample once per week.
AIM: 1 or 0 errors for 5 minutes.

Level 4 CARRYOVER
5 minute task. Instructor uses pictures or other materials and asks appropriate questions. Child answers with target word in a sentence.
AIM: 1 or 0 errors for 5 minutes.

Level 3 SENTENCES
1 minute task. Child says 5 to 7 word sentences from pictures.
AIM: 25 to 30 sentences per minute.
Subtask—
   Sentences—Imitation
   AIM: 25 to 30 sentences per minute

Level 2 WORDS
1 minute task. Child says target words from pictures.
AIM: 45 to 55 words per minute.
Subtasks—
   A. Words—Imitation
      AIM: 45 to 55 words per minute.
   B. Sentence Completion
      AIM: 25 to 30 words per minute.

Level 1 IDENTIFICATION
Child points to pictures instructor names.
AIM: 25 to 35 points per minute.

HIERARCHY AND PROFICIENCY STANDARDS FOR ARTICULATION

(Student starts at optimum level on hierarchy and moves up after proficiency is reached. Subtasks are only used when necessary.)

Level 6 GENERALIZATION—Activities to generalize target sound to other settings and observers. These include
   A. Peer observation and monitoring
   B. Teacher observation and monitoring
   C. Parent observation and monitoring
   D. Activities outside therapy setting

Level 5 CONVERSATION—5 minute conversation sample taken once per week throughout the entire program.
AIM: 1 or 0 errors in 5 minutes.

Level 4 CARRYOVER—5 minute question and answer task from target sound word list. Instructor uses a list of initial, medial and final target words to elicit from student sentence responses containing target word. (Start Carryover and Sentence Levels together)
AIM: 1 or 0 errors in 5 minutes.
Subtasks:
   A. 5 minute reading task. Instructor asks the student to read from a book for 5 minutes.
   B. 5 minute question and answer task from problem solving list. Instructor asks questions and student answers.
   C. 5 minute sequencing or storytelling task from pictures or books without words. Student tells stories from pictures.

Level 3 SENTENCES—Initial, Medial and Final—one minute task. Student says sentences 2 times each from a 20 picture probe containing the target sound in the initial, medial or final positions. (Start Carryover and Sentence levels together.)
AIM: 30-35 sentences per minute with 1 or 0 errors.
Subtasks:
   A. Sentences Initial
   B. Sentences Medial
   C. Sentences Final
   D. Phrases—Initial, Medial and Final—one minute tasks. Student says rote phrase (i.e., I see a ____) 2 times each from a 20 picture probe.
      AIM: 45-50 phrases per minute with 1 or 0 errors.

Level 2 WORDS—Initial, Medial and Final—one minute task. Student names 20 pictures 2 times each from a 20 picture probe
containing the target sound in the initial, medial and final positions.
AIM: 45-55 words per minute with 1 or 0 errors.
Subtasks:
A. Words—Initial
B. Words—Medial
C. Words—Final
D. Words—Imitation—one minute task. Student repeats picture names 2 times each after the instructor. AIM: 70-80 words per minute.
E. Syllables—Initial—30 second task. Student says target sound plus vowel over and over. AIM: 45-55 syllables per 30 seconds.
Subtasks:
A. Syllables—Medial
B. Syllables—Final
C. Syllables—Imitation—30 second task. Student repeats cv syllables 2 times each after the instructor.

Level 1 ISOLATION—30 second task. Student says target sound over and over. AIM: 90-120 sounds in 30 seconds.
Subtask:
Isolation imitation—30 second task. Student repeats sound after instructor. AIM: 60-80 sounds in 30 seconds.

Optional—Auditory Discrimination — one minute task. Instructor points to target sound picture and pronounces correctly or incorrectly. Student judges correctness by saying "right" or "wrong." AIM: 25-30 responses per minute.

The AIMS for all these speech and language pinpoints may be too high for kindergarten and first grade students or children with motor, auditory discrimination or processing difficulties. AIMS may be too low for older children. Adjust AIMS accordingly.

David and Susan have been instrumental in developing activities to use Precision Teaching to measure speech and language growth for children. They recently published an article in the Journal of the Iowa State Speech Language and Hearing Association called, "Precision Teaching: An Approach for Measuring Progress." This article appeared in the July 1982 Volume of this Journal. Anyone who is interested in further information on the use of Precision Teaching in the speech and language areas could write to David and Susan at the Mississippi Bend Area Education Agency, 2604 North 4th Street, Clinton, Iowa 52732.

If there are any other practitioners of Precision Teaching who have developed proficiency standards in unusual and diverse areas, I would appreciate hearing from them. This column might be an appropriate avenue for disseminating that kind of information to others in the field. I would also be interested in hearing from those of you who are working on curriculum development for the use of Precision Teaching with higher level skills.

