The Data-sharing Newsletter

1977 – 1982

Carl Binder, Editor

Special thanks to Matthew Furzland who scanned, clipped and formatted the text on these pages from the original mimeographed documents.

Binder, C. (1977-1982). *The Data-sharing Newsletter.* Waltham, MA: Behavior Prosthesis Laboratory, Walter E. Fernald State School

A Scribe, The Pharesees, and My Chart Family

The ***Data-sharing Newsletter*** was a wonderful thing. It started as a way to maintain contact with 50 teachers whom I trained during 1976-1977 in a Lesley College/Massachusetts Bureau of Institutional Schools statewide course in Precision Teaching. After spending a summer with Lou Brown at the University of Wisconsin Department of Behavioral Disabilities (where I was unable to interest anyone in charting), I was convinced more than ever that teachers, psychologists, and nearly everyone else needed to know about the standard celeration chart and its profound implications for human leaning and performance.

So I sent out a little notice proposing a data-sharing session for local folks, to be hosted at Dr. Bea Barrett's Behavior Prosthesis Lab Classroom on the ground of the Fernald State School, and a couple of people came. Over the years, at the monthly meetings, which grew out of that first one, we often had only a few people. But we always managed to teach and learn from one another by using the standard celeration chart as a communication tool.

The meeting notice became a report of previous meeting, expanding into a full-fledged newsletter. In the process, I became a "scribe", recording the conversations, ideas, and contributions of other for all to read and share. After sending a few copies to charters in other places (Eric and Elizabeth Haughton were in Canada), I began to receive subscription requests and chart ideas from all over North America. Serving as an information conduit in this way was exciting, largely because it placed me in regular contact with so many people throughout the world of standard celeration charting and Precision Teaching. I learned from everyone and was able to integrate what I learned. The integration of facts and concepts is what I enjoy most, so the ***Data-sharing Newsletter*** was a very enjoyable project for me. It helped shape our research at the Behavior Prosthesis Lab classroom, and our consulting work with schools and agencies all over North America.

One of the most important functions of the ***Data-sharing Newsletter***, from my point of view, was to assert the importance of *standardization* in charting and in measurement, against those who would use "rubber ruler" and stretch-to-fill charts to emphasize (or de-emphasize) the effects of interventions. Another "cause" for the newsletter was adherence to the discipline of *functional behavior analysis* – the use of measurement to define the functions of behavioral and environmental events. I often wrote about the importance and necessity of measuring behavior frequencies, and included quite a few diatribes against the use of percentage correct by those claiming to be behavior analysts (when percent correct, technically speaking, isn't even a true measurement dimension!). In other words, we did a lot of arguing against the "Pharisees" of JABA and others who have gutted Skinner's legacy by abandoning his most important contributions: response rate measurement in conjunction with the method of single-subject functional behavior analysis. Believe me, it often felt very much like we were "crying out in the desert" of bastardized behavior analysis! And it still does. Even today, many have yet to learn the early lessons about behavior frequency and skill development brought to us by Eric Haughton and some of his protégés.

Speaking of Eric, I must dedicate the republication of these newsletters to him. He was a bright light in so many ways – a beautiful, loving, complex, and creative man. Over the years of Data-sharing, Eric provided so many ideas and so much encouragement, so great a model for real

communication and relationship among people, such a great heart, and so many far-reaching ideas, that it is really impossible to define his total contribution. Suffice it to say that without Eric, we might still be pushing behavior frequencies around with stimuli and consequences like the good "behavior modifiers" who came before us. His insights and comprehension of element/compound relationships in the domain of behavior frequency surely comprise one of the most significant contributions in the history of instructional technology. I am sure that we have yet to appreciate all of the "implications" (one of Eric's favorite words).

So what about chart families? Let's list some of the geneology associated with the ***Data-sharing Newsletter***. Certainly, Fred Skinner is our very great Grandfather. He gave us behavior frequency and single-subject functional behavior analysis. Og Lindsley was our chart Father, our Patriarch, the one who gave us the Standard Celeration Chart, the most elegant quantification of learning (celeration) in the history of learning research, and so many of our best terms and ideas. Credit Lindsley with bringing Skinner's method to the analysis of *human* behavior. Bea Barrett was my chart Mother – the person who spent more than ten years teaching me (and so many others), in practice, the real meaning of functional definition and its implications for the analysis of human behavior. Few authors in the field of behavior analysis can approach her genius for expressing the subtle implications of our methodology and its principles. Eric Haughton was an older brother, or perhaps an uncle, in my chart geneology. His ideas, both explicitly cited and implicitly influential, permeated the newsletter and the work of many of our most active data-sharing participants. And, of course, there were the local regulars who attended monthly meetings so often, bringing charts, stories, and good cheer. Cliff Bourie, Richard and Debra McManus, and Richard Asztalos were perhaps the most consistent contributors over the years. Other regulars included Joanne Sassone, Jill Carson, Peggy Sullivan, Yvonne Tylinski, Marge Lerner, Bill Hartman, and Wayne Robb. From afar, many of my Master's students from Fitchburg State College contributed charts shared at our meetings; and Anne Desjardins – one of Eric's protégés – appeared via her charts on numerous occasions. Robert Orgel, on of Ogden's students, was among out most interesting guests from out of town when he presented count per year charts revealing the real nature of the oil crisis. Finally, Jim Pollard, a chart-son whose work has surpassed that of his chart-father in so many ways, revived and continued the Data-sharing tradition in recent years by organizing and chairing numerous sessions himself. These folks are all family in a very special and personal sense. We shared so many moments of insight and discovery over the years, so many charts from which we all learned about the order and the subtleties of human behavior frequencies and celerations. Thank you all so very much. And please, continue to care enough to chart.

Carl Binder
Newton, Mass.
January 2, 1986

P.S. In retrospect, Owen White was also an invisible presence at our Data-sharing sessions. His book – *Exceptional Teaching* – was the foundation of our original Massachesutts Bureau of Institutional Schools training program, and his research on decision-rules was tested and confirmed with many regular attendees of our meetings.

Pre-Data-sharing Newsletter Announcement – May2 1977

Dear Friend:

By now, a number of teachers and other professionals in this area are beginning to use the standardized "language" and procedures of the Standard Behavior Chart and its associated planning and file system. This means that we have arrived at a threshold for the efficient sharing of data and programmatic information among a large number of people. We at the Behavior Prosthesis Laboratory would like to capitalize on this emerging situation by scheduling "Data-sharing Sessions" on a regular basis so that we can foster the sharing and improvement of teaching methodology. If enough interest is shown, we may also begin sending out a monthly "Data-sharing Newsletter" to those who attend the sessions and place themselves on our mailing list.

The first of the Data-sharing Sessions will probably occur in June or July, and will focus on the mechanics of efficient sharing, and on some specific procedures and data as well.

If you or any of your associates are interested in attending our Data-sharing Sessions, we ask you to please fill out the form below and mail it to us by June 1 so that we can notify you in advance of the first and subsequent sessions. If there is a certain time during the week which would be most convenient for you to attend, please specify that so we can plan accordingly. The sessions would be held in our classroom at the Behavior Department of the Fernald School. Please use your preferred (home or work) address.

Name:_____
Address:_____
_____
_____
zip

Phone:_____

❑ Teacher
❑ Student Teacher
❑ Psychologist
❑ Other _____

Thank you very much.

Sincerely,

Carl B. Binder
Behavior Prosthesis Lab
W. E. Fernald School
Box 158
Belmont, MA 02178

DATA-SHARING NEWSLETTER

#1 June, 1977

Dear Friend,

As promised, we are planning to schedule our first Data-sharing Session on June 22, 1977, at 4:30 PM. This time was chosen to allow people to attend on a day when many teachers have the afternoon free for professional (non-teaching) activities.

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Future scheduling is open to discussion, and we may decide to schedule meetings every two weeks, alternating evenings and afternoons, so that as many people can attend at least some of the sessions as possible.

The first session will be devoted to some discussion of the process of data-sharing by means of the Standard Behavior Chart and its associated file system. We will touch on use of the chart for supervisory and administrative purposes, as well as the mechanics of chart-tracing (reproduction) and the construction of overhead projection transparencies at minimal cost and effort. Some data on reading, at least, will also be presented.

We hope, if the Data-sharing Sessions attract sufficient interest, to develop a core group of teacher-trainers who will help other teachers in their assessment "language" of Precision Teaching. We hope, also, by beginning the data-sharing process this summer, to help as many of you as possible to begin the next school year with a thoroughly prepared system of assessment, planning and charting in your own classrooms.

Please feel free to spread the word, and to bring other colleagues, administrators and teachers to our sessions. Data and programmatic information can be shared among as few as two or three people, but we hope to attract as many people as possible to the first and subsequent Data-sharing Sessions. We look forward to seeing you on Wednesday June 22.

Sincerely,

Carl V. Binder
Staff Research Psychologist
Behavior Prosthesis Lab

DATA-SHARING NEWSLETTER

#2 July, 1977

Dear Friend,

I had a party and nobody came! Well, not quite. In fact, at our meeting on June 22, at 4:30 PM, five of us had an opportunity to share some data and some thoughts on reading, counting and number-naming, some fine motor skills, and a sorting task.

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We are excited about the future of our Data-sharing Sessions, and expect them to grow in size. We want to help one another to develop more effective programming and planning methods, to improve the degree to which we are all responsive to the individual needs of students through data analysis on the Standard Behavior Chart, and to develop a core of people who will help to train others in their schools, institutions, collaboratives or clinics. We hope that the Data-sharing Newsletter, starting out as a pretty rough little publication, will grow and improve to meet your needs for communication with one another about programs, available resources, jobs, etc. We need your support if this venture is to get off the ground. We already have five people, and hope for more next time. Please feel free to bring your friends and associates. And if it is your lack of familiarity with the Standard Behavior chart which makes you hesitate, don't worry. We will be certain to spend time to help people learn how to use the chart. And in the process of sharing information by means of the chart, it will become more than an abstract, academic item – it will become a familiar and indispensable tool which, as stated by one of those present at our first session (Paul Churchill), "seems to meet a lot of the needs that I have been experiencing (for data summary and analysis and communication) recently."

So, we hope to see you next time.

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Take care.

Sincerely,
Carl Binder

DATA-SHARING NEWSLETTER

#3 July, 1977

Dear Friend,

Our data-sharing session on Wednesday, July 6, was quite interesting. We discussed a variety of topics, including the convenience of a standard file system based on the Standard Behavior Chart, a simple technique for finding the average trend in a set of data-points on the Chart, and the use of the dynamic aim as a decision-making tool.

Joanne Sassone showed us some data from several of her students working on a sorting task (knives, forks, spoons). The data showed their original acquisition of the identity matching skill in a teacher-controlled trials procedure, and then a few weeks worth of proficiency-building data on the chart which indicated that at last one of her students was accelerating by X1.2 per week, an acceptable rate of growth. She discussed her use of reinforcing consequences delivered on a ratio schedule as the proficiency-building technique.

We also discussed some data from students in the Behavior Department classroom who are practicing a skill that involves counting tiny objects to a given written numeral. Our use of a student-paced procedure, involving numbered receptacles in egg cartons and kidney beans for counting, allows the student to have many more opportunities to practice this skill per day than would a more traditional trails procedure. We discussed the dimensions of 'bounce" on the chart (i.e., day-to-day variability in performance) as a sensitive indicator of behavioral reliability, attending skills and compliance. Some students and some skills appear to exhibit more bounce than others, and attention to this dimension may be a helpful guide to instructional programming and decision-making. We also discussed the possibility of "calibrating" the difficulty of different fine motor / gross motor requirements in terms of charted rate measures. If a student can sort small objects at a given rate (requiring a relatively fine pincer grasp), how well will he be able to sort larger objects? Charted response rates should provide a sensitive measure of task difficulty in this regard, and may be an especially useful way of programming and predicting individual students' performance in such motor tasks as workshop skills.

Finally, Jill Carson began to discuss her work with extremely low-functioning multiply handicapped students. How can we quantify or measure the effects of "sensory stimulation?" This is a very new area in the use of precision measurement techniques, and we expect to spend a good deal of time at future meetings discussing the problems involved and brainstorming about possible solutions. One solution which we seem to have discovered with Jill is the use of the Standard Chat for charting number of seconds out of a total period of ten minutes that a student is able to self-support his or her head. The chart, with minor modifications, seems to provide a sensitive record of progress in what is essentially a muscle-strengthening program for head control.

We hope to see more of you at future sessions. The common language provided by the Standard Chart is helping us to help each other to help our students.

Sincerely, Carl Binder

DATA-SHARING NEWSLETTER

#4 Aug., 1977

Dear Friends,

On Wednesday, July 20, we had a particularly interesting Data-sharing Session, devoting most of the time to a discussion of measurement strategies for gross motor movements and position-holding among a severely low functioning deaf-blind multiply handicapped population. It is a great challenge to attempt to measure and define rudimentary behaviors among students who have usually been consigned to a passive "sensory stimulation" approach. Questions arose as to the objectives involved in the traditional non-contingent stimulation of such persons. What is such stimulation which does not require any active student responding designed to accomplish? How might we measure the effects of such procedures? Can we hope to shape useful movements and discriminations in such students? How do we measure such target responses as food-swallowing, lip closure, head control or gross arm/leg movements? A recent study of normal infant development of behavior in the prone position which used the Standard Behavior Chart brought some light to bear on these questions, especially with respect to response definition. We know less about how to teach the profoundly handicapped than anything else, and our attempts to devise effective measurement strategies and teaching methods will doubtless involve a great deal of discussion and data-sharing in the coming year.

Again, I encourage as many of you as possible to begin attending our data-sharing sessions. Only if teachers talk to other teachers, using the universal "language" of measurement can we hope to build a community of innovative, self-improving educators. We hope that these sessions will provide a start in the right direction. Especially now that the school year is nearly upon us, and many of you need to prepare assessment materials, file systems and other basic classroom systems (or improve on existing ones), these sessions can be put to good use.

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This summer in the Behavior Department, we have been fleshing out the file system, which I have suggested to many of you in "Guide to a Standard File System." Within a few weeks, we should be able to show you a complete system which incorporates plan sheets, data summary sheets, charts and Project Master sheets for more than 65 projects being conducted with our 5 students. With a complete, up-to-date system of this kind, it is quite possible to chart daily and to make decisions about programs quickly and efficiently. Come and take a look. I hope to see you on the 24th.

Carl Binder
Behavior Department
Fernald State School

DATA-SHARING NEWSLETTER

#5 September, 1977

Dear Friend,

We had an extremely interesting and productive Data-sharing Session on Wednesday, August 24. We welcomed some new participants from the AMEGO School in Quincy and looked at some data on a feeding problem and a sight vocabulary program.

Both Elissa Hoover and Kevin Solsten expressed concern about the most effective methods of gathering data on disruptive behaviors of various kinds, debating the relative merits of time-sampling and interval sampling. When data are being gathered all day long, it is obviously nearly impossible keep continuous records of each instance of the target behavior. But on the basis of regularly scheduled (e.g., every 10 minutes) observations it is possible to gather and chart data which will tell us if the problem is changing, with a minimal amount of effort. Elissa and Kevin both promised to try various methods of gathering such data and hopefully will report back to us, sharing what they learn.

Marge Lerner presented some charts on an adult community resident whose constricted throat prevents him form eating normal food and who has learned some very cleaver ways of gaining attention by means of non-compliance. Her charts show marked improvement in the length of time required to consume a standard sized meal as a consequence of a series of procedures which have been applied under her consultation.

Jill Carson shared with us some of her problems in trying to teach a blind low-functioning student to place pegs in a peg-board and we expect to see a chart of her progress at some future session.

We discussed certain aspects of a sight-vocabulary program being developed in the Behavior Department classroom, in particular some methods and data from our attempts to improve students' speed of scanning words on a worksheet.

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"CARE ENOUGH TO CHART!"

Carl Binder
Behavior Department
Fernald School

DATA-SHARING NEWSLETTER

#6 October, 1977

Dear Friend,

The school-year has begun, and more people have begun to express interest in the data-sharing sessions as opportunities to provide information and programmatic suggestions for one another, and to develop a community of self-improving educators. Our mailing list is now close to 40 names, but since a number of those people have never attended any of the Data-sharing Sessions or provided feedback to me in any way, I think its about time for "subscription renewals."

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One of the more exciting things that have developed with respect to the Data-sharing Sessions is that people from a wide variety of programs and professional affiliations, spanning a range of student populations and administrative agencies have attended the meetings. This mixture of people all using the same language of the Standard Behavior Chart in a variety of applications, provides an interesting context for the sharing of many different perspectives and concerns. I think that we all have a great deal to learn from one another.

Carl Binder
Behavior Department
Fernald School

DATA-SHARING NEWSLETTER

#7 November, 1977

Dear Friend,

You may recall that in the last *Data-sharing Newsletter* I asked you to send me your name and address if you still want the receive the newsletter. A fair number of people responded by filling out the form and sending it back. But quite a few others have not responded. So: this is the last call. If you have not yet written to me, please write or give me a call to insure that you will continue to receive notices of our Data-sharing Sessions (This is a sort of "Dead Man's Test." If you don't respond, I'll presume that you're dead.)

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Much of our discussion at the October 26 Data-sharing Session focused on alternative methods for collecting and using data on behavioral chains, especially self-help skills. In many cases, the traditional step-by-step check-list is cumbersome and not really very useful. Data are only worth collecting if they are actually *used* on a daily basis for making programmatic decisions. And the typical independence-level check-list is neither convenient to use (especially for a single teacher) nor easy to chart in any useful manner. Thus, such data are often collected but not really used for decision-making. We discussed some alternatives, including simple elapsed time measures and the possibility of teaching and measuring one step at a time until all steps are under the control of verbal instructions before combining the steps in chain. Elissa Hoover plans to experiment with the latter method and report back to us.

In the same context, we began to discuss programming for and measurement of vocational skills. I expect that part of our next two meetings will concern this general topic, and I invite you all to think about it in the meantime. For example, of what value are simulated workshop tasks? What criteria should be used for mastery of workshop tasks? Should component skills (e.g. counting, sorting, grasping/releasing, etc) be worked on in isolation until proficient before putting them together? What kinds of placements are realistic for our students? What kinds of vocational opportunities are likely to be available a few years from now?