PRESERVICE AND INSERVICE TRAINING

Peggy Albrecht and Marie Eaton

Systematic Instructional Management Strategies (SIMS) Project

The SIMS Developer/Demonstrator Project of the National Diffusion Network provides inservice teacher training to interested school districts throughout the United States.

SIMS began in 1972 as an elementary program for severely learning disabled students; and the following year, the project expanded to a junior high site. Since teachers requested information about the methods and materials used at the Centers, SIMS applied for a Title VI-G grant and became a Child Service Demonstration Center in 1975. From 1975 to 1978, the Demonstration Center staff developed the SIMS Reading and Written Language Curriculum, developed inservice training materials, and provided inservice training to Minneapolis and suburban teachers. Evaluation data were collected from those teachers who were trained. In 1979 the Project was validated by JDRP, and later became part of the National Diffusion Network. Since that time, SIMS has trained more than 800 teachers and administrators in at least 12 states.

The SIMS Developer/Demonstrator Project provides two-day training workshops and one pre-planning day. The Project also provides technical assistance in the form of six and twelve week chart reviews, telephone conferences, summary letters, and follow-up on-site training, if requested.

The adopter district provides transportation and per diem costs of the trainer, and curriculum materials. The district also agrees to submit charts and test scores for the on-going evaluation of SIMS.

The SIMS workshop trains teachers to:
1. Use a discrepancy model for solving performance problems.
2. Use the SIMS Reading and Written Language Program to increase the rate at which learning disabled students acquire the basic coding skills.

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3. Assess students using the SIMS Concept Assessment.
4. Use direct teaching strategies to maximize learning.
5. Use continuous monitoring systems to provide feedback to teachers, students and parents.
6. Use data decision rules to determine when to make instructional interventions.
7. Interpret evaluation data to determine program effectiveness.

Information concerning training or curriculum materials may be obtained by contacting: Karen Nelson, SIMS Coordinator, or Mary Keithahn, SIMS Trainer.

SIMS Developer/Demonstrator
1501 Aldrich North
Minneapolis, Minnesota 55411
(612-529-4189)

COMPUTERS
Bill Wolking, Steve Graf
and John Eshleman

Fall, the feel of crisp air and time to try new things and start new projects. We'll tell you about two programs this time. Maybe you will feel like trying one or both to help you accomplish some of your PT goals for the Fall. Both programs are new. One is a big commercial package designed to enable an Apple micro to take much of the paperwork out of Precision Teaching. The other is a short program, free and designed to turn a model I, III, or IV TRS-80 into an electronic behavior counter and cumulative recorder. You programmers will be able to revise it to make it work on the Apple II's.

Many of us have seen or used programs that accept frequency data and display and/or print some approximation of the Standard Celeration Chart. Three such programs have been used in the north Florida area for the past several years. There is one for the TRS-80 machines, one for the Apple II machines, and one for the Atari 800. They all seemed great at first and yet none of them have ever "caught on." There must be something wrong. Whatever the case, Ted Hasselring and Carol Hemlett and a small publisher in Portland, Oregon have taken a flyer at a commercial program to take the paperwork out of Precision Teaching. What follows is taken from an advertisement and is not based on first hand use of the program. Our purpose here is to alert JPT readers to the existence of the program and its functions.

AIMSTAR is the name of this program. It is described as user friendly, requiring "no special skills or training to use." One may not take this too literally, since a tutorial disk is included with the package. The purpose of the program seems to be to provide a rather broad base of support functions for data-based teachers and clinicians, including counselors, speech therapists, and itinerant service providers. The ad suggests that AIMSTAR will take the drudgery out of daily data recording and charting. It will also fit celeration lines and do most of the arithmetic computations PT'ers want done. Finally, it is supposed to "greatly aid in decision making." All sounds good. No mention is made of whether the program is used by the learner. It would be a shame to lose that interface.

Unique features of AIMSTAR include:
1. draws charts that simulate the standard six-cycle behavior chart or adjusted charts with fewer cycles (1, 2, or 3);
2. draws behavior charts with time spans of 30, 60, 120 or 270 days;
3. has a Help function which displays an AIM rate, a pointer, and an "exact value data point."
4. provides a "line of progress" which provides the learning trend line for the most recent six days of data;
5. has a "print chart" routine;
6. tracks each program component—such as skill name, program, aim date, aim rate, program objective, antecedent, correct and incorrect pinpoint, and consequences for correct and error movements
7. increases teacher instructional time and decreases the data collection and data management time.

That's an impressive list of functions. It will be interesting to see how they work. The package includes 1 master diskette for Apple II, II+, or He; 1 backup master; 1 tutorial diskette, and 1 Users Manual. The price is $195.00. It is available from ASIEP Education Co.; Dept. A4; 3216 NE 27th Ave; Portland, Oregon 97212.