We are beginning to reap the benefits of data-sharing, even in these early stages of the process. Using the common "language" of the Standard Behavior Chart and Plan Sheets, we're finding it increasingly possible to address common problems and to share procedures and results with one another. I for one am learning a great deal at every session. We are developing a small but truly communicative community of educators. Hopefully the size of the data-sharing network will grow in the coming months and years. (We <u>are</u> keeping data!)

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REMEMBER: "CARE ENOUGH TO CHART!"

Carl Binder
Behavior Prosthesis Laboratory
W. E. Fernald State School

DATA-SHARING NEWSLETTER

#8 December, 1977

Dear Friend,

As you can see, we've gotten a bit fancier in our production of the newsletter. Xeroxed labels and a Gestetner stencil-maker (compliments of the Media Resource Center) made it easier to publish a more readable rag.

The idea of scheduling one Data-sharing session in the evening each month seems to be a good one. At our meeting on Tuesday, November 22, there were twice as many people in attendance as the median number of those who have attended previous meetings. We spent a good deal of the time discussing a somewhat unusual case brought up by Mindy Wilensky and Peter O'Connor of the Eliot Clinic in Concord. Charting their data on a weekly Standard Chart allowed us to see the effects of their attempts to decelerate the problem behavior in question more clearly than if those same data had been charted on daily chart. This is yet another instance of sensitizing our measurement procedures to reveal the clearest possible picture of behavior change.

At our previous two sessions we have spent time discussing the best way of charting chained skills. We have devised an adaptation of the chart which should allow teachers to make useful pictures on the Standard Chart of their attempts to fade out physical guidance, pointing and verbal cues when teaching sequences of "steps," while maintaining a record of the time dimension. This new methodology promises to solve quite a few of our long-standing problems with respect to charting this kind of skill.

Speaking of the time dimension, I simply do not understand why so many people do not take it into account when measuring behavior. Durations and rates, so easily recorded on the Standard Behavior Chart, are ignored by more traditional graphs of percentage and number of behaviors. It seems intuitively obvious that the time dimension is an absolutely essential aspect of behavior, and that failure to keep records of it sacrifices a great deal of measurement sensitivity. "How long did it take the student to perform this skill?" Why are so few professionals interested in this question?

I am excited about the fact that I have been asked to do a series of workshops on the Standard Behavior Chart at the Boston College Campus School. This means that we may have one more whole administrative unit (such as the AMEGO School in Quincy and the Behavioral Development Center in Providence) where the Standard Behavior chart is used throughout, with strong support from the administration. It is in the context of such an integrated unit where the standard "language" of the chart can be most powerful. When an entire system adopts the chart for its record-keeping and decision-making functions, Project Master Sheets can be used at the administrative level to keep track of programmed activities throughout the system, administrators can use the chart to make decisions with respect to over-all system progress (e.g., charting number of projects begun and continued per week, or amount of celeration per week throughout the system), and in-house data-sharing sessions can be scheduled so that staff meetings become strongly data-based. We hope to see more and more of this in the future insofar as it will benefit all of us in the area who want to share information more efficiently.

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Have a very peaceful Holiday Season! Carl Binder, Behavior Prothesis Lab

DATA-SHARING NEWSLETTER

#9 January, 1978

Dear Friends,

As the newsletter and Data-sharing Sessions go into their ninth month, I am both pleased with the opportunities for communication which they have created, and a bit disappointed in the rather "gentle" acceleration of interest and growth of participation in the data-sharing process. Although it may be merely the abstract sentimentality of a researcher, I'm convinced now, more than ever, of the need for frequent, personal, data-based communication or sharing among educational and clinical professionals, and of the degree to which a standard and very powerful "language" of measurement and charting can facilitate the process. At each data-sharing session those present have shared important principles or procedures on the basis of charted data, analyzed in a spontaneous problem-oriented discussion. This sort of mutual, data-based consultation breaks through self-created barriers which we often impose upon ourselves by communicating only with our co-workers or close associates. None of us, in our varied locations and professional activities, has all the answers, or even the opportunity or discover them. But each of us can contribute objective, reliable information to the common fund if we will simply measure the effects of our procedures and communicate the information frequently, in person, by means of a commonly understood "language." For those who receive this newsletter but are skeptical about "6-cycle graph paper" or "Precision Teaching" or whatever, I simply ask you to attend one of our sessions and see for yourself that a great deal can be shared in a short time by means of a quantitative, multi-dimensional, universally applicable *picture* of behavior change.

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A poster is attached to this newsletter which can be placed near your calendar, or on a bulletin board in or near your classroom or office. Please don't fail to attend for reasons of memory-loss. The afternoon meeting is intended primarily for teachers and other professionals at, or in the general vicinity of the Fernald School. The evening meeting is scheduled so that all professionals in the area may attend as conveniently as possible.

December & January Meetings

At our last two meetings we discussed a variety of topics and data-projects, at least three of which should be of general interest.

1. Proficiency and session length: on the basis of four data-projects (4 students) which measured the rates at which students counted objects into containers on which the desired quantities (0-15) were marked – a common sort of workshop task – it seems clear that we should work with students or vocational trainees until they can perform quite rapidly and accurately for short periods before increasing the length of the uninterrupted work session. Of the four students, when assessed for daily 3-minute practice periods, two were able to count forty or more objects per minute into cups, whereas two had not developed as high a degree of proficiency. When the practice periods were increased to 15 minutes, the two more proficient students maintained their high average rates whereas the other two fell substantially in their production rates. These data call into question the common workshop-training procedure of demanding long periods of work before the development of high levels of proficiency. We discussed the implication of these data

in some detail, with respect to measurement of daily variability, the establishment of prerequisite rate "aims," and possible remediation procedures.

2. Daily charting, variability and apparent progress: by comparing some vocational data on the Standard Behavior Chart with the same data plotted on a more traditional bar-graph "improvement chart," we observed that without a plot of daily performance variability, incorrect conclusions are likely with respect to the assessment of progress.

3. Administrative pinpoints: we began to compile a list of data pinpoints, or movements, which could be conveniently extracted from an ongoing file-system based on the Standard Behavior Chart and used to assess the effectiveness, cost/benefit and need for short-term staff intervention within and across classrooms, schools and entire administrative systems. Some of the movement-cycles discussed include:

Data-points charted:

per minute	per student
per day	per staff person
per week	per classroom
per month	per school
	per system

Instructional (or clinical) data-projects:
started
continued
terminated

per week	per student
per month	per staff person
	per classroom
	per school
	per system

'celeration (quantified behavioral slopes on Standard Chart)

per week	per student
	per staff person
	per classroom
	per school
	per system

Forthcoming Data

Teachers of low-functioning students have difficulty in discovering effective reinforcers, reinforcing activities, or constructive activities in which their students will engage independent of the teacher. Elissa Hoover, a Fernald teacher, has been experimenting with a task in which 35mm film canisters are filled by the teacher, in various ratios, with edibles or tokens, and students are given a large box of these which they may open (a fine-motor task) and from which they may extract the constant,, independent activity and show great interest in gaining access to the task. We hope that Elissa will share her data and observations with us at one of our next two data-sharing sessions.

Please feel free to contact me with any questions or suggestions you might have. And PLEASE try to attend one of this month's sessions.

Sincerely, Carl Binder, Behavior Department

DATA-SHARING NEWSLETTER

#10 March, 1978

Dear Friend,

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Session Format

Data-sharing Sessions are intentionally rather informal gatherings. The idea is for participants to share whatever data and/or programmatic information they might bring with them. For this reason, topics are not announced in advance. If you have Charts or Plan Sheets which you would like to share, or for which you would like advice, please bring them. We have lots of transparency pens and clear acetate so that you may easily show your Charts and Plan Sheets to the group on our overhead projector. We *always* seem to find more than enough material for discussion and mutual consultation.

February Sessions

The Great Storm eliminated our February 8 meeting. But on the evening of February 21, eight of us met for two hours and discussed three sets of data:

1. Some vocational skills data from the Behavior Dept. classroom, indicating the effect on performance of changing the length of work-periods (record floors), and suggesting performance-rate prerequisites for doing so.
2. A project on hand-biting analyzed both on the Standard Behavior Chart and in a variety of other ways by Cliff Bourie. This project was particularly interesting as an illustration of methods for discovering both the antecedents and the consequences controlling a problem behavior.
3. Charts from the AMEGO school residential program showing the apparently deleterious effects of a drug prescription (Halidol) on a student's problem behavior. Hopefully this month we will be able to see the effects of this same series of prescription changes on the student's skill performance.

Requests for Charting Workshops

A number of people have indicated an interest in learning more about the nitty-gritty mechanics of data-collection and/or use of the Standard Behavior Chart. I would be quite willing to arrange one or more informal introductory sessions, separate from our regular Data-sharing Sessions. If interested people will come to one of our scheduled March meetings, I will be happy to work out a suitable time and place for an informal workshop or series of them. Please let me know.

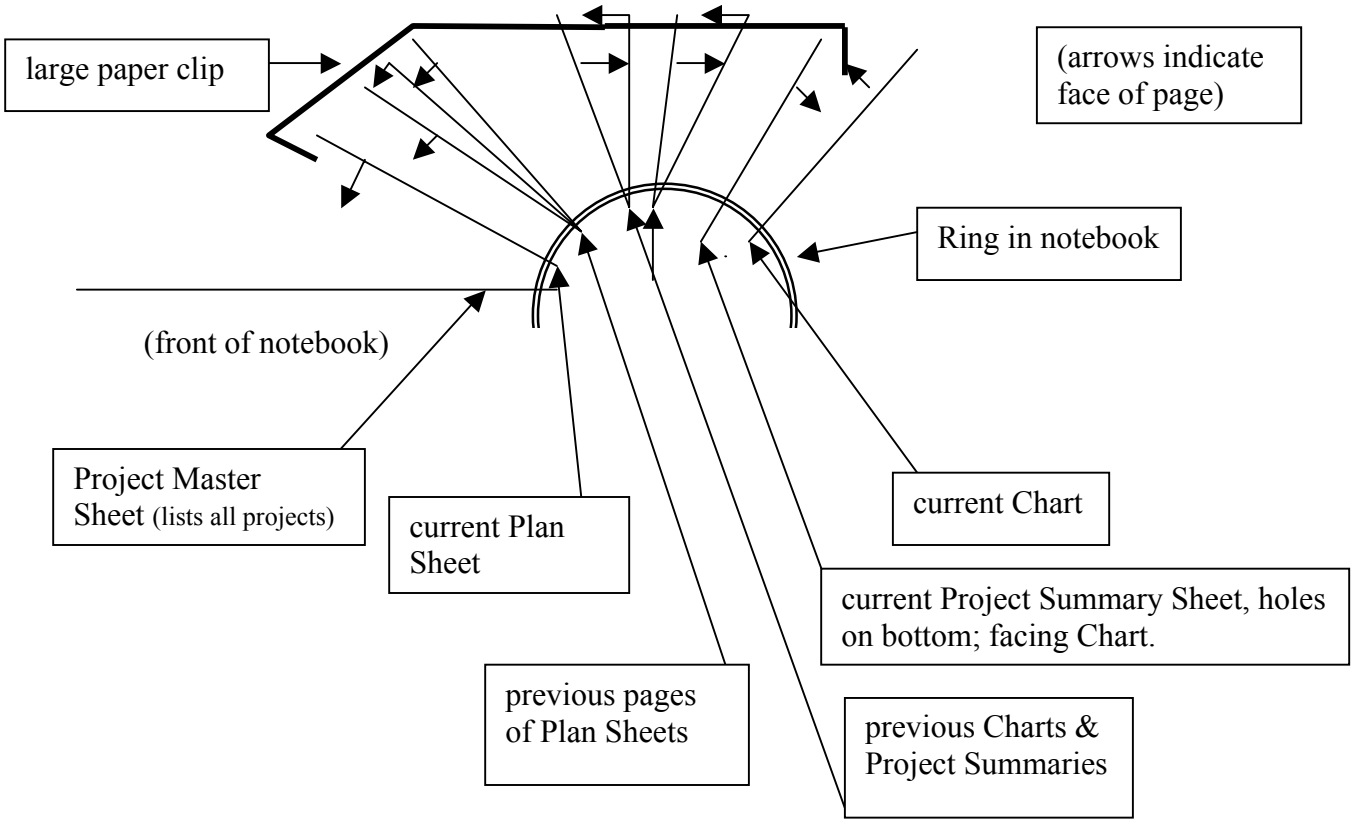
New Charters

The number of teachers and psychologists in the Greater Boston area who are familiar with and/or regularly use the common "language" of the Standard Behavior Chart continues to grow. In January and February, teachers at the Boston College Campus School were introduced to Precision Teaching. Thirteen members of the educational and professional staff from the

Merimac Educational Collaborative and surrounding programs for severely handicapped students are currently receiving in-depth training in the use of the chart and its associated file system. Teachers and their aids from the Skills Development Program, an EdCo program at the Foxboro State Hospital, have recently begun to adopt the Standard Behavior Chart for programmatic planning and assessment and courses offered at both Boston college and Fitchburg State College, utilize the *Exceptional Teaching* package, a teacher-training program based on the Standard Behavior Chart. As these numbers continue to increase, more and more educators and clinicians can expect to communicate with one another more easily, sharing information and effective methodology by means of this common "language for measurement."

A Most Convenient File System

After more than a year of use by a number of teachers in different classrooms, the *Guide to a Standard File System* appears to be working efficiently and conveniently. Moreover, we have determined what appears to be the most convenient way of arranging Charts, Plan Sheets, Project Summary Sheets and Project Master Sheets in three-ring notebooks. The *Project Master Sheet* goes in the front of the notebook, serving as both a summary of projects therein, and convenient index. For ***each project***, the pages are arranged as pictured below:



The *Project Master Sheet* is in front of the notebook. For each data-project filed in the notebook, including all pages of *Plan Sheets*, *Project Summary Sheets*, and charts which have accumulated during the progress of the project, the forms can be most easily arranged as indicated by the diagram. A large paper-clip holds together all pages not in current use, making it easier to page through the notebook, but allowing easy reference to past records for that project by simply removing the clip.

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#11 April, 1978

Dear Friend,

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Session Format

Data-sharing Sessions are intentionally rather informal gatherings. The idea is for participants to share whatever data and/or programmatic information they might bring with them. For this reason, topics are not announced in advance. If you have charts or Plan Sheets which you would like to share, or for which you would like advice, please bring them. We have lots of transparency pens and clear acetate so that you may easily show your Charts and Plan sheets to the group on our overhead projector.

March Session

We had an especially exciting session on Tuesday night, March 21. Richard McManus shared a chart of a vocational skill performance as well as one of self-hits from the student mentioned in last month's newsletter who is suffering from the deleterious after-effects of Halidol. The damaging effects of the drug continue to be obvious on both charts. A number of programming and assessment suggestions were provided from the audience and the information shared with us by Richard on the effects of Halidol should prove extremely important in any of our future encounters with "chemo-therapy."

Among the 15 persons attending the session were Eric and Elizabeth Haughton who were visiting the Boston area, on vacation from their work in Belleville, Ontario. Dr. Haughton was one of the earliest pioneers in applied behavior analysis (e.g., Ayllon and Haughton, 1962), and one of the seminal figures in the development of Precision Teaching methodology. Elizabeth Haughton, too, has been involved in Precision Teaching curriculum development from the very beginning. What they had to say and show at our Data-sharing Session was nothing short of mind-boggling. A two-year old severely cerebral palsied child walking 60 steps per minute in a walker; first graders reading words orally at three times the average adult *silent* reading rate; and truly exceptional development of fine-motor skills by severely handicapped students. Eric contrasted the traditional discontinuous (step-wise) or "landmark" model of skill development with the continuous developmental picture emerging from the measurement of growth in movement frequencies from conception through adulthood. He showed us the educational implications of these contrasting models, and stressed the necessity of developing proficiency (i.e. performance rates) in the most basic movements before pushing students into new curricular content as the key to removing the ceiling-effect so often observed in handicapped students' skill development. He gave us a copy of *A Practical Taxonomy of Normal Body Control and Beginning Skills* which provides frequency aims for the development of normally proficient skills. And both Eric and Elizabeth provided us with an array of suggestions and rules of thumb which should be helpful as we attempt to replicate their successes with our own students. In short, the Haughtons provided a rather clear glimpse of the revolutionary educational effects which are possible as a consequence of response-frequency measurement and proficiency criteria. They showed us what happens when you not only remove measurement ceilings

(imposed by merely assessing accuracy), and teacher-imposed performance ceilings (i.e. trials procedures), but also ceilings imposed by low levels of beginning motor-skill proficiency.

Mr. Tom Hutchinson, executive editor for the College Division of Charles Merrill Company, publisher of *Exceptional Teaching* – a text and media package for training teachers in Precision Teaching – was also among our visitors. Merrill has now completely revised the media package, substituting 12 comprehensive 30-minute films (or videotapes) for the original set. These films are available for use in public broadcasting (they emphasize public law 94-142 and other more general issues as a context for Precision Teaching), and may be purchased by owners of the original package at half price, along with the text. Moreover, many of you will be glad to know that plans are being formulated for supplementary textual and media materials on Precision Teaching with the severely handicapped, and on curriculum sequencing based on movement frequency criteria or aims. In short, it appears that a major publishing company is committed to the development and dissemination of high-quality training materials in Precision Teaching.

Requests for Charting Workshops

A number of people have indicated an interest in learning more about the nitty-gritty mechanics of data-collection and/or use of the Standard Behavior Chart. I would be quite willing to arrange one or more informal introductory sessions, separate from our regular Data-sharing Sessions. If interested people will come to one of our scheduled April meetings, I will be happy to work out a suitable time and place for an informal workshop or series of them. Please let me know.

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Sincerely,
Carl V. Binder

REMEMBER:

"Care enough to chart."

and

"The child knows best."

and

"Never say never!"

P.S. For those of you who might have seen (and coveted?) my stiff green plastic frequency-finder (also slope and percentage-finder plus excellent straight-edge), I am told they are available for $1.30 each form Ms. Vicki Ries, Experimental Education Unit, CDMRC WJ-10, University of Washington, Seattle, WA. 98195. They are well worth the investment.

DATA-SHARING NEWSLETTER

#12 May, 1978

Dear Friend,

This month's Data-sharing Sessions will be on Tuesday, May 23 (birthday of the Buddha) and on Wednesday, May 31 (birthday of Walt Whitman).

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April Session

A number of interesting issues, procedures and charts were discussed at our April meetings. The visit by Eric and Elizabeth Haughton in March provoked a burst of high-rate decision-making and program-change activity among a number of us, and we are just beginning to see some significant effects of those changes on our charts. Teachers in the Behavior Department classroom, at the AMEGO School, and in several EdCo classrooms and elsewhere have been experimenting with procedures for instruction, practice and measurement of some of the beginning skills and body control movements pinpointed by the Haughtons. Several physical therapists have become charters, and are beginning to measure the effects of their therapeutic efforts. This is an especially exciting development, form my point of view. The *Practical Taxonomy of Normal Body Control and Beginning Skills* left by the Haughtons has been copied many times (it is available to anyone for our cost of 5 cents per page X 42 = $2.10), and is guiding many of the changes in our programming.

Losing your Marbles?

Teachers at the AMEGO School are into marbles as good material for grasp/release practice, and they have a good wholesale source. I am told that:

Marble King (**2005 update: www.marbleking.com)**
Berry Pink Industries
P.O. box 195
First Avenue
Paden City, West Virginia 26159

sells 5/8 inch cat's eye or rainbow marbles, in boxes of 2100 for about $10.00. That seems like a good deal to me.

Submit your List of Potential Consequences

At the April 18 meeting we discussed the lack of any "reinforcement survey schedule" for severely and profoundly handicapped students. Such a list of potential consequences – events, substances, activities, etc. – would be useful for teachers, parents and psychologists in a variety of ways. If you will send me a list of all such potential consequences which you have tried and/or thought of, I will compile a single organized list and make copies available to all those who contribute. (A category for consequences arranged for teachers', administrators', bus drivers', and parents' behavior might be useful, too.)

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Why Stress *Movement Frequencies?*

We often find that people don't understand why we stress the development of high movement frequencies (rates). Many would prefer to emphasize content (i.e., new discriminations) rather that proficiency (i.e., high-rate performance). Ultimately, of course, this is an empirical matter – and the data argue strongly for proficiency-building as a prerequisite for advancement to more difficult tasks. But there is one very simple argument that flows directly out of the definitions of stimulus discrimination and response differentiation: By definition, discrimination requires differential responding. That is, in order to indicate or acquire any discrimination an individual must be able to emit a well-defined response. It follows that the acquisition and/or performance of any discriminative behavior will go smoothly only if the relevant response or movement can be performed smoothly. We see this effect repeatedly in situations where students' lack of proficiency at reach/grasp/place/release movements retard their acquisition of academic, vocational and self-care skills.

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Sincerely,
Carl V. Binder
Behavior Prosthesis Laboratory

P.S. At the Midwestern Association for Behavior Analysis (MABA) convention, among other things, there will be a party for Dr. Ogden Lindsley, inventor of the Standard Behavior Chart, celebrating his 25th year in human operant conditioning. We offer our most sincere thanks and congratulations to Dr. Lindsley for his outstanding contribution to education and to the understanding of human behavior in general.

DATA-SHARING NEWSLETTER

#13 June, 1978

Dear Friend,

This month there will be one Data-sharing Session. The Wednesday afternoon sessions were originally designed to be convenient for teachers, psychologists and others at and near the Fernald School. Very few of those for whom the afternoon sessions were planned have attended or expressed interest. Therefore, it seems appropriate to deal with those few on an individual basis rather than to schedule a specific meeting time for all.

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May Sessions

Much of the discussion at our May sessions focused on diagnostic data analysis, or the comparison of charts representing different *behavers* and/or different *movement cycles*. When enough data have been accumulated on a variety of tasks with a number of students (or when such data are collected during a planned period of assessment – usually ten consecutive class days), it is often possible to isolate component skill deficits, to specify functional relationships within individuals' behavioral repertoires, and to carry our a variety of other such comparative analyses. Such diagnostic analyses are possible because of certain characteristics of the Standard Behavior Chart: a standard measure of growth (slope or '*celeration*), a standard measure of variability or *bounce*, calendar synchronization, and *the universal metric of response frequency*. We can compare absolute frequencies, accuracy pairs, and rates of growth independent of one another across students, tasks, or procedures. It is possible to compare different populations on these dimensions (cf. B. H. Barrett, Communication and the Measured Message of Normal Behavior, York, R. & Edgar, E. (Eds.), *Teaching the severely handicapped (Vol. 4),* in press, -- available from Dr. Barrett), and in so doing, to assess how far we must take our students in order to achieve behavioral normalization. We are only in the beginning stages of developing this diagnostic methodology with severely retarded students. But it is already clear that such comparative analyses will greatly increase the power of our instructional technology.

Specifically, we looked at five sets of data: First, we reviewed the data presented in Bea Barrett's paper cited above, nothing differences in skill performance between normal adult, normal pre-school and retarded populations with respect to component/composite skill relations.

Secondly, we looked at two sets of cumulative records from the laboratory which illustrated two functionally different kinds of "rockers:" one person who rocked at the high rate only when performing a reinforced plunger-pulling task at a high rate, and a second person who rocked only while *not* pulling the plunger. Thus, for one student a programmed alternative could be expected to decelerate the stereotyped behavior, and for another the opposite might be true.

Third, we shared chars of three different, but related, fine motor tasks from two different students from Joanne Sassone's classroom. Each student could place poker chips in a can at about 20 per minute, and could place chips in a *slotted* can at about 10 per minute. But while one of them put pegs in a board at about 10 per minute, the other was only able to perform this task at five per minute. These data ask us a question: Why the discrepancy? What component skill

deficits account for the difference? Only closer observation and measurement of a further cluster of related tasks are likely to answer the question.

Finally, in the series of diagnostics, were eight sets of data provided by Wendy Hood-Bettencourt. She assessed four regular adults and four handicapped adults on a series of four fine motor tasks for ten consecutive weekdays. The tasks were: *put one rubber washer in each plastic bag*, *put objects into container*, *put 1/2-inch pegs in board*, *repeatedly grasp/release a pencil*. The data suggest a number of points of analysis, but by far the most apparent are the differences between the two groups in both intra-individual and inter-individual variability. With one exception, the regular adults were faster on all the tasks than the retarded adults. Moreover, the regular adults' performances of the four tasks all fell within very narrow ranges (X2.0) of one another and showed virtually no day-to-day bounce. On the other hand, the combined between– and within–individual variabilities of the handicapped adults on the four tasks were from X3.0 to X20.0. These data illustrate the often forgotten fact that, *with respect to skill performances, the normal population is far more homogeneous and consistent than is the developmentally retarded population*.

Effects of Halidol Termination

Richard McManus brought us up to date on the effects of terminating a drug regimen (Halidol) on self-abusive and other interfering behaviors in a student at the AMEGO School. After a series of program changes, a brief time-out procedure has been tried with the effect of a /2.0 deceleration from about 0.2 per minute self-hits over about a six week period. It's not clear how much of this effect is due simply to a reduction in the drug after-effect. But we are pleased to see the improving trend. We're eager to see simultaneous charts of skill performance.

Monthly and Yearly Charts

Those involved in administration, business management, financial planning and other similar enterprises should be aware of Monthly and Yearly Standard Behavior Charts. On these charts it is possible to make projections by means of 'celeration lines, to chart many different human activities and to represent financial information (i.e., dollars) and the sources or allocations to which the dollars are related on the same chart. This latter characteristic allows for easy cost/benefit assessment, projections of profits or expenditures, and other similar analyses.

Second Call for List of Potential Consequences

At the April 18 meeting we discussed the lack of any "reinforcement survey schedule" for severely and profoundly handicapped students. Such a list of potential reinforcing consequences – events, substances, activities, etc. – would be useful for teachers, parents and psychologists in a variety of ways. If you will send me a list of all such potential consequences which you have tried and/or thought of, I will compile a single organized list and make copies available to all those who contribute. (A category for consequences arranged for teachers', administrators', bus drivers', and parents' behavior might be useful, too). We have received very little response so far. If you will submit whatever list you might already have or can scribble legibly on a piece of paper, my offer to compile a "Reinforcement Survey Schedule" is good until the end of June.

Sincerely, Carl Binder, Behavior Prosthesis Lab

DATA-SHARING NEWSLETTER

#14 August, 1978

Dear Friend,

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Trials Procedures, Teaching Efficiency and the Standard Behavior Chart

Although we strive to use teaching procedures which allow our students to respond *at their own pace* without the constraints of teacher-presented trials, the reality of the matter is that most of our classrooms still contain at least a few trials procedures for teaching severely handicapped students beginning discrimination skills and the like. Moreover, the vast majority of classrooms for the severely handicapped rely *exclusively* on teacher-controlled trials procedures, along with the measurement-imposed ceilings of percent correct charts. A great deal of our efforts during the last few years have been devoted to developing procedures and materials for moving from teacher-controlled (trials) procedures to student-paced (free operant) tasks. To summarize, we must either 1) go "back" to movements which the student can perform independently then progress forward again on that basis, or 2) develop transitional fading procedures for changing from trials to free operant tasks (e.g., from matching to sorting). We have several publications in preparation on this matter, but a great deal of work has yet to be done.

In any case, to whatever degree teacher-paced procedures are used, it is often argued that the time dimension is irrelevant and that simple percentage correct measures of performance are all that is required. *"Why time the session if it includes both teacher-time and student-time?"* Well….in NOT timing such teacher-paced sessions, we are acting as though that teacher-time doesn't exist, or makes no difference. But is that really the case? It seems obvious that if the student has to *wait* for the teacher to set up the next trail, he can do lots of things during that time, including a host of undesirable things. Don't *you* get bored when you have to wait for someone else? This suggests that we should try to minimize the in-between trials time. But how will we know if we don't *time* the session? How will we know how many opportunities per minute our procedures *allow* the student? How will we be able to evaluate the *efficiency* of those procedures? By scheduling fixed-time sessions of trials (if you *must* have trials), you will be able to evaluate the relative efficiencies of your materials and procedures. That is, you'll be able to look at *teachers'* response-frequencies (which impose ceilings on the number of opportunities students have to respond per minute) *as well as* the accuracy of students' performance.

10-Day Diagnostic Assessments

During the summer, teachers in the Behavior Department Classroom have been conducting a series of 10-day assessments in order to evaluate their students' proficiencies on a 10-day assessment in order to evaluate their students' proficiencies on a variety of component and composite movement cycles. For 10 class days in a row, students are presented with a selection of short probes on a variety of tasks which represent critical parts of the curriculum. Ten days of repeated measurement are required to show reliable frequencies (especially with the more "bouncy" or variable students) and to indicate the effects, in any, of daily practice. If tasks

are chosen cleverly, and if they are thoroughly analyzed into their components, it is possible to diagnose deficits and to prescribed individual instructional or proficiency-building plans. We expect to devote much of our next few Data-sharing Sessions to discussion of this form of assessment.

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We're looking forward to another year of increased instructional development and professional communication as more and more in the area adopt the "language" of the Standard Behavior Chart.

Sincerely,
Carl V. Binder
Behavior Prosthesis Laboratory

DATA-SHARING NEWSLETTER

#15 September, 1978

Dear Friend,

The summer is over, and many of you (the lucky 10-month per year ones) will be returning to your classrooms. Once things have settled down a bit, we hope to see more of you – including some new faces – at our Data-sharing Sessions. We are open to scheduling them at any time which is convenient for the majority of people, and would appreciate your filling out and sending us the schedule preference form attached to this newsletter if you would like to attend.

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August

At our August Data-sharing Session we discussed the rationale and a few of the findings from a series of 10-day diagnostic proficiency assessments conducted in the Behavior Department classroom by Cliff Bourie and Richard Binell during the summer. We hope that the manner in which these assessments were prepared, conducted and analyzed will provide a useful model for these of you who want more than the usual "checklist" information about your students' skills and deficits. The model follows the one presented in White and Haring's *Exceptional Teaching* text, with the difference that 10 days rather than 5 days of data were collected. We adapted the *Exceptional Teaching* model for use with a set of 47 fine motor, pre-vocational and beginning academic skills. More on our findings and diagnoses/prescriptions will be presented at the September meeting.

Four Kinds of Ceilings

As those of you who attend Data-sharing Sessions know, we at the Behavior Prosthesis Lab have found it useful to describe the constraints imposed on students' skill development in terms of four kinds of "ceilings." Much of our work during the last two years has been guided by the principles implicit in this analysis. The four kinds of ceilings are:

1. Measurement-defined ceiling: When only a percentage correct scale is used to measure skill performance (or even more constraining, a simple absence/presence scale), – that is, when the time dimension is ignored – it is impossible to distinguish among various levels of skill proficiency. An individual who can, for example, sort objects with 100% accuracy at 10 per minute and one who can do so at 50 per minute cannot be distinguished when viewed on a percentage scale. But this difference in rate is exactly what might distinguish a severely handicapped student from the student's "normal" adult teacher, as far as skill development is concerned. When we fail to measure along the time dimension, we impose a serious constraint on our *expectations* for handicapped students, as well as on the likelihood that we will work to "normalize" their skill-proficiencies. (cf. Barrett, B. H. "Communitization and the measured message of normal behavior," York, R. & Edgar, E. (Eds.), *Teaching the severely handicapped (Vol. 4)*, Special Press, 724 S. Roosevelt Ave., Columbus, Ohio, 43209, in press, for provocative discussion of this matter).

2. Teacher-imposed ceilings: Teacher-imposed ceilings are usually associated with measurement-defined ceilings. If accuracy or absence/presence is the measurement dimension, then inefficient and/or teacher-paced instructional or practice procedures are likely to be

employed. It is virtually impossible to present any sort of teacher-paced trials faster than 10 per minute. Yet normal adults perform such skills as number-naming or object-naming at rates above 100 per minute. Thus, as was discussed in last months' *Newsletter*, it is necessary to fade from teacher-presented trials procedures to procedures in which students can work at their own, unconstrained rates. Moreover, even in such student-paced procedures, cumbersome or inefficient instructional materials often impose unnecessary and "retarding" ceilings on the development of skill. Much of our work during the last few years has been devoted to the development of a curriculum for the severely handicapped which does not impose such constraints.

3. Deficit-imposed ceilings: Once we allow students to work at their own rates, we repeatedly observe that after an initial jump in proficiency, they often become "flat-liners," and fail to accelerate to within normal frequency ranges for many skills. In spite of all kinds of attempts at proficiency-building by means of antecedent and consequence changes, they seem unable to break through these apparent performance ceilings. As Eric Haughton has been emphasizing for so many years, this may often be due to low-frequencies in important component movement cycles. For example, students' sorting rates are constrained by their container-filling rates which in turn fail to grow because of inadequate grasp/release proficiencies. Simple hand-strengthening exercises may be prerequisite to successful proficiency building for any of these skills. Similar analyses apply to nearly any other categories or levels of skill development, from gross body-control movements all the way to English Composition, solving differential equations, gourmet cooking, carpentry or watch-making. Our 10-day assessment methodology is designed to diagnose such skill deficits so that they may then be remediated.

4. Student-defined ceilings: There may be deficits which are irremediable. This is obvious when students are handicapped by severe sensory deficit or permanent physical debilitation. Unfortunately, of course, such impairments are often *assumed* to be the source of skill deficit, before persistent attempts have been made to remove each of the first three kinds of ceilings. Analysis of Dr. Bea Barrett's 38,000+ hours of laboratory data continue to re-confirm the conclusion that peak response rate, more than ay other dimension of behavior, is correlated with psychometric classification and severity of handicap. So we may sometimes find, after exhausting every imaginable avenue for remediation, that or students' proficiencies fall far below normal or even functional levels of performance. Then we must: a) clearly identify deficits and delineate the effects of those deficits so that other teachers and future placements will take them into account, and b) attempt to design behavior prosthetics for the students, thus enabling them to "work around" the deficits and accomplish certain critical effects by alternative or unconventional means.

We must emphasize, however, that the order in which the four ceilings have been described is the order in which attempts should be made to remove them, and that the fourth kind of ceiling represents an admission of failure on our part.

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Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#16 October, 1978

Dear Friend,

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September Meeting

At the September meeting we had an unusually large group. Richard McManus and staff members from the AMEGO School shared some skill proficiency data from a student whose behavior management charts had been shared at previous meetings. A number of new faces appeared at the meeting, including some from the AMIC program. Joanne Sassone, who teaches from EdCo, showed us a color-naming chart for one of her students illustrating a positive change in acceleration due to the use of teacher-presented flashcards instead of a worksheet format used previously. This case is a nice example of how student-specific modifications of materials can produce progress in surprising ways. Worksheet performances are usually faster than performances with teacher-presented materials, and they are certainly more independent. But if the student has an irremediable scanning problem or has not yet been successfully led through the transition from single-item naming to scanning/naming objects in arrays, then the opposite may be true. Hopefully, Joanne will report to us at a later session, showing us which of these explanations applies to her student.

Sharing in the Newsletter

This Newsletter, like Data-sharing Sessions, can serve as a means of communication within the community of Precision Teachers, both locally and outside the Boston area. More generally, it can be a means of information transmission among data-based behavior-change agents of all sorts. To that end, we welcome written reports of procedural innovations, both great and small, which might be of interest to others. Brief, to-the-point descriptions of clever materials or interesting findings will be shared in the *Newsletter* whenever they are submitted. For example, we recently heard of one teacher who was able to get an especially resistant child to begin imitating gross motor movements by putting a piece of tape on his nose, providing the model for "touch nose," and then reinforcing when he moved to remove the tape. The tape was faded out and the imitative control remained. Do you have anything you'd like to share? Please send it in.

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We hope to see you for Eric Haughton's appearance. Until then remember that data aren't worth a damn to students if teachers don't use them for day-to-day decision-making.