If you have a model I, III, or 4 TRS-80 computer and a joystick, you may use this program to count up to four separate behaviors simultaneously and to get a print out of the counts by any unit of time you select. This short program makes counting and recording several behaviors at once easy. A joystick is used to input behavior counts. Instructions for users are included as an early segment of the program.

When you start this program you enter a name for the four behaviors to be counted and select a reporting interval. Behavior counts are displayed on the screen as soon as you move the joystick in an up, down, or sidewise direction. At the end of each interval a summary of counts...
for the interval is sent to the printer. If you select a one minute interval, you will have a record of frequencies on a minute by minute basis. If you select a 5 minute interval, the printed summaries will record the total count for each behavior for five minutes.

This program is especially useful for live demonstrations of behavior baselines and interventions. Summaries of behavior counts may be printed out every minute (or any other interval selected) until the baseline appears stable. When the baseline looks stable, put a contingency into effect. The output from this program will show you "on line" whether the contingency is functional.

This program was written by Dr. Henry Tenenbaum, Multidisciplinary Classroom, College of Education, University of Florida, Gainesville, FL 32611. Please contact him for copies.

If this program could be made to work on a Radio Shack Model 100 computer it would make a very portable and convenient package for traveling and consulting PTers. The Model 100 is a new generation of "lap" computer, weighing only 3.9 pounds and about the same volume as a large textbook. It has a very versatile set of programs included and operates on batteries for about 20 hours.

That's all folks! Next time we hope to be able to give you some firsthand user evaluations of AIMSTAR and other goodies.

**TERMINOLOGY**

**Free/Abbreviate, Free/Write, and Free/Say**

Ogden R. Lindsay

At the Second Orlando Winter Precision Teaching Conference, Julie Vargas commented from the floor at one of the sessions that we should stop using the word "think" for learning channels without specific input. I agreed with her as did Steven Graf and also John Eshleman. Others at the conference snickered and mentioned that we were trying to be old-fashioned behaviorists refusing to accept the obvious.

At the Third Orlando Winter Precision Teaching Conference held a year later, the same rooms in the same motel called back our concerns from the prior year. I started searching for more accurate substitutes for the "think" in the channels "think/abbreviate", "think/write", and "think/say".

Although logical to say nothing or write a dash for the input in these channels without specific immediate input, it is awkward and almost impossible to talk that way. "Nothing/abbreviate", "dash/abbreviate", "simply abbreviate" are not only awkward, but downright misleading.

This second time I worked on this problem of handling unspecified channel input, I discovered an excellent solution. I had just finished describing the origins of small animal free-operant conditioning to several conferencegoers, stressing the importance of the lack of controlling antecedent stimuli in the "free" aspect of the free-operant.

Guess what? As I walked off into the room where a year earlier Julie had criticized "think/abbreviate" and "think/write", I said "free/abbreviate" and "free/write" and "free/say"! Those words accurately describe the channel where the behavior is free to perform with no stimulus restrictions before an audience or with a pencil or blank paper.

The word "free" comes from "free-operant conditioning" which was used to describe the important differences between free- and controlled-operant conditioning in the laboratory research of the fifties (Ferster, 1953). The difference between "free/say" and "see/say" is that the "see/say" channel specifies that visual stimuli are controlling the behavior. Of course, "see the lower case letter/say its sound" is the precise way to describe a channel using a detailed object for each channel input and output verb. We should only resort to verbs without objects when we are summarizing across a lot of specific channels using the same sense inputs and motor outputs.

Julie Vargas wanted to do away with "think" as channel input and also as output. She wanted to do away with all "thinking" in our descriptions. I disagree. Thinking frequencies are very useful to compare with a person's writing and saying frequencies when analyzing behavior. We need to keep "think" as a behavior, as an output.

"Think" outputs are impossible for someone else to monitor entirely, but external products can be counted. We would then have channels like:

- Free/think the alphabet names in sequence and repeat.
- Free/think the alphabet sounds in sequence and repeat.
- Free/think count by ones.
- Free/think count by twos.
- Free/think multiply sequentially by 2
Currently, it is impossible for others to count each thought as you think it. It is also impossible for you to count your own high frequency thoughts as you have them. But you can record their product to roughly indicate your thought frequency. For example, in "free/think the alphabet letter names in sequence" you can make a tally mark every time you think the letter "Z". I made 15 tally marks and got to "K" when my minute was up. So my letter thinking frequency was 15 alphabets × 26 letters + 6 up to "K" equalling 396 letters per minute.

In summary, we should not use "think" as a synonym for unspecified channel input. We should use "free" instead. However, we can still use "think" as a channel output, if that is the behavior we are recording. We can count output thinking by its products without seriously interfering with its process.

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Dedicated to Mrs. Irene McGreevy, a very special person, and to the children, who, by sharing their Charts, taught us what we know.