Sincerely
Carl V. Binder

DATA-SHARING NEWSLETTER

#17 November, 1978

Dear Friend,

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October Meeting

Our October Data-sharing was an overwhelming success with 23 people in attendance, including many new faces. Dr. Eric Haughton, our special guest, gave us a good deal to think about and to incorporate into our programming. Both at the AAESPH (American Association for the Education of the Severely and Profoundly Handicapped, later renamed TASH) conference the week before, and at our Data-sharing session, Eric stressed the necessity of attending simultaneously and with equal concern to ***pace*** and ***quality***. "Quality" refers to the dimensions of accuracy and topography with which we are most familiar and to which most educators attend exclusively. "Pace" refers to the time dimension – measured as response rate or frequency – and, as a term, is intended to discourage a simplistic concern for "raw" speed while focusing on the fact that all behavior occurs in time. As is easily demonstrated by a few simple behavioral observations, "You can take behavior out of time (by failing to attend to pace), but you can't take time out of behavior." Thus, enabling our students to perform at an appropriate pace is of paramount importance if we seek to "normalize" their behavior or to program for retention and endurance.

In the development of pace, we find that many component fine and gross motor skills need to be accelerated before progress can be expected on more complex skills. Basic body-control, movements and the beginning skills – reach, point, touch, grasp, place, release – must be worked on *in isolation*.

One of the most interesting points that Eric made during his 10-day stay with us concerned the importance of working on the "think" channel. For those of you unfamiliar with Precision Teaching "channel" terminology, it is a way of categorizing input to the student and his behavioral output. Oral reading or object-naming, for example, are see/say tasks, while sorting is see/do. Instruction-following is hear/do, and pointing to objects named by the teacher is hear•see/do. "Think" may be either an input or an output, and the term is used where we can't see any other obvious channel. For example, self-paced skills with no teacher-prompts after an initial "please begin" are think/do tasks (later called free/do). Silent reading is see/think. And day-dreaming or imagining is think/think. Eric's point was that if a student is tooling along on his own think/think at several thousand per minute (which is very possible – try think/think alphabet in sequence or random childhood memories), and we're trying to work with him on a task that's only 20 per minute, we don't have much of a chance because of all the distracting covert behavior (think/think) that occurs between each overt response. So we need to find some self-paced overt (think/do) response – almost anything will do – which the student can make at a reasonable rate (600-200 per minute) before we can expect much programming success elsewhere. The "think" channel is thus seen as the behavioral "driver" in this most interesting perspective.

Recently Published

Behavioral Psychology for Teachers by Julie Vargas (Fred Skinner's daughter) is a recent publication of Harper & Row (10 East 53rd St., N.Y., N.Y. 10022) and provides an excellent discussion for teachers of all of the important principles of behavior as applied to education. Moreover, it contains an excellent treatment of graphing, in general, and the Standard Behavior Chart in particular. It's price is $7.95.

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Sincerely,
Carl Binder

DATA-SHARING NEWSLETTER

#18 December, 1978

Dear Friend,

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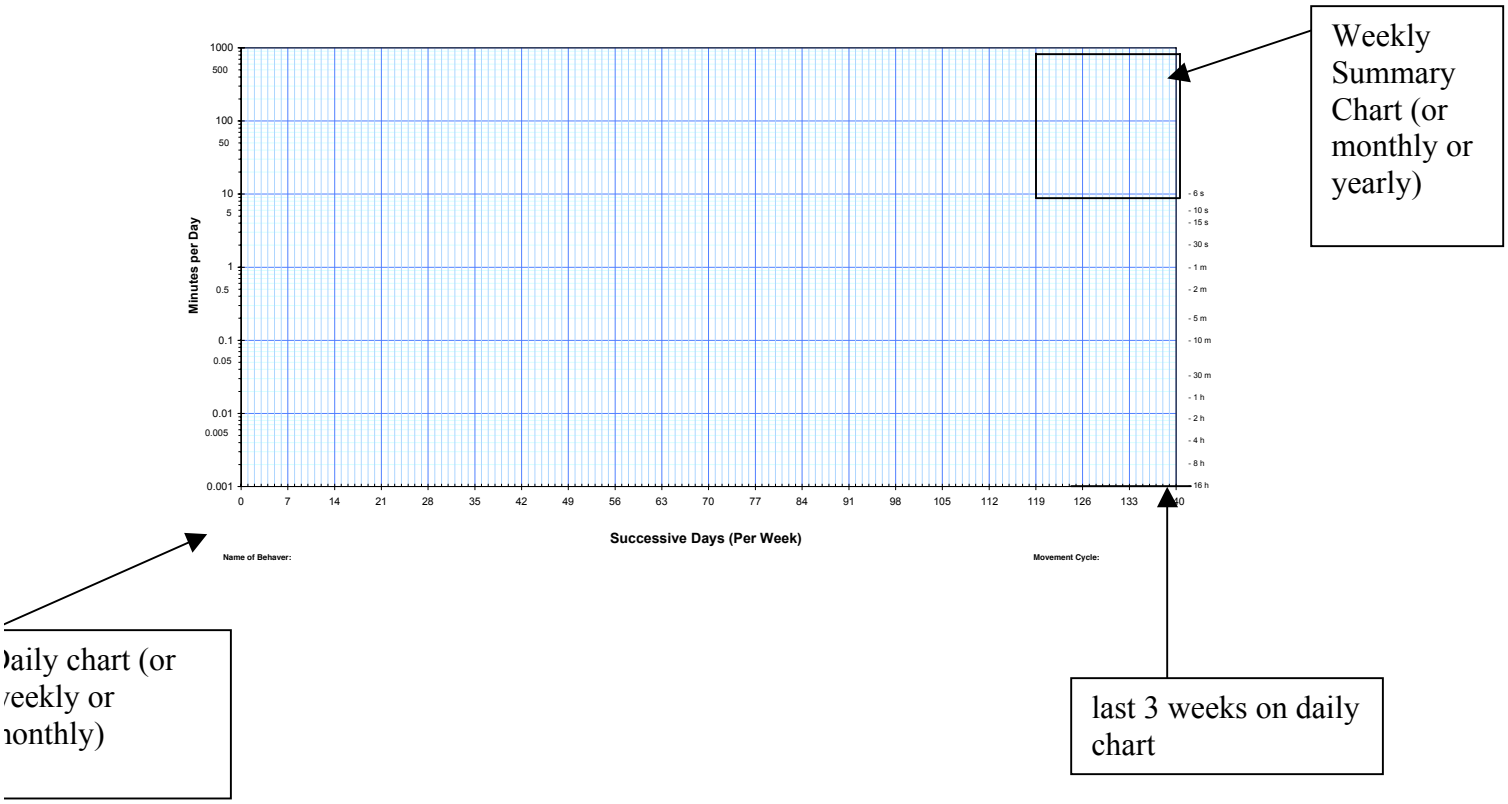
Last Meeting

17 People attended our December 4th Data-sharing Session, including groups from EdCo's Parker School program, the AKIC program and the AMEGO School and Residence. We shared some data from Jim Pollard's classroom (Chelmsford) that illustrate a simple technique for the assessment of consequence effectiveness for severely handicapped students. Jim placed small items or potentially reinforcing substances inside 35mm film canisters (Kodak) and put a bunch of them in a large container. Students were then allowed to open the canisters (a good fine motor task) at their own pace to obtain the contents, for 3 minutes per day. This is an ideal sort of task for assessing the reinforcing effects of items placed in the canisters as long as the students are capable of performing it. (Limitations or ceilings will, of course, be imposed on the performance by a lack of ease or proficiency in certain fine motor components. This is an important fact, but need not prevent one from using the canister-opening task in this way, except in the case of essentially total deficit). This task has the virtue of allowing the student to be totally independent of the teacher, both with respect to prompts and the delivery of consequences. Thus, any acquisition or maintenance of the performance can be attributed to the reinforcing function of the items in the canisters (or the task itself), rather than to some unspecified actions or inadvertent attention of the teacher, much as in the case of a controlled laboratory environment. Jim's students were allowed access to the box of canisters every day, and the contents were changed (e.g., from M&M's to cheese curls) every 5 class days. The differences in rates at which the students would open the canisters represent differences in consequence effectiveness. In the case of one student, for example, it was clear that cheese curls were about 6 times more effective than either M&M's, or Zarex (sweet) liquid. The effect of the cheese curls was remarkably consistent, producing the same median rate during each of the 2 separate weeks in which they were used. We can imagine extending this or similar methods to an assessment of satiation effects (increase duration of task), ratio schedules (put items in only some of the cans, and fill cans with foam rubber so they can't rattle), simple color discrimination (only red ones contain cheese curls), etc. It was really nice to see Jim's data insofar as they illustrate a true test of consequence effectiveness – something we all talk about but seldom actually carry out.

People from the AMEGO School shared data from a student whose violent outbursts are virtually uncontrollable, and we all racked our brains to suggest possible program changes.

Peggy Newman of the AKIC program introduced an extremely interesting and potentially very useful charting technique shown to her by Matt Israel a number of years ago. It is based on the fact that it is often useful to be able to see a weekly summary chart of daily data (or monthly summary of weekly, etc.). In particular, when daily frequencies are relatively low and/or quite bouncy, a weekly picture can often reveal trends or patterns not seen on the daily chart. The points plotted on the weekly chart can be medians (middle values – probably the best choice in most cases) for each week, summed counts for each week (if daily counts are low), or any other

summary value of interest (means, values for a particular day of the week, etc.). They are plotted on a "mini-chart" formed in the top right-hand corner (or bottom, if there's more room there) of the daily chart, as illustrated:



Make a mini-chart rectangle encompassing the top 2 cycles of the last 3 weeks on the daily chart. (Use 3 cycles if your count varies over more than a 2-cycle range). Use 20 of the 21 day-lines in the rectangle to chart weekly summary data from the 20 weeks of the Standard Daily chart. If your project moves on to a 2nd daily chart, make a 6 week x 2 cycles mini-chart to copy the 20-week mini-chart from the first plus 20 weeks of summary from the current daily chart. Very simple, eh?

Data-sharing at EdCo

We're very pleased that the Data-sharing model is being adopted as a format for staff meetings at the EdCo program at Parker School in Lexington. Data-based staff communication and information-sharing on the Standard Chart provides a powerful foundation for the growth of agency effectiveness.

Precision Teaching materials Available

As most of you are aware, Precision Teaching and use of the Standard Behavior was originally developed most extensively with regular and mildly handicapped elementary school students. It has continued to grow in this application, and a number of school districts have

developed first-rate practice materials, curriculum sequences for P.T. application, and even staff training and consultation services. Two places to write for information and materials are:

Precision Teaching Project
801 2nd Ave. North
Great Falls, MT 59402
(ask for info. and materials Directory)

Ms. Rita Menninga
Hastings County Board of Education
156 Ann St.
Belleville, Ontario K8N 1N9
(Ask for all pace-based learning-outcome packages and measurement plans).

NOTE: These resources are no longer available as of 2005, when this is being re-published.

-- Administrative Detail Deleted--

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#19 February, 1979

Dear Friend,

-- Administrative Detail Deleted--

January Meeting

21 attended our January 9 Data-sharing Session, and a number of people shared some data. Richard Asztalos from the AMEGO residential program showed us a chart illustrating a rather creative approach to the State-required "self-preservation" test for community residences. This standardized "test," as many of you may know, consists of a series of somewhat crude line-drawings depicting various situations, some of which contain smoke, flames or other indications of fire. The standard questions to be answered either "yes" or "no" in conjunction with the pictures include such queries as "If you see flames, is there a fire?" and "If you smell a flower, is there a fire?" The test is obviously not a meaningful assessment of self-preservation skills, but the State requires that all residents be able to respond to the questions with 100% accuracy when tested by an inspector. Through a fading series of color-accentuated versions of the pictures, in combination with pace-building of the see/sign "yes" and "no" responses (to 55 per min.), Richard insured that his student would pass the inspector's test.

Joanne Sasson shared a color-naming chart illustrating the performance of a cerebral palsied student in her classroom who is having difficulty accelerating on see/say colors in array. Suggestions included various changes in the size and spacing of the colored squares in array, as well as some more basic see/touch objects in array practice.

Finally, Bill Hartman brought an extremely interesting chart shared with him by Jim Rast of the Sunland Center state school in Gainesville, Florida. Jim's student exhibited a rather high rate of face- and head-slaps (10-20 per minute) which no positive approaches had been successful in decelerating. In order to explore the effectiveness of a mild potentially decelerating consequence (lemon juice squirted into the mouth), and to provide data for an ethics committee, Jim conducted a small test that lasted about 50 minutes. He modified the Daily Behavior Chart by using its day-lines to record rates of behavior in successive one-minute periods for the duration of the period. Thus, a total of 50 lines were used to record head-slap frequencies during 50 successive minutes. For the first 17 minutes, Jim followed each head-slap with a squirt of lemon juice. The rate decelerated to zero slaps per minute. For the next 8 minutes, Gatorade was used instead of lemon juice, and the slaps increased to their original level. For a few minutes more, lemon juice was again used, producing a reversal to zero. Then milk was tried, and the rate again increased. Finally, a last reversal to lemon juice produced a return to zero. This short "experiment" and its accompanying chart provided clear evidence concerning the effectiveness of lemon juice in reducing the self-abusive behavior of a particular student. Such a modification of the chart for recording successive one-minute rates of behavior can be especially useful in attempts to discover functional movements and positive consequences, particularly with extremely low-functioning students.

We should mention in passing that Bill Harman, who brought us these data from Florida, is a recent arrival in the Boston area and a thoroughly-trained expert in Precision Teaching and use of the Standard Behavior Chart. He currently works as a psychologist at the Eunice Kennedy Shriver Center at 200 Trapelo Road in Waltham, and is a faculty member at Northeastern University.

New Charters

Under the leadership of Kent Johnson, director of professional training at the Fernald School, the professional staff of the Behavior Management Unit at Fernald are in the process of being turned on to the Standard Chart, Precision Teaching, and the importance of Prerequisite Operations Training (POT) – or fluency-building in tool movement cycles. Kent's ultimate goal is to provide similar training for professionals in all units at Fernald. We wish him luck!

In addition, we are excited that the staff of the Efficacy Research Institute, aka the "Taunton Mini-school," are adopting Precision Teaching and the Standard Chart as a central methodology at their school for autistic students. We expect that their research (and their students' growth) will be a great deal more efficacious as a result.

New Project Summary Sheet

Cliff Bourie of the Behavior Prosthesis Lab has designed a new 2-sided version of the Project Summary sheet that provides more space for data than did our former version. The column marked AR is to be filled in with an *accuracy ratio*, rate correct divided by rate incorrect (with a zero-count or either, use the value of your record floor). The accuracy ratio is a measure of accuracy (or of "replacement," in the case of appropriate/inappropriate behaviors) that does not incorporate the ceiling imposed by the usual percentage correct measure.

I hope you days and weeks are peaceful and happy. Let Valentine's Day remind us to be loving all year 'round. Take care.

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#20 May, 1979

Dear Friend,

I must apologize for the 3-month suspension of Data-sharing sessions and of the *Newsletter*. Efforts to produce a Ph.D thesis interfered with the data-sharing session process.

-- Administrative Detail Deleted--

Last Meeting

At our February meeting, Cliff Bourie presented a pair of charts from one of his severely handicapped students who is learning to tell time (see/say time), and to think/say days of the week in sequence. In time-telling, Cliff is teaching his students to name times 5 minutes after the hour, 10 minutes after, 15, 20, 25, 30; then 5 before, 10 before, 15, 20, 25, 30. This is different from the usual sequence which teacher half-hours, then quarter-hours, and only then the 5-minute increments. Cliff's plan is working quite well, with errors decelerating to zero in one-minute probes and correct rates accelerating to near the normal adult range (50-70 clock-faces read per minute).

Cliff's second chart (think/say days of the week) illustrated an attempt to increase a student's speaking rate while working on a think/say skill. After a number of plan changes, including metronome pacing and the use of a paced model, the student's pace was still below 50 words per minute in a one-minute probe. At that point, Cliff and Lorraine Galante noticed that the student was taking a short breath between each word. After the teachers modeled taking one exaggerated *deep* breath only after saying "Saturday" at the end of the weekly sequence of days, the student's rate of think/say days of the week accelerated to about 90 words per minute over a 5-weel period, nearly a X2.0 frequency multiple. Inefficient breathing had been imposing a ceiling on speaking fluency.

Mindy Wilenski asked whether fluency-building affects transfer-of-training to subsequently learned skills. She described the mediated transfer paradigms that have recently been investigated by Murray Sidman and his students, and we had a lively discussion about the implications of response rate measurement for mediated transfer.

Bea Barrett showed some of her most recent schematics on the Standard Chart which clarify the dimensions of time-sampling measurement procedures. In time-sampling procedures, the observer looks at the behaver at the end of each fixed interval (e.g., every 10 minutes) for a given number of intervals (e.g., for 12 intervals, or 2 hours) and counts whether or not a given behavior (or "condition") is occurring at the moment of observation. These data are generally presented in terms of the percentage of intervals at which the target behavior or condition was present. This quantification, of course, obscures important temporal dimensions of the procedure. If a given time-sampling procedure is graphed on the Standard Behavior Chart, it appears as a "record window" or band of possible frequencies between a ceiling, the highest possible frequency (e.g., .10 per minute for observations every 10 minutes) and a floor, the lowest possible (e.g., .0083 per minute for a 2-hour period). The measured frequency of behavior is

constrained by the measurement procedure itself to appear between these two limits. The procedure is insensitive to behavior frequencies that occur below the floor or above the ceiling. Analyzing time-sampling procedures in the frequency domain makes it possible to examine more closely the effects of a given choice of observation period and interval size. Such analysis is important if we wish to make an optimal match between the naturally occurring frequencies of target behaviors and the parameters of our observation procedures. Bea refers to this marching process as an instance of *measurement calibration*.

Letter to the Editor

Eric Haughton recently wrote a letter commenting on the use of Project Summary Sheets, tabular forms for recording numerical data before charting:

> The inclusion of a well-designed data recording sheet in issue 19 prompts me to direct a thought to field workers, an observation that has grown out of ten years of field work. In a laboratory setting it is required to record data in several ways. In field settings, however, multiple recordings aren't usually necessary, and since multiple entries take time and increase the likelihood of errors, they can be dispensed with. For several years I asked teacher and students to record by tabulating and charting. Decisions are made, however, from the charts. The tabulated data step is a lab procedure that doesn't seem necessary in the field. Even if you go to the charts to "recover" the measured pace, you'll only be off by about 10%, which is the traditional error level in data anyway! Thus, if you don't need a record of the numbers, the charted record is more than adequate precision, and saves time and paper!

Cliff Bourie, a field-worker who, admittedly, work in a research context, replies:

> Eric, you're absolutely right about the extra time and paper required to enter data on a Project Summary Sheet. However, we've found that this is especially useful in certain situations. For example, when introducing people to the chart and its use in the classroom, the Project Summary Sheet helps new charters in finding their way around the chart, and allows the supervisor to double-check accuracy. (We've found lots of errors, even with experienced charter, in this way). Also, if a relatively long period of time has elapsed since your last data entry (sickness, vacation, etc.), the pairing of the dates and day-numbers on the PSS is convenient.

It seems clear that there are both advantages and disadvantages to recording data prior to carting them. We recommend that beginning charters always use the Project Summary Sheets until they become fluent in charting and calculating rates. Then, depending on personal preferences and other considerations, charter may or may not wish to continue using Project Summary Sheets.

Decision Rule Research in the Boston Area

Norris Haring and Kathleen Liberty of the Experimental Education Unit at the University of Washington have asked me to work with them on a research project designed to produce decision rules for instructional programming with the Standard Behavior Chart. On the basis of several years of classroom application and revision, they have developed a set of decision rules that use patterns of charted data (correct/error rates, and 'celerations) to predict plan changes

most likely to produce the desired results. These rules are exciting because they allow for decisions beyond a simple change/don't change choice. Rather, they may actually lead to a correct choice among the alternatives of changing consequences, arrangements, antecedents, step-size in the curriculum, etc.

Norris and Kathleen have asked me to help them field-test the latest set of rules. I am thus asking all charters in the Boston Area to contact me if they wish to participate in the project. Those who express interest may choose to terminate their involvement once they have read a description of the rules. Or, they may go so far as to try using the rules for a full year, receiving advice and regular follow-up from me and the Experimental Education Unit in return. If any of you are interested, please contact me as soon as possible so that I can forward your name to Seattle and begin the process.

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Future of the Newsletter

In a little less than 2 years, this Newsletter has grown to a circulation of over 200 subscribers in 16 states and Canada. It remains a rather homely publication, usually composed and reproduced in a day's time, and anything but scholarly. It began as little more than a notice for Boston area Data-sharing sessions, although subsequently we have welcomed interest and comments from other parts of the country. As Precision Teaching grows, we hope to see an increasing number of data-based educators communicating with one another. We would welcome a national publication devoted entirely to data presented on the Standard Behavior chart, and would happily contribute to it as long as it did not fall prey to many of the academic formalisms which limit the value of many professional publications. This *Newsletter* may soon begin to publish charts, if precision teachers would like to submit them. In any event, we will do anything within our means to encourage the data-sharing process at a grass-roots level.

To those in the Boston area, we extend an invitation to attend our Data-sharing sessions and to otherwise keep in touch. To those outside our region, we suggest that you begin to hold your own local Data-sharing sessions, and we encourage you to send charts, letters or other comments to us so that we may share them with our readers.

In any case, we can't go wrong if we care enough to chart!

Sincerely,
Carl Binder

DATA-SHARING NEWSLETTER

#21 July, 1979

Dear Friend,

Next Meeting

OUR SPECIAL GUEST [during the next meeting] will be Dr. Bill Hartman, Chief Psychologist at the Eunice Kennedy Shriver Center, and formerly of the Sunland Mental Retardation Center and University of Florida in Gainesville. Bill has agreed to share charts from the Sunland Center showing various ways of using the Standard Behavior Chart for administrative decisions, staff and resource management, cost/benefit analysis, etc. His presentation should be especially interesting and useful for those in administrative or supervisory roles, and will probably provide us all with a broader perspective on potential uses of charting.

June Meeting

Our June 26 meeting was devoted largely to a report by me and cliff Bourie on our 3-day visit with Eric and Elizabeth Haughton and their associates in various Hastings County (Ontario) schools. We showed some slides of Anne Desjardins and Bev Palmer working with their severely multiply handicapped students at the Plainfield Children's Home on body control movements, self-help skills, and the "Big Six" (reach, point, touch, grasp, place, release). We saw Ernie, whose charts Eric has been sharing with us for 2-1/2 years; 3 years ago Ernie was a "crib case." When cliff and I visited him 2 weeks ago, we could hardly keep up with his pace as he literally ran around the room, reaching for and grasping the hand of anyone who would dance with him.

We visited the Tyendinaga School (Shannonville, Ontario) where Olivia Preston showed us three years of monthly and semi-annual screening data on a broad range of basic academic pinpoints in all grades (K-8). For each class on each pinpoint the results for a given screening were represented on a monthly chart as a vertical distribution line drawn between the high and low performances in the class with marks for the median and quarters. We were impressed with the degree to which such charted summaries of screening could help administrators, consultants, and teachers make decisions about instructional effects and over-all learning, as well as about specific groups of students, and individuals within each group.

We spent several hours with Guy Taylor, as teacher and curriculum specialist for Hastings County Schools, who has been applying precision teaching principles to language arts for junior high and high school students. Among Guy's most interesting observation was the fact that the average high school student spends a *total* of about 12 minutes per day writing, including writing his or her name! He stressed the need for increasing writing fluency (think/write) – independent of content or style – as a prerequisite to composition. You can't teach self-editing or grammar until the student is able to write enough words per minute to work with!

We visited Michael Maloney, who has opened the Quinte Learning Center, a storefront tutoring service in a downtown, Belleville, shopping mail. Michael combines Direct Instruction (i.e., DISTAR) and precision teaching, providing 1:1 and group instruction for both children and

adults. We hope to be able to monitor Michael's progress very carefully. It may be that the delivery of instructional expertise through "the private sector" will be able to avoid many or all of the pitfalls of involvement in bureaucratic systems, while having an eventual impact on public education by creating a demand for comparable effectiveness.

Our morning in Elizabeth Haughton's first grade at the Queen Victoria School (Belleville) was one of the most exciting experiences in my own professional career. Hers is an extraordinarily active and "open" classroom where young children have learned to be attentive to their own educational growth. Almost as soon as we entered the classroom, several students accosted us with requests to hear their 1-minute timings in reading. Students were excited when reaching their 200 per minute aims, and diligent in returning to practice skills which had not yet grown to fluency. Unlike typical classrooms, in which most students appear either bored or frustrated, virtually every student in Elizabeth's class was busily involved in practicing skills at his or her won level. They work on tool skills for reading, writing, and arithmetic, as well as on more advanced composite skills such as think/write sentences, stories, or poems, see/write add facts, and see/say new selections from storybooks. And, as those of you who know Elizabeth would expect, this data-based classroom exuded an extraordinary feeling of warmth and mutual helping, cooperation and affection (i.e., there were many organisms emitting high frequencies of cooperative responding, physical and eye contact, and positive verbal statements!).

Our overall impression from the visit to Hastings County was that the precision teaching work which has been going on there during the last few years is among the most important educational endeavors anywhere. Unfortunately, with a change in upper-level administration at the Hastings County Board of Education, there has been a significant loss of support for the committed precision teachers and staff within the system. This situation provides yet another example of how tremendous success at the level of instructional effectiveness does not insure continued support. Many of us who have attempted to transform educational systems with the introduction of precision teaching have encountered similar difficulties at the political level. There are many objections to data-based instruction, not the least of which is thaht it can make some people in the system look bad. There is a need for vigorous discussion, at an international level, of both our successes and our failures in this regard. We must share successful strategies, as well as what we've gained from learning opportunities (i.e., "mistakes").

Another thought with which we left Hastings County is that there is a need for someone to survey and catalog all of the curriculum sequences and materials that have been developed by precision teachers throughout the continent. We should become a more cohesive and communicative group so that there will be less duplication of effort and more mutual support. The Great Falls, Montana, Precision Teaching Project has made a significant contribution in this regard by compiling a "Materials Directory" for curriculum produced in their school district. We need an analogous effort internationally, and perhaps an International Directory of Precision Teachers. In the same vein, Og Lindsley's recent discussions about the possibility of a precision teaching journal should be followed up with prompts, offers to help, and other such cooperative movement cycles.

Two people shared charts at our June meeting, each for the first time at Data-sharing. Debra Morgan showed a chart that illustrated the effect of simple grasp/release practice on opening bottles. When edibles were either enclosed in the bottles, or presented immediately after the student opened a bottle, rates of bottle-opening remained between 0 and 2 per minute. After

several weeks of practicing a simple task in which straws were transferred from one place to another, return to the original task yielded rates of 12-18 per minute. This case represents what might be an effect of "practice on the think channel" insofar as the simpler task seems mainly to have provided an opportunity for the student to learn to perform *any* task independently (think/do) at a reasonable rate.

Yvonne Tylinski showed us a chart of one of her adult clients learning to fill out job applications fluently. Attention to the pace of this and related skills may be particularly important for handicapped clients who are moving from sheltered to community employment.

Session Format

We expect that regular readers of this Newsletter are bored with this section, which always reads the same from month to month. We feel it necessary to include the section so that newcomers will have some ideas what to expect at Data-sharing sessions, but we realize that most of you have probably stopped reading it because it has been the same for so long. Perhaps we should include a dirty joke each month, or in some other way make it new and exciting. On the other hand, perhaps we should leave well enough alone and simply let it serve its function for new readers.

Data-sharing Sessions are intentionally rather informal gatherings. The idea is for participants to share whatever data and/or programmatic information they might bring with them. For this reason, topics are not announced in advance. If you have charts or Plan sheets which you would like to share, or for which you would like advice, please bring them. We have lots of transparency pens and clear acetate so that you may easily show your Charts and Plan sheets to the group on our overhead projector.

Eric Haughton Workshops

Most of you in the Boston area will by now have received flyers for the two curriculum workshops which we have scheduled with Eric Haughton for August 28-31. The two 2-day programs will each be devoted to a separate curriculum area: body control and the "big six;" and primary academic skills. Each 2-day program costs $50. Registration is limited to 20 each, the first 20 who send in payment with their application forms. If anyone is interested, but did not receive a flyer, please call me.

Happy summer!

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#22 August, 1979

Dear Friend,

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July Meeting

At our July Data-sharing Bill Hartman presented charts of his and Laurie Kimura's gathered in an ongoing project at the Sunland Mental Retardation center and the University of Florida in Gainesville. Laurie's charts showed supervisory data from residential cottages with such pinpoints as number of training sessions per week, number of staff working hours, and number of resident training hours per week (the latter can be derived simply by summing record floors). The charts showed effects of various managerial interventions (e.g., staff meetings, policy changes) on amount of program time relative to total staff time and on frequency of training sessions per week. The rationale was to first increase the amount of measured programming, and then to work on improving the quality of that programming as measured by 'celerations on the chart.

Bill's own data took off from that point in an attempt to assess cost-effectiveness in terms of 'celerations and program cost. Working with Hank Pennypacker at the University of Florida, he derived a measure of cost by dividing the total program budget by the number of program days (i.e., sum across residents of number of days on which programming occurred in each of several program categories) to obtain a cost, in dollars, per "program day." Effectiveness was defined in terms of average (i.e., harmonic mean) 'celerations in each program category, and the cost/benefit was computed as cost, on the average, to double (or halve, in the case of deceleration targets) behavior frequency in each category (number of days at the given average celeration required to double or halve multiplied by cost per program day).

As Bill pointed out, there are a number of problems to this approach, including the fact that it lumps all programs into gross categories so that differences in pinpoint priorities and difficulty of programming are obscured. But it appears to be the first attempt at a chart-based cost/benefit analysis, and as such is an extremely important advance towards an empirically based marriage of accounting and accountability in behavior-change systems. It will hopefully lead to refinements and alternative approaches.

We were happy to welcome Matt Israel, Linda Parrott, Bill Dube and another teacher from the Behavior Research Institute, as well as Grace Baron and several of her staff from the Behavior Development Center. We hope that both of these Providence (R.I.) programs will continue to send participants to our Data-based Sessions.

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Gadget Bag

On our visit with Eric Haughton and associates in Ontario, we noticed an extremely useful application of clear mylar sheets. If 8.5 x 11" mylars are inserted in chart notebooks over

charts, it is possible to write on them with temporary *Vis a Vis* felt-tip pens to record notes, to draw celeration lines for decision-making, and to plot the previous week's points when beginning a new chart. When used with charts that accompany teachers to teaching sessions for drooling students, the mylars also keep charts clean and dry.

At the Association for Behavior Analysis convention in June, Og Lindsley showed us an extremely useful new timer/calculator. The Casio Card Time (ST-24) is a super thin pocket calculator with a built-in stopwatch and alarm. It can be used as a conventional stopwatch to time accurately to .10 seconds, and as a timer with an alarm for fixed-time measurement sessions up to 12 hours. It is also possible to set the timer for recycling so that the alarm beeps every cycle. At the faster rates, this function serves as a slow metronome or as an interval timer for time-sampling and interval recording. A teacher can set the timer to recycle at one minute, for example, and leave it to provide a continuous chain of one-minute timings. For light sleepers, the alarm can be used to replace an alarm clock. And by pressing the "+" and "1" buttons on the calculator in quick succession, one can enter counts while simultaneously timing. The ST-24 is available for $29.95 in the Boston area, and purportedly runs for 2,000 continuous hours on its two silver oxide batteries.

"What I did last summer"

I've prepared this newsletter rather quickly, on the last day before a 2-week trip. I expect to visit with precision teaching people in Montana, Seattle, and from a variety of other centers around the country, and will bring back whatever I learn to our September meeting. In the mean time, as we all get geared up for the Fall, let's enjoy the remaining weeks of summer. Remember that it's conventional in North America to begin charts on the Sunday closest to Labor Day. That way we can all keep in synchrony. Doesn't that give you a warm tingly feeling all over?

Sincerely,
Carl Binder

DATA-SHARING NEWSLETTER

#23 October, 1979

Dear Friend,

-- Administrative Detail Deleted--

We encourage you to bring any and all charts that you'd like to share. This month we would like to specially emphasize data that you don't know how to chart, or measurement problems with which you need advice. So bring your problem data, and we'll see what the group can do with them.

On Sharing

One of the original premises of Precision Teaching is a commitment to share. As Og Lindsley is fond of pointing our, the Standard Chart was originally designed to reduce the time required to share information among teachers. We are committed to person-to-person sharing of information and suggestions for improvement. That is obviously the purpose of this Newsletter and of the Data-sharing Sessions. In that light, I have some rather disheartening information to share. During the last several months, I have written and/or called a number of charters in various parts of the country, requesting bits of information or charts that I had seen them present at conferences or other presentations. Among the people whom I contacted were several of the most prominent leaders of our field. Out of 7 such requests I received 1 response. If the information requested was not for general circulation, I might at least have received a hand scribbled explanation. But no such communiqués have been forthcoming. If the excuse is "time," then I ask how long does it take to copy a few charts or to scribble a note? Don't you think sharing deserves a high priority? I think we ought to get off our asses and start putting our charts where our mouths are. And that means you, too, Father Og!

Think/Write and Think/Say Ideas

One of the more effective methods for generating lots of ideas in a short time is to conduct one or more short timings during which behavers think/write or think/say as many relevant ideas as they can. This is especially useful in a group. First, do a timing of think/write, and then do see/say from the list as a leader writes the ideas down on an overhead projector. We credit Eric Haughton on especially useful and frequent use of this method.

NOTE: The terminology THINK/WRITE was later changed to FREE/WRITE (Editor, 2005).

At our last Data-sharing session we did a number of 1-minute timings on a variety of topics. There were 14 people present. Our first timing was on REASONS FOR COMING TO DATA-SHARING. Among the reasons generated were:

- to share data
- exchange information

- get ideas
- give ideas
- free coffee, tea, herbal drinks, edibles
- exchange materials
- share problem-solving
- see nice people
- learn different ways to use chart
- reinforcement for charting
- see different data-collection methods
- find out what Data-sharing is about
- maintain contacts
- gossip
- support from others
- seek jobs
- advertise for jobs
- learn about other programs

Our second timing was SUGGESTIONS FOR IMPROVEMENT OF DATA-SHARING SESSIONS AND NEWSLETTER. Some of the suggestions were:

- have a monthly theme
- have lo-calorie soft drinks
- a few people well-prepared to present
- bring more charts
- more talking; words/person/minute
- more ideas
- formal sub-headings for Newsletter
- other locations for meetings

It seems to us that in most group settings, suggestions for improvement can be useful. And this is a good way of generating them. In fact, Richard McManus described an application of this technique at the AMEGO school, to be described below.

One of the suggestions for improvement was that we have formal sub-headings in the Newsletter. (As we might have guessed, its suggestor was Kent Johnson, an instructional designer). As the editor, I'm not yet certain that the headings will actually be formalized, appearing each month. However, a list of suggested descriptive topics will no doubt be useful in organizing the Newsletter in any case. We did a 1-minute timing on HEADINGS FOR THE NEWSLETTER, and came up with:

- suggested think/write topics
- curriculum ideas
- materials
- new Precision Teaching publications
- materials not to buy
- success/failures
- practice ideas
- information about charter, people, programs

- job openings
- meetings and conferences
- synopses of the above

If you have additional suggestions, please send them this way. And if you have contributions for either the Newsletter or our meetings, please share them. I can't promise to include everything, but I'll do my best. And I'll try to cover all the topics that are relevant to available information.

September Meeting

In response to staff-turnover problems and the need for revised job descriptions, Richard McManus initiated a process at the AMEGO School that seems to have been very positive in its results. One of the most important results is that the staff acquired a greater sense of "ownership" with respect to the program and their own job responsibilities. In a staff meeting, Richard used the think/say timings of staff and student interactions in 8 categories. That is, they listed as many different kinds of interactions as they could think of. The idea was to characterize as fully as possible what kinds of interpersonal behaviors occur at AMEGO. The group then used the think/say approach to list all possible descriptions of jobs that require more than 5 minutes per day. After categorizing these descriptions, the staff broke into small groups to obtain consensus on how to carry out the various jobs, how to allocate responsibility, etc. In this and further discussions, the think/say timing appears to have played a crucial role in producing high frequencies of suggestions. The entire process and its results will probably be of interest, in detail, to other programs, advisors, supervisors, et al. Richard has promised to write it up and share it with all interested parties. His address is:

AMEGO School
10 Merrymount Rd.
Quincy, MA

Another product available from the AMEGO program is a report authored by Kevin Solsten and other staff on a Precision Teaching approach to developing proficient tool-handling and other vocational skills with the "autistic" and other severely handicapped students at the school. Taking off from suggestions by Eric Haughton that we focus on developing normal adult rates of the "Big Six" (reach, point, touch, grasp, place, release) and other beginning skill elements before trying to put them together into chains or compound skills, Kevin and the staff at AMEGO broke down a large set of tool-handling skills into basic elements and gave their students months of practice on them in isolation. The results were often quite dramatic: students who had been unable to learn the compounds where taught in chaining procedures, performed them almost spontaneously after months of practice on the elements. Kevin has written a lengthy report with illustrations, a list of movement cycles, and additional useful information. It should also be requested from the AMEGO address, listed above. I think the busy people at AMEGO deserve a round of applause for their recent innovations and willingness to share!

Kalispell Conference

A portion of our September meeting was devoted to a synopsis by yours truly of a Precision Teaching conference held in Kalispell, Montana, for staff of and consultants to the

Great Falls, Montana, Precision Teaching Project. The Great Falls project, centered in the Sacajawea School, has been in operation for about 10 years. The list of those in attendance thus included many of the most experienced and well-known precision teachers in the world. The 4-day conference included a wide selection of presentation by trainers, supervisors, advisors, and teachers.

Og Lindsley opened the meeting with the challenging statement that we have about 5 years left to show instructional effects placing children 3 or 4 years ahead of those taught in the conventional way. Otherwise, he argued, out charts and methodology may well go the way of so many other educational fads. As he has been saying so often lately, there is no reason why we can't be getting X2.0 and X3.0 celerations as a matter of course, rather than the piddling X1/25's that so many of us have been satisfied to achieve. Og went on to present a format for supervisory charting and decision-making based on learning pictures. The learning picture is simply the picture made on a chart by the average celerations of about 2 weeks of data. There are 1-line, 2-line (e.g., corrects and errors), 3-line (e.g., corrects, errors, skips) or even 4-line learning pictures. They should be inspected about every 2 weeks. Alternative topics or curriculum areas can be inspected each Friday (or whatever day of the week you regularly schedule decision-making). Regular children can learn to sort their own charts into categories of learning pictures, and to give each category a name (e.g., "big mouth", "flat-flat", "snow plow", etc.). Teachers and aides become advisors with students as their own managers. Teacher then chart, on weekly charts, information summarized from all charts in the class. They divide the pictures into categories of improving, maintaining, and worsening. They then chart in each category number of lines, pictures, children, and decisions. (Subsequent inspection of the same pictures will allow charting of correct and incorrect decisions.) These four pinpoints charted on weekly charts can provide advisors and supervisors with a great deal of information for supervisory decision-making. How many lines per picture? How many pictures per child? How many decisions per child? Is this class getting better as a whole? How is the whole program going? Which teachers need help?

Kathleen Liberty and her associates at the University of Washington, as many of you are aware, have been working to develop chart-based decision-rules which suggest most likely successful program changes. They have been working largely with severely handicapped students. Kathleen presented an extremely interesting summary of her work, a full report of which can be obtained by writing:

Dr. Kathleen Liberty
Experimental Education Unit WJ-10
CDMRC
University of Washington
Seattle, Washington 98105

Craig Pace of the Utah State Board of Education presented data suggesting that 10-day celeration data may be unnecessary when using screening procedures to find students in need of special help. Harold Kunzelmann and his associates, among others, have developed the method of using 10 days of charted data on skill performances to screen students in diagnostic evaluations. They have looked at distributions of frequencies and celerations to find students who are having trouble in particular skill areas. A common rule has been to select out students in the bottom 25% of the frequency and/or celeration distributions for special help. (A relevant

publication is an article by Magliocca, Rinaldi, Crew, and Kunzelmann in the April, 1977, issue of *Exceptional Children.*) Those using this screening procedure have generally found that its results correspond very closely to teachers' "clinical" evaluations and the results of standard test batteries, but at very much less time and expense. Craig showed data that suggest that only frequency distributions are necessary for successful screening, and that celeration distributions actually worsen the correspondence with other methods. A general conclusion from this information is that performance, not learning rate, is the practical basis for diagnostic judgment, and that if a student *does* have a learning rate problem, it will eventually show up in the form of low performance. Thus, use performance data for screening, but concentrate on celerations for programmatic decision-making.

Dick Clement, Principal of the Sacajawea School, presented one of the most impressive data sets that I have ever seen. Among his charts were administrative pictures of monthly screening data on a variety of topics over several years' time. They provided an excellent example of how monthly screening can be used by supervisors to make decisions about curriculum, groups of students, teachers who need help, etc. By far the most dramatic of his data were charts on standard achievement scores at the Sacajawea School in distributions of scores for the other (non-Precision Teaching) schools in the Great Falls district. After a number of years of Precision Teaching, students at the Sacajawea School are scoring an average of *20 to 30 percentile points above those in other schools* in reading and math. These results are just a beginning toward meeting the challenge issued by Og at the beginning of the meeting. If we can have this kind of effect with X1.25 celerations, what will happen when we really start cooking! The teachers and staff at the Sacajawea School deserve a really big Happy Face.

Ken Reavis, of Old Dominion University in Norfolk, Virginia, presented data from his Precision Teaching project at the Child Study Center. It was especially exciting for me to see someone else doing Precision Teaching with severely handicapped students. There are not many of us, as far as I know. People at the Sunland Center in Gainesville, Florida; Kathleen and her friends in Seattle; the many charter whom I know in the Boston area. If there are others of you out there, let me know so that we can tell people where you are.

There were many other great presentations in Kalispell, but I'm running out of room. In the future, I'll try to mention other charters in various parts of the country. I'd appreciate your writing me to let me know where you are and what you're doing so that we can let others know.

Harold Kunzelmann in Boston

Harold Kunzelmann in Boston, one of the earliest and most influential of charters, has moved to Boston to establish an East-coast office of International Management Systems. Harold and his associates (especially Karl Koenig) specialize in writing grants, designing screening devices and conducting large-scale computer analyses of the results, consulting with school districts and other agencies, and a variety of other kinds of consultation. We hope to get Harold to one of our Data-sharing Sessions in the Boston area so people can meet him and learn from him. His local phone number is 731-1550. Welcome to Boston, Harold!

ST-24 now called PW-80

The Casio ST-24, a small multi-function timer and calculator, is now called the PW-80. It is an invaluable tool for Precision Teachers, and was reviewed in our last issue. It is available for $29.95 at the Harvard Coop and at Markline (Cambridge or Waltham).

Copies of Lindsley's A.P.A. Talk

Barbara Ray was kind enough to record Og Lindsley's talk at this year's meeting of the American Psychological Association, and to give me a copy. Og gave an excellent introduction to the Chart, and then proceeded to share experiments in psychology, comparing them to current results and to those from Precision Teachers. Because he makes presentations so that both blind and deaf people can understand, the tape is quite good even without the visuals. I have access to a quick cassette copier. If you will send me a *blank* 90-minute cassette, and a stamped self-addressed mailing pouch for return, I will make you a copy. I hope Og doesn't mind. But the talk was so good that it really needs to be shared.

So, I hope to see you at our next meeting. And please keep those cards and letters coming!

Care enough to chart!

Sincerely,
Carl binder
Behavior Prosthesis Lab

DATA-SHARING NEWSLETTER

#24 November, 1979

Dear Friend,

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In the past, we have encouraged people to attend Data-Sharing Sessions, with or without charts. The idea was to increase the number in attendance so that the discussions could be useful and interesting. We still encourage any and all persons to attend, especially those who have never done so before. But now that the meetings generally average between 15 and 25 people, on a regular basis, we would like to accelerate the number of charts shared. At recent meetings, 3 or 4 people have generally brought and shared charts. We'd like to double or triple that figure as quickly as possible. Most of you *do* have charts. And whether they are "good", or "bad", it is certain that we'll all benefit by increased sharing. So please bring one or more charts when you come on December 4. We'd very much like to be faced with the problem of making sharing more efficient in order to accommodate a large number of sharers!

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Last Meeting

At our October 23 meeting, we had a number of interesting discussions and several shared charts. We discussed the use of and rationale for *record floors* and *behavior floors* on the Standard Behavior Chart. Most charters are familiar with the former, and are aware that the record floor is the frequency that corresponds to one movement cycle counted during the observation or assessment period. This floor serves as a record of the session length, as well as indicating where to chart any zero counts (just below the record floor). It is conventional to chart zero counts as question marks just below the record floor, indicating that although we observed none of the specified movement cycles during our assessment period, we don't know what would have happened if we had observed for a longer period of time. The behavior floor is a second floor, sometimes used on the Standard Chart to indicate the total period of time during which the movement cycle *could have occurred* (when the assessment period was only some portion of that total duration). The behavior floor is charted as the frequency corresponding to one response in that period of time, and is useful when charting only samples of all-day social or deceleration targets, etc. for further details on these, and other aspects of charting, see:

Pennypacker, H. S., Koenig, C. H., & Lindsley, O. R. *Handbook of the Standard Behavior Chart*. Precision Media, Box 3222, Kansas City, KS, 66103.

White, O. R., & Haring, N. G. *Exceptional Teaching*. Charles E. Merrill Publishing Co., 1976.

One advantage to the use of the record floor is that it may reveal relationships between session duration (or time of day) and frequency. By systematically altering practice durations, for example, it may be possible to note how fluency a student must perform for a short period of time in order to be able to maintain the frequency for a longer period. This relation would be

apparent in the picture formed by frequencies and record floors on the Chart. Debra McManus once noticed that a student seemed to exhibit a particular movement cycle more frequently on Wednesdays than on other days. Wednesdays were half-days of school, and consequently the record floors on Wednesdays were higher than on other days. She observed that the recorded frequencies were also higher. This pattern on the chart implied that either Wednesdays, or mornings, were in some way different from other days, or afternoons. By charting frequencies for *mornings only* on other days, it would be possible to decide between the two hypotheses.

Cliff Bourie presented several charts showing data from a 10-day assessment for 2 students on a number of the components of walking. Cliff was interested in diagnosing his students' "retarded gait", and approached the problem by analyzing walking into a number of hip, trunk, leg, and arm movements, which he assessed for 30-second periods each day for 10 days. He provided a model, and other prompts as necessary during the assessments, and examined both frequencies and 'celerations (or growth trends) at the end of the 10 days. He discussed the charts and their implications for further practice, instruction, and finder component analysis.

Joanne Sassone presented a chart showing the effects of various interventions on the frequency of toileting accidents of one of her retarded multi-handicapped students. She also showed a chart indicating the durations for which the student was placed on the pot each day before producing some kind of "result." This second chart produced a discussion about the proper way of charting durations on the chart. There are those who argue that because people like to look at charts on which increasing duration is indicated by a line that slopes upward, we should change the *count per minute* up/down lines on the Standard Chart for those projects to minutes. The trouble with this approach is that it is then no longer a *standard* chart, and is not compatible with other charts showing frequencies with record floors. As Og Lindsley has often pointed out, ***a duration is just the frequency of one*** (just as latency is the frequency of the *first* one). It therefore can, and should be charted as a frequency on the Standard Chart – the frequency of 1 in how ever long it took to occur. A record floor is just a special kind of duration, and we should probably stay with the convention of charting durations as though they were record floors. If people can understand record floors, they should certainly be able to understand durations that appear as decelerating line when they increase.

Richard Asztalos shared a chart showing some of his work with a non-verbal "autistic" student at the AMEGO residential program. Richard's student has some receptive language, but had learned only 3 or 4 expressive signs. Following up on Eric Haughton's suggestions that all people should be taught to express a yes/no choice and that students should practice body control movements in isolation until they can be performed within the normal frequency range, Richard set out to teach his student to express yes and no with head-nods and head-shakes, respectively. First he successfully implemented a practice plan for getting the two movements, in isolation, up to the normal range, without requiring any discrimination beyond the ability to practice one or the other of the movements in rapid repetition when asked to do so. Having achieved those aims, Richard began requiring his protégé to make the appropriate gesture in response to various questions. The questions took the form of "Do you want…?" The trouble was that his student nodded "yes" to all of the queries and, indeed, seemed pleased to receive each and every item offered (including pieces of furniture, eggs, and many other rather strange items). Finally Richard and his staff discovered that the student did *not* like thumb tacks to be anywhere near him, or cigarette smoke. Richard began to prompt the student to shake his head whenever thumb-

tacks or cigarette smoke was offered. The chart, which Richard shared, showed this part of the sequence, and the learning picture indicated a steep deceleration over the course of a few weeks. Without any added training, Richard's student spontaneously generalized the yes/no gestures to a variety of other situations and seemed fully capable of expressing his choices under most circumstances. This may be another example of the facilitative effects of working on component movements in isolation until normal frequency standards are achieved, before moving on to an application phase in the sequence.

Richard McManus shared his personal self-management chart showing progress on the tenor saxophone. Richard charted correctly sounding diaphragmatically blown notes and notes which did not sound correct, with nice celerations over the course of the project. His was a great application of self-charting, and we encourage others to share such personal management projects with us in the future.

Suggestions for Improvement

A 1-minute think/write timing at the beginning of last month's meeting produced the following new suggestions for improvement of Data-sharing Sessions, the Newsletter, and the process, in general. As with past suggestions, we will share them in the Newsletter, and try to put some of them into effect.

- a Precision Teaching journal
- sharing R/APS (retention/application performance standards), age norms, normal adult norms for frequency of performing various tasks
- attract more people to meetings
- include specific curriculum topics
- organizational management charts
- "pinpoints for current dilemmas," definitional problems
- devices, apparatus, measurement tricks
- sampling procedures
- self-charting pinpoints
- ideas for effective and persuasive presentation of the Chart and Precision Teaching to new people, i.e., "song and dance routines."
- allow other people to chair meetings
- have new people introduce themselves

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It's Fun When You're Good at It!

There are a number of observations which Precision Teachers have made over the years about high-frequency, fluent performance. They seem to fit together in a rather interesting way.

First, we have always known that a good way to decelerate undesired movement cycles (acts or responses) is to teach an appropriate alternative. People who have tried to apply this principle to decelerating high-frequency acts such as "autistic self-stimulating" behaviors have not always been successful, however. One reason may be that the See-Saw theory is not always

correct, that when one movement cycle increases in frequency the other may not, in fact, decrease. As Og Lindsley recently pointed out, it *is* possible to smear feces on the paper as you write answers to long division problems.

A second set of observations is that very low frequency performances don't seem to improve much with ratio schedules of reinforcement, as the laboratory psychologist would have us believe. This may be because it is difficult to "make contact" with the behavior of handicapped students when delivering consequences. But the observation also seems to hold true for regular school children. We know that one of the reasons that consequences don't seem to accelerate performance rates is that dysfluent elementary or tool skills impose ceilings on the growth of compound skills. It also seems that students have very little endurance when they can only perform skills at relatively low rates – they don't *enjoy* the activities very much. (Neither do *you* enjoy things at which you are very dysfluent.)

Thirdly, we have seen countless examples of students performing moderately fluently with *no* extrinsic consequences. A number of years ago, for example, Ann Starlin pointed out that reading below 20 words per minute is at the "frustration level," while reading above 50 or so per minute is at the "independence" level, requiring little supervision or reward for productive practice. Eric Haughton's rule of thumb is that students will practice independently after they've reached about half a minimum fluency standard. And, we often notice that practice at this level is accompanied by obvious signs of enjoyment and interest.

It has often been hypothesized that high-rate stereotyped behavior (i.e., "self-stimulation") is somehow intrinsically reinforcing. We've also noticed that when we are able to produce *high frequency* alternatives to these behaviors, the stereotypies decrease or even disappear. Eric Haughton has talked about developing the "think" channel, suggesting that we need to develop high frequency think/do movement cycles to compete with such students' think/think or inappropriate think/do movements. It seems clear that not just an alternative response, but a *high frequency* alternative response is what is required in such cases. Perhaps if we think about stereotypies as very proficient movements in the midst of otherwise dysfluent repertoires, we can make sense out of our observations. If it is, indeed, "fun when you're good at it" and "hard when it's hard," then purposeless, but "proficient" movements may be inherently reinforcing. And successful alternative must be practiced to very high degrees of proficiency in order to compete.

The above implications seem to be consistent with an approach to training the handicapped which has become increasingly common among Precision Teachers in recent years. On the one hand, we've been interested in increasing rates of simple fine and gross motor movements as elements of most other skills. But we have repeatedly discovered that reinforcement schedules don't seem to work. Thus, a number of teachers have been using physical guidance in the beginning of training, putting students through the movements *at rates approximating normal ranges of performance*. This is quite different from the usual use of guidance, and it has been a good deal more successful. When students become willing to allow themselves to be put through the guide/do movements at normal pace, then the sequence goes to hear-nudge/do until normal pace is reached, then to hear/do, etc. Among the successful practitioners of this approach are Eric Haughton, Mary Kovacs, Annie Desjardins, Bev Palmer, Cliff Bourie, and Kevin Solsten. Its effectiveness may be related to the fact that "it's fun to do

when you're good at it." There are probably quite a few testable hypotheses associated with these speculations.

Sharing R/APS and Aims

Precision Teacher working with regular students have continually revised their aims upward as students have demonstrated the ability to surpass previously set performance standards. Teachers working with handicapped students are only recently beginning to establish aims for an enormous number of skills. We would be happy to serve as an information exchange, printing lists of pinpoints and fluency standards submitted by readers. Normal adult rates, as well as ranges of performance on skills for various age categories, could also be shared. If you would like to submit you lists of aims, please include: number of people assessed, measurement duration, ages, and clearly pinpointed movement cycles.

New Publications

Tom Hutchinson, executive editor at Charles Merrill Publishing company, has demonstrated and exceptional commitment to data-based education, and to Precision Teaching in particular, over the last few years. He has expressed a willingness to place his professional resources in the publishing business behind Precision Teaching, if it can be made commercially viable. Those of us involved in Precision Teaching can certainly use such a friend, and should probably be as supportive as possible. As most of you know, Charles Merrill published White & Haring's book, *Exceptional Teaching*, one of the only Precision Teaching books that is currently available. Two new publications, products of Tom's efforts, also deserve attention:

Howell, Kenneth W., Kaplan, Joseph S., and O'Connell, Christine Y. *Evaluating Exceptional Children: A Task Analysis Approach*. Charles E. Merrill, 1300 Alum Creek Drive, Columbus, Ohio, 43216. This book has a significant section devoted to using the Standard Behavior Chart in diagnostic/prescriptive teaching.

Exceptional Teacher. Special Press, 724 South Roosevelt Ave. Columbus, Ohio, 43209. This monthly newsletter, published by Tom Hutchinson, is available for $12.50 per year. It appears to be moving slowly toward more and more content that is directly related to Precision Teaching, and contains other useful information as well.

Precision Teaching Nationally

We would like to publicize the existence of schools, special programs, and other agencies that use Precision Teaching and the Standard Behavior Chart. We therefore encourage readers to submit the names of their agencies, addresses and phone numbers, and a *very brief* (a couple of sentences, at most) description of the population and program. We'll print those as we have room to do so. Hopefully, the availability of such information will encourage charters to share information directly with one another.

Precision Teaching Course at Fitchburg State

As a part of a M.Ed. program for teacher of severe special needs students, Fitchburg State College will offer a full 15-week course entitled "Diagnosis and Instructional Programming" during the Winter, 1980, semester. The course is taught by Carl Binder, and is the only thorough, full-term course in Precision Teaching offered in this area. Teachers of mildly handicapped and regular students have taken the course in the past, and benefited fully from its content. It may be taken independent of the Master's program, and is a 6-credit course costing $240. For further details contact either yours truly, or Elaine Francis, Dept. of Special Education, Fitchburg State College, Fitchburg, MA. The course is best suited for working teachers, meeting one night per week and stressing practical assessments with weekly feedback form the instructor.

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So….that's it for this month. We hope to see you on December 4, or to hear from your in the mean time. Remember, charting's easier if you can drop 20-30 points per minute, charting as you teach.

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#25 December, 1979

Dear Friend,

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What is Data-sharing?

We are committed to the sharing of programmatic and personal data, by means of the Standard Celeration Chart (a communication facilitator). More than two years ago, I began to invite people in the Boston area to get together monthly to share charts and related information, to learn from one another and offer suggestions for improvement, and to introduce new people to Precision Teaching and the Standard Celeration Chart. In those days we had a few such meetings at which Bea Barrett and I were the only ones in attendance. Now we average between 15 and 25 people per meeting, and there is a core group who are themselves becoming trainers and communicators to a larger community of data-based behavior-changers. We have grown as a group, supporting one another and helping to maintain a flow of new ideas. It has been an extremely useful experience, and we recommend the data-sharing format to others, either within agencies or as a regional process.

This Newsletter, which began as a one-page notice to people in the Boston area, will this month circulate to nearly 400 people all over North America, and is growing at about x1.10 per month. As informal as it is (generally composed on the typewriter in less than a day), it seems to be becoming something of a large-scale publication.

Our Data-sharing sessions themselves are extremely informal. We gather at about 7:30 PM, and usually begin the organized meeting at about 8:00 PM. Some people bring snacks; we have coffee, tea, herbal drinks, cider, etc. Increasing numbers of people bring charts, sometimes tracing them onto clear mylar at the beginning of the meeting. Each person with something to share does so, usually on an overhead projector. Those in the audience ask questions, make suggestions, applaud, etc. There is a great range of expertise and sophistication, from non-charters and new charters to expert measurement freaks. We share charts on special education applications, regular education topics, behavior management targets, and personal self-management projects. We try to encourage new applications, especially administrative and supervisory ones on weekly and monthly charts. In short, we share a lot of information and new ideas, and we have a lot of fun. The meetings go as long as anyone will stay around, usually until 10:00 or 10:30 PM. Please come, if you can!

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Last Meeting

At our December 4 meeting, 16 people attended, most of whom presented charts. Richard Asztalos served as chairperson and did an extraordinary job of encouraging people to bring charts. Richard shared some pie diagrams that had been constructed at the AMEGO School at the suggestion of Eric Haughton on a recent consulting visit. The diagrams were constructed by staff members who participated in a staff development and planning meeting. They can be used

whenever one is trying to estimate either the real or the ideal proportions of an activity, entity, resource or process that are devoted to a set of components. For example, the AMEGO staff decided that ideally, program decision-making and content should be allocated 54% to the teacher, 24% to the parent, and 22% to the student. Their estimate of the real proportions and AMEGO, however, were 72% for the teacher, 16% for the parent, and 12% for the student. The discrepancy between these two estimates provided a basis for constructive discussion. Other diagrams included: proportions of teacher's time devoted to teaching, learning, and program development; proportions of technical, "human", and conceptual skills required for effective teaching; proportions of time devoted to instruction, practice, and measurement in the classroom; proportions of time in 1:1, independent, and group activities in the classroom. The use of such pie diagrams for stimulating discussion and planning are unlimited.

Bonnie Wheat presented a chart showing the effects of practice on arm-pit scrubbing proficiency. After assessing 12 steps in a showering chain *in isolation*, and finding that her student was unable to perform several of them at a normal adult pace, she began to work on the dysfluent elements in isolation. The rationale is that is each component or step can be performed easily and at a normal pace, it will be relatively easy to link then together in a complete chained performance. This approach has been quite successfully applied at the AMEGO program in a variety of self-help skill and vocational skill training procedures. Bonnie's chart showed rapid acceleration toward the aim of 190 swipes per minute for daily 15-second timings.

Richard McManus shared a chart on which he had plotted normal adult ranges for a series of writing skills. He collected information from four adults in repeated 15-second timings. The skills were writing: 0-9, printed a's, connected cursive a's, printed b's, c's, backward c's, d's, e's, x's, and the persons' own names. Differences in the frequency ranges among these skills define their relative difficulty or complexity, and have obvious implications for curriculum planning. Such charted comparisons of normal ranges of performances are always instructive in a variety of ways. Richard also brought his "blows notes on saxophone" chart for the second month in a row. He emphasized that having learned to play scales and isolated notes at high frequency has allowed him to apply these elementary skills to playing songs, in solo and with accompaniment, with ease.

We encourage more people to bring their own personal management charts to Data-sharing Sessions.

Faith Schlegel shared charts from a 5-day assessment of head and trunk control movements that she conducted with 6 students at the AMEGO residence. We discussed the programming implications of this kind of assessment, and noted individual differences among the students in both learning (growth rates or 'celerations) and performance (response frequency). One suggestion for improvement was that a 7-10 day assessment provides a more reliable basis for drawing 'celeration lines, especially when there is more than a little bounce from day to day.

Tom Campbell shared a chart of one of his students' growth in letter-reading (see/say alphabet). He emphasized the use of this skill for articulation practice, and noted that improvements in performance frequency often reflect an increased ability to make specific speech sounds, or an improved breathing pattern. In the discussion, someone mentioned Eric Haughton's observation that many students in both regular and special classes seem to suffer

from oxygen deficiency, and that brief periods of running in place or deep breathing can often markedly improve performance.

Linda Ward, from Bay Cove Human Services, shared a behavior management chart from her work with a 38-year old client. The acceleration of appropriate behavior and deceleration of inappropriate behavior represented a major breakthrough at her previously "non-behavioral" agency. Being able to show staff and administrators a picture of progress with this particularly disruptive client has enabled her to significantly raise the credibility of a behavioral approach at Bay Cove, and to engage others in the process of functional behavior analysis. The use of a standard graphic format that shows changes in behavior frequency as straight-line trends or celerations will certainly quicken the process. We need to remember that the Standard Celeration Chart was originally designed by Og Lindsley as a communication facilitator. Only later did he discover the tremendous power of its multiply/divide frequency scale.

Mersh Lubell from the AMEGO residence brought a chart form a program designed to improve articulation skills through object-naming. Choosing familiar objects whose names included "problem" consonant sounds and the "SH" sound, she gave her student daily practice in naming objects. (They were pieces of clothing and other items found in the laundry room of the residence). Acceleration toward fluency in this skill with a concomitant deceleration of mispronunciations represents an effective speech program for this student.

Debra McManus, from the Protestant Guild, shared a count per week chart of physically aggressive acts by one of her clients. Debra served as advisor on this project, while five of her staff (Bill, Paula, Pat, Kath, and Mary) were the managers. From a starting-point of about 5 per week in July, the aggressive acts decelerated at about ÷1.35 per month to reach nearly a constant 0 per week in November. The client received time playing basketball or baseball on days when he was able to go without any of the aggressive behavior, and was taught a variety of other appropriate ways of socially interacting with peers and staff. Debra's chart illustrated the advantages of using count per week Standard Celeration Charts for behavior that occurs relatively infrequently. On a daily chart the data would bounce up and down at the bottom of the chart, with many days at a count of zero. By summing across each week, it was possible to see the decelerating trend much more clearly than would otherwise be possible.

Finally, I shared some charts and data that I had recently received in the mail form Connie Clement in Great Falls, Montana. These were the charts shown by Dick Clement, Principal of the Sacajawea School, at the Kalispell conference in August. First we looked at graphs of the amazing rise in achievement test scores at the Sacajawea school since 1974 when Precision Teaching was first adopted. Using other non-PT schools in the district for comparison, the graphs showed that PT has produced a 20-40 percentile point difference in average scores on various parts of the Iowa Test of Basic Skills. Connie also sent copies of monthly screenings for each grade (1-6). These charts of monthly screenings, showing high, low, and median performances on each skill for each class in the school, allow teachers and administrators to make overall decisions about curriculum and supervision, as well as to identify students in need of special help. I should mention that it was Olivia Preston, of the Tyendinaga School in Shannonville, Ontario, who originally turned Dick on to the monthly summary format. For further information, write:

Precision Teaching-Project
3300 Third St. N.E.
Great Falls, Montana 59404

Olivia Preston
Tyendinaga School
Shannonville, Ontario
Canada

Note: As of 2005 when this is being republished, this information is out of date.

Notes from Great Falls

Betty Duvall, a first-grade teacher in Great Falls, Montana, wrote to share the following:

"Dealing with first graders has given me a whole new outlook on oral reading. As a fourth grade teacher I looked at celeration and ending frequencies with the goal being to build high frequencies in preparation for rapid silent reading. As I work with first graders I have begun to feel that the emphasis for oral reading ought to be on the beginning frequency since probably the goal of oral reading is to be able to pick up and with little practice read at a listenable rate of about 120-140 wpm. I probably have somewhere in my possession about a hundred charts that seem to indicate that if you wish a child to pick up and read at, say 120, consistently, you will need to push the ending frequency to 240 wpm or a x2.0."

"Right now my first graders have beginning frequencies of between about 80 and 120 wpm and the x2.0 theory seems to be holding up. It might be interesting to note the first grade speaking frequencies run about 90-140 per minute. I checked the speaking frequencies while the children were 'sharing' (show and tell), which of course is a think/say."

I should mention that I recently checked out Betty's theory with some teachers in Hastings County, Ontario, and they generally agree. The x2.0 figure will vary depending on how close in level of vocabulary the new selection is to the practice material. But in a homogeneously sliced curriculum, it seems about right. In any case, beginning frequency is clearly important, and it develops as a function of ending frequency. What we have in Betty's case is a beautiful example of the Standard Chart and Precision Teaching putting science in the hands of teachers and students. Thank you very much for sharing, Betty!

Ray Beck, Director of the Great Falls Precision Teaching Project wrote to tell me that his staff, in collaboration with Tom Lovitt and Wally Berard, have recently received a grant to investigate "whether the use of a specific set of precision teaching decision rules brings about significant change in academic performance." The basic design will compare the effects of using decision rules, versus charting with no specific decision rules, versus no charting. We'll be looking forward to the results. Our guess is that there will be tremendous variability among teacher and students, and that such research will turn out to be very difficult to control. But it's an important question, and a challenging project. Good Luck!

New Publications

Pat McGreevy recently wrote to poll interest in a Precision Teaching publication, published monthly, and costing between 10 and 20 dollars per year. He'd like to serve as editor, if there is sufficient interest, and would like to receive feedback on the proposal.
Write:

Patrick McGreevy, Ph.d.
Educational Consultant
4330 N.W. 82nd
Kansas City, MO 64151

Betty Duvall has put together a frequency based "program of oral activities for basic tool skill development" which she calls *Can Do*. It includes materials and a management system for practice in all basic elementary academic tool skills, and costs $29.95. for more information, contact:

Can Do Publications
514 Skyline Drive
Great Falls, MT 59404

A new journal for behavioral research with the severely handicapped is attempting to be born. It will be an international journal, and promises to be quite data-based. The editor, Paul Smeets, recently contacted me to say that if a sufficient number of manuscripts are not received pronto, the birth many never occur. These contingencies may allow some of us who have unpublished data from severely handicapped students to publish them, charts and all. The manuscripts must conform to rigorous scientific format, and may include experimental studies, methodological reviews or discussions, or "technical reports on the demonstrated validity, reliability or functional utility of new measurement techniques and instrumentation." Those of you with a scholarly bent may want to inquire:

Dr. Paul M. Smeets
Developmental Psychology
University of Leiden
Hooigracht 15
2300 RA Leiden – The Netherlands

The journal will be called *Behavior Research of Severe Developmental Disabilities*.

Precision Teaching Course

David Freschi and Aileen Stan-Spence, of the Spaulding Youth Center in Tilton, New Hampshire, recently wrote me to announce a "two-weekend intensive course for two graduate credits offered February 1 and 2 and March 28-29. The cost is $160.00. The course, which will be taught by David Freschi, is relevant to teachers, administrators and human service personnel

working with all levels of handicapped individuals. Practical and theoretical are blended to provide the student with the opportunity to develop high level skills of analysis, program development and evaluation. Each student must complete a field project. Contact:

Jean Moreau – Registrar, SYC
P.O. Box 189
Tilton, N.H. 03276

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Adjusted Rates and Behavior Floors

Kathleen Liberty, Owen White and their associates at the University of Washington have for some time been advocating the use of "adjusted rate" measurement procedures with instructional procedures that involve trial-by-trial presentations of single response opportunities. The procedure involves using a stopwatch, starting it immediately after a response opportunity is presented, stopping it immediately after the student has completed the response, and repeating this cycle until the specified amount of assessment time has accumulated on the watch. This method has the effect of eliminating the time required for the teacher to arrange materials, present consequences, etc. We have had a friendly argument about this method going on for several years. I've argued that charting these data as though they were representative of a continuous student-paced performance is misleading, and that charts of adjusted rates might have a number of undesirable consequences. They may lead to the assumption that when a student has reached a given aim, in terms of adjusted rate data, in a trails procedure, this is equivalent to having met the performance standard in a continuous performance. They may allow teachers to ignore the amount of time they spend arranging material, thereby maintaining unnecessary teacher-imposed ceilings on student performance. I've suggested that we need to look very carefully at teacher-imposed ceilings and instructional efficiency (trials per minute), and that continuous timings and charting of trials procedures allow us to do so. Kathleen and Owen have countered with data suggesting that adjusted rate data allow for more reliable decisions about student performance. My response has been that this is certainly the case if instructional inefficiency makes for highly variable inter-trail intervals. But since the major concern is accuracy in trials procedures, we should probably look primarily at the relationships between correct and error frequencies anyway, and frequency-based decision rules may not really be appropriate in most cases. Besides, teachers should probably be starting with movement cycles that students *can* perform continuously in most cases (e.g., guided reach, point, touch, grasp, place, release, etc.), and trials procedures should be avoided as much as possible.

The reality of the situation, however, is that trials procedures probably are necessary in some cases with severely handicapped students. Or at least their teachers think so. And Kathleen and Owen are correct in saying that in some cases variable inter-trial intervals cannot be avoided (e.g., when edible consequences are used). The question is, how can we collect adjusted rate data and at the same time keep track of instructional efficiency or of how long a session was actually required to obtain the given amount of *student* behavior as recorded on the chart? I think that the use of *behavior floor* will satisfy us both.

Recall that in the last issue we described a duration as "the frequency of the whole thing," and explained that a record floor is simply a special kind of duration, (i.e., the duration of the

observation period). In some cases, we explained, a second floor know as the *behavior floor* is used to record the length of the time during which the behavior *could have been counted* or actually occurred. The discrepancy between the record floor and the behavior floor represents the proportion of time during which the behavior actually occurred that it was measured. In most instructional applications, there is no need for the two floors since data are collected continuously (although using the behavior floor is one way to indicate that the measurement was only a probe). In the case of adjusted rate, we could use a behavior floor to indicate the length of session required to obtain the measurement period indicated by the record floor. The space between the two floors would reflect instructional efficiency, and our attempts to alter procedures toward independent and continuous student responding would ultimately lead to the convergence of the two floors. Does this suggestion solve the problem?

I'm writing this just before the Christmas week, and I expect that you're receiving if after New Year's. I hope that your holidays were peaceful, and that the 1980's treat you kindly.

Remember: Sharing multiplies knowledge

Sincerely,
Carl V. Binder

P.S. To Kathleen, and everyone, we wish a jubilant return from Winter Solstice!

DATA-SHARING NEWSLETTER

#26 March, 1980

Dear Friend,

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Last Meeting

I usually try to provide a synopsis of the previous meeting in the space. However, I've lost my notes and I can't recall the details. I do recall that we had quite a lively session, as usual, and that a number of new people attended. Ellie McDonagh presented some behavior management charts, and Richard McManus brought us up to date on his saxophone data projects. I apologize for not mentioning the other contributors – next time I won't lose my notes.

Precision Teaching at Boy's Town

Since the beginning of this school year, the educational program at Boy's Town has been converted to a Precision Teaching approach under the able leadership of Don Black. For several years, Boy's Town has been an active center for the Achievement Place model, imported from the University of Kansas. Now we are seeing an exciting integration of that model with the instructional and assessment power offered by Precision Teaching. We wish Don and his staff good luck in what hopefully will be a happy marriage.

Charting Calisthenics

Cliff Bourie recently began using the Standard Behavior chart to monitor the growth of vigor and endurance in his severely handicapped students as they practice a routine of exercises each morning. For each exercise, (e.g., push-ups) Cliff charts the frequency of movements for the first 1-minute of performance, and also plots (as a second "floor" below the 1 minute record floor) the duration for which the student is able to continue without stopping for more than 5 seconds. I suppose that others might have used the chart in a similar way, but this was the first example that I've encountered. Of course, the duration is actually plotted as the frequency corresponding to 1 movement in the total period of time – the standard way of charting durations (and latencies) on the Standard Chart.

Changing the Standard Chart

There are a number of way in which people make changes in the format of the Standard Behavior Chart. For example, some charters change the label up-the-left to indicate "minutes" rather than "count per minute" on the assumption that it is easier to view increasing durations as trends moving up the chart than as trends moving down the chart, which occur when durations and latencies are charted as frequencies. Others use ratio percentage correct charts rather than plotting accuracy as a pair of frequencies on the count per minute dimension. There are a number of variations involving less than 6 counting cycles stretched over an entire 8_ x 11 page. The perpetrators of these non-standard charts all have reasons for their changes, usually involving assumptions about convenience, ease of training, etc. Certainly, there is nothing sacred about the standard chart, as supplied by Behavior Research Company. Anyone is free to use whatever

graphic he or she chooses. (As far as we know, Og Lindsley doesn't have any connections with the Ultimate Enforcer!) But the *Standard* Behavior Chart was originally designed to serve as a standard communication device, to facilitate the interpretation, sharing, and comparison of information by means of a standard graphic "language." Moreover, it is possible to chart durations, latencies, and accuracy on the Standard Chart in a way that allows easy comparison, without modification. The standard size of the chart makes it possible to immediately discern both frequencies and celerations form a simple visual inspection, without reference to the numbers up the left or across the bottom, with a little practice. And 5-year olds have been taught to monitor and chart their behavior using the Standard Chart. So why make the changes, in the final analysis? Why can't we all simply agree to use a standard format, as did the operant conditioners with their cumulative recorders? The facts are that the chart *is* universally applicable, and very easy to learn about. So let's attend to the data, and stick with the Standard Chart as it is. Otherwise, why bother paying for the stuff? Why not simply make our own graphs on dimestore graph paper?

Journal of Precision Teaching

Pat McGreevy has received enough response to the idea of a formal precision teaching publication to plan for the first issue of the *Journal of Precision Teaching*. The journal will be issued on a quarterly basis, and the subscription fee is $12.00. For further information, subscription, or the submission of manuscripts, write

Journal of Precision Teaching
Patrick McGreevy
4330 N.W. 82nd street
Kansas City, Missouri 64151

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Practice Ideas for Self-Help Skills

Jim Pollard is currently analyzing as many self-help skills as he can think of into basic elements (i.e., reach, point, touch, grasp, place, release, twist, push, pull, wipe). These are all basic component skills that go to make up virtually all manual skills. He is then listing as many suggestions for practicing these elements in *isolation* as he and his associates can think of, and plans to share the results. He would appreciate whatever suggestions for assessing and practicing these elements in isolation that anyone can contribute, and can be reached at:

Jim Pollard
M. E. C.
101 Mill Road
Chelmsford, MA 01824

Precision Teaching at the ABA Convention

The annual convention of the Association for Behavior Analysis will take place at the Hyatt-Regency Hotel in Dearborn, Michigan, on May 23-28. In general, this is one of the most interesting meetings that one can attend, from the point of view of functional analysis and all its applications. It also represents one of the few places at which a fairly large number of precision teachers gather on a regular basis. Og Lindsley, Hank Pennypacker, Owen White, Steve Graf, and lots of others get together for increasingly large conversations and information sharing each year. And there are generally quite a few chart-based presentations. This year there will be at least one poster session devoted to the Standard Chart, and probably a Data-sharing Session with overheads and as many participants as time will allow.

Check Ron Van Houten's Article in JABA

Be sure to check out the latest edition of the *Journal of Applied Behavior Analysis* (vol. 12, Winter, 1979). Ron Van Houten, a charter from way back, has written an article called "Social validation: the evolution of standards of competency for target behaviors." It is one of the first articles published in a professional journal for many years that presents a strong argument for standard measurement on the frequency dimension, and for the establishment of frequency norms, or what Eric Haughton calls Retention/Application Performance Standards (R/APS). Congratulations and thanks to Ron!

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That's about it for this month. None of the usual editorials at the end will appear this month, for lack of time.

Sincerely
Carl V. Binder

DATA-SHARING NEWSLETTER

#27 April, 1980

Dear Friend,

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March Meeting

Last month I shared some charts sent to me by Anne Desjardins, of Hastings County, Ontario. One of the most innovative teachers in North America with the severely handicapped, Anne has begun to collect frequency data from several very young non-handicapped children. She recently sent me several charts, among which was a weekly summary chart of Kendra's (10 mos.) growth in the "Big Six" (reach, point, touch, grasp, place, release) in combination (i.e., picking up and putting an object at a different location). Kendra accelerated from about 8 per minute in early September, to around 65 per minute in mid-November. Right and left hands looked exactly alike with respect to increase in the skill. (The movements were assessed with auditory prompts plus nudge cues, hear-nudge/do.) Anne conducted similar assessments of crawling, walking, and hear/point to 3 objects. She sent 2 other charts showing daily growth of reaching proficiency (right and left hands) in a 2-month-old girl. Frequencies grew from 10/min to nearly 60/min in 3 weeks. Several other summary charts show snapshot (i.e., one measurement) data from a group of 3-4 year-old children in the Big Six, as well as push-pull, shake, squeeze, tap, and twist. There was little if any evidence of hand dominance in these data. What Anne's charts represent is a kind of data which we desperately need and which are easily available to many of us, especially those with young children. We need frequency norms on a number of elementary movement cycles from birth through school age in order to begin to see what development looks like, in detail, on the count per minute dimension. In you would like to contact Anne about her work, write:

Anne Desjardins
Early Childhood Education
Loyalist College
Belleville, Ontario
Canada

Chart Statistics

I shared information concerning the use of 'celeration lines in the assessment of significance of behavior change across different interventions. As many of you may know, Carl Koenig, in his dissertation at the University of Kansas under Og Lindsley (1972), and Owen White, in various working papers at the Universities or Oregon and Washington, have developed and empirically tested the use of quarter-intersect and split-middle trend lines (i.e., 'celeration lines or lines of progress) on the Standard Chart. They showed that lines drawn through 10 or more points of data on the chart predict with a high degree of accuracy the continued growth of frequencies over the next 5 to 10 data-days. For the statisticians in the audience, I shared a technique developed by Owen White and described in Hersen and Barlow's 1976 book on *Single-case Experimental Designs*. In Kazdin's chapter in that book, on statistical analyses for single-case designs, there is a brief description of the Standard Chart, and 'celeration analyses.

Owen's technique involves the use of the 'celeration line as a predictor of continued growth in frequencies. The idea is that if there is no significant change in conditions (or ceiling effects, etc.), then the projected split-middle 'celeration line from 10 to 15 days of data should bisect the points for the next 10 days or so. With this assumption, it is possible to run a simple statistical test to assess the probability that a given intervention-effect could have occurred by chance:

$$\text{Probability} = \frac{N!}{x!\,(N-x)!}\,(.50)^N$$

where Y! = 1x2x3x4……xY, N= the number of dots in the 2nd phase, and x = the number of dots falling on one side or the other of a celeration line projected into the second phase, based on the dots in the first phase. It is predicted that the projected line will divide the dots in the second phase in half, and this simple binomial formula tests the degree to which that is true. For related readings on this matter, see:

Hersen, M., and Barlow, D. *Single-case Experimental Designs*. Pergamon Press, 1976, pp. 303-310.

Pennypacker, H.S., Koenig, C.H., and Lindsley, O.R. *Handbook of the Standard Behavior Chart*. Precision Media, Box 3222, Kansas City, KS, 66103, 1972.

White, O.R., and Haring, N.G. *Exceptional Teaching*. Merrill, 1976 (1st edition), p. 307 ff.

Music PT

Richard McManus brought us up to date on his saxophone data, demonstrating the basic Precision Teaching principles of curriculum slicing and stepping as they apply to learning to play a musical instrument. Richard has become able to play major scales at above 1000 notes per minute, and major 3rds at 600-700 per minute (which he thinks is probably too low). He has thus far been unable to obtain measures of his teacher's playing, but we hope that he'll be able to do so soon (perhaps by tape recorder) so that it will be possible to establish Retention/Application Performance Standards (R/APS). In any case, Richard moved on to practicing major 5ths, which are apparently quite difficult on the sax. Starting out at about 120 per minute, he accelerated to around 300 per minute in a couple of weeks. But at that point, his growth stopped at a plateau for 4 weeks, and Richard decided to slice back. Instead of playing the 5th both up and down the scale, he planned to practice only going up the scale. The change allowed him to accelerate to about 500 notes per minute in less than a week, but then flattened out again. He then sliced back to only practicing 3 major 5th changes, F-C, G-D, and A-E with separate error practice. We'll see what happens next time. Richard's charts illustrate nicely how charting and PT curriculum principles can be applied to data-based music instruction, an area in which I am sure we can do a great deal more.

Richard also introduced a complex topic for discussion, i.e., the analysis of social skills into measurable/teachable skill elements. We spent a good deal of time trying to define strategies for doing such an analysis, and came up with more questions than answers. I encourage any of you who have worked on social skills from a Precision Teaching point of view to send me a letter so that I may share your experiences with others via the *Newsletter*.

Finally, Bill Hartmann told a story which highlighted the problems inherent in teaching students to make eye contact with the teacher as a prerequisite for further instruction. In working with a severely retarded student at Sunland Center in Gainesville, Florida, Bill and his associates made the common assumption that eye-contact should be taught first, in isolation from pointing, touching or other elementary movements that *include* looking at a target as an inherent part of the action. They used the usual technique of holding pieces of food near their own eyes, so that the student would look in the direction of their eyes. After a series of fading steps in which the food was eliminated, the student learned to orient toward the teacher when any instruction was given (although they never could eliminate the rather "retarded" opening of the mouth which occurred simultaneously). This represented the accomplishment of so-called "eye-contact," and is a common objective for teachers of this population. Unfortunately, it was later discovered that the student was actually looking without focusing her eyes on the teacher, but rather focused somewhere around the bridge of her nose (perhaps the ajna chakra?). This discovery, after quite a long period during which it was not noticed, illustrated the difficulty (if not impossibility) of defining "eye-contact" when it is targeted to occur in isolation. Moreover, it is apparent that many handicapped students are fully capable of *seeing* materials and thus making correct choices, etc., without exhibiting anything resembling "eye contact." We *do* need to work on such target-oriented movements as reach, point, and touch. But it is not clear that eye-contact in isolation is a worthwhile objective.

Jim Pollard Strikes Again!!

We have known for some time (largely from the work of Eric Haughton, Anne Desjardins, and Mary Kovacs) that we need to work on the most elementary movements (Big 6 and Body Control movements) with the profoundly retarded, in order to bring them up to normal performance frequencies, if possible. Otherwise, the severe deficits in these elements prevent further skills from attaining any kind of useful frequency levels. Anne Desjardins has made major contributions in developing the use of paced guidance as a first step in attaining this goal. Guide/Do up to R/APS is a powerful technique, when followed by Hear-Touch/Do, Hear/Do, and Think/Do, each practiced up to normal adult levels. There is something about being guided up to the appropriate pace that helps even the profoundly retarded to grow. Changes in frequency over the course of such a procedure reflect lessening in resistance or spasticity, increases in cooperative movement, and perhaps learning how it feels to perform at the appropriate pace. There is also, in many cases, strengthening of muscles and increasing of range-of-motion that occur in the Guide/Do phase. But we (Jim Pollard, I, and others) have recently been puzzled about how to apply this technique to "floppy" students whose limbs seem completely bereft of any muscle tone or voluntary movement. On the very first attempt it is possible to guide such students to normal adult frequencies of performance, but stepping to Hear-Touch/Do produces a step-down to zero. The question is, how to find any capacity for voluntary movement in such students.

Luckily, Jim works with a couple of extraordinarily skilled physical therapists, Sue Imbriglio and Nancy Peatman, who have been turned on to Precision Teaching and frequency measures for some time. Recently, in trying to apply the Guide/Do technique to some "floppy" students, they stumbled on what may turn to be a significant discovery. At the very extremes of a given range of motion (i.e., last few degrees before complete extension, and last few degrees before complete flexion), such students being guided through the motion seem to exhibit a bit of active movement. The source of this movement probably involves stretch receptors in the

muscles, and may be entirely reflexive. But it may also provide a starting-point for the development of performance frequencies (whether or not it is currently merely reflexive). Jim, Nancy, and Sue are planning to measure the frequencies of such movements for several weeks, and also measure the durations during which the movements can be made to occur. Changes in either or both measures should indicate whether the movements can form the basis for development of skill, or whether they are purely reflexive and thus simply habituate when repeatedly elicited.

Clay Starlin on Reading Instruction

The names Clay and Ann Starlin have long been associated, in Precision Teaching circles, with reading instruction. Clay Starlin has recently published what is, in my opinion, the best currently available guide to teaching people how to read. Based on many years of field research, the article presents in clear terms, with current aims or performance standards listed, a Precision Teaching approach to reading. I'm not sure if the *Iowa Perspective* is available on request, but if it is not, you may be able to obtain a copy of the article by writing directly to Clay. The article, entitled "Evaluating and teaching reading to irregular kids," is as appropriate for regular students as for special needs students. In appeared in the December, 1979, issue of *Iowa Perspective*.

State of Iowa
Department of Public Instruction
Special Education Division
Grimes State Office Building
Des Moines, Iowa 50319

Casio ST-24 is Available Again

The Casio ST-24, a wonderful little calculator and multifunction timer/stopwatch with alarm, is again available. At one point it was renamed the PW-80, but has now been returned to its original denomination and retails for $27.00 in the Cambridge area. One of its most useful features is that any interval, from 1 second to 24 hours, can be programmed to recycle with a signal indefinitely. This is a powerful function for many measurement and practice applications (not the least of which is a 60/min or less metronome). I recommend the ST-24 to all!

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That's it for this month. I hope to see you on May 13. In the mean time, enjoy the beautiful Spring weather!

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#28, July, 1980

Dear Friend,

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Cliff Bourie Tries Micro-sessions

There is mounting evidence to suggest that *endurance*, or the ability to maintain a relatively high proportion of beginning skill performance frequency over increasing session durations, is a function of beginning frequency (or proficiency level). In other words, high proficiency produces maximum endurance, in addition to facilitating application of skills. My thesis research supports this view, and so do classroom data examined by Eric Haughton, among others. In any case, we know that many students' frequencies are much higher during the initial portions of timed sessions than during the remaining portions of the sessions. In some cases, we use relatively short timings (e.g., 15 seconds or 30 seconds) in order to obtain maximum performance levels and prevent students from settling into low frequencies—especially when we first work with a given student. Cliff Bourie, who teaches severely retarded adults in the Behavior Prosthesis Lab classroom (here at Fernald), has been trying a somewhat radical version of this approach with such skills as free/say days of the week and free/say numbers by 5's to 40. He first determines the normal adult proficiency level and uses that as an aim. He then computes the number of seconds required to go through the sequence (e.g., 5, 10, 15,…40) once at that frequency. He uses that value, e.g., 2 seconds as an initial counting period, and accentuates the time limit with a visible timer. Under these conditions, the response requirement is clear—one time through the sequence. And the aim is also clear, defined by the time limit. When the student reaches the aim, Cliff changes to 2 times through at the normal proficiency standard, etc. The idea is to maintain that level of performance while building endurance. This procedure amounts to a fixed ratio schedule of reinforcement with a limited hold (time) contingency. One of its advantages is that the entire performance is very easy to demonstrate to the student. Cliff would appreciate hearing from anyone who has tried a similar approach, or who has comments or charts to share.

Pulse Rates on the Chart

Becky Marholin and her associate staff-members at the Wrentham State School have been trying to increase the cardiopulmonary fitness of some of their severely retarded students. One common measure of fitness involves a comparison of resting pulse rate with post-exercise pulse. At our May Data-sharing, they presented some pulse data on daily charts and we discussed alternative charting formats. A weekly summary chart (one measure per week, perhaps the median daily rate) removes some of the daily bounce so that 'celerations are more obvious. Another suggestion was to chart the *difference* between the two rates in order to accentuate change in the relationship. We'd like to hear from anyone else who has charted heart rates on the Standard Behavior Chart, or who has some different suggestions.

High Error and Steep 'Celerations

Over the last few years, Og Lindsley and his students and associates have been examining a somewhat novel approach to curriculum. Their hunch is that students starting with error frequencies much higher than correct frequencies will show steeper 'celerations, or more *learning*, than students beginning in the more conventional way with higher correct frequencies. If this is true—and supportive data are accumulating—it implies that comparatively large steps through a curriculum will produce the highest rates of learning. *As long as steep 'celeration is not emphasized to the exclusion of high tool skills frequencies*, this approach seems likely to revolutionize our thinking about curriculum slicing. We should all give it a try, and find out what our students' charts can tell us. After all, the child *does* know best.

Deficit Ratios & Potential for Improving Performance

During the last few years, my Masters students and I have been working out diagnostic assessment formats based on 5 to 10-day screenings and comparisons of our students' performance levels with normal adult proficiency standards. We've expressed our students' deficits as ratios, dividing the proficiency standard by each student's highest frequency, to form what we called *deficit ratios*. These ratios allow us to compare deficits among different skills and students, independent of the frequencies of specific skills. Gilbert (1978), in a book on performance engineering (see below), has been using the same ratio in both educational and business settings. However, he calls it the *Potential for Improving Performance* (PIP). We think this term is better than ours because it emphasizes the positive, much as we prefer the term *learning opportunity* to *error*.

Publications

Gilbert, T.F. *Human Competence: Engineering Worthy Performance*. McGraw-Hill, 1978. (Address: Book Distribution Center, Highstown, N.H., 08520, $16.95). This is one of the few really original books I've seen in a long time. Written for anyone wishing to improve human performance, it offers frameworks for analysis and a host of useful approaches, based on Gilbert's years of consulting to business and education.

Cooperative Games. Family Pastimes, R.R. 4, Perth, Ontario, Canada, K7H 3C6. This catalog contains a variety of original games which require cooperation rather than competition in order to win. I highly recommend it to parents, educators, and just plain folks.

Curriculum Snapshot (1977), Compiled by Dr. Eric Haughton. This pre-publication, 30-page booklet includes snapshots samples of performance pace and quality in eight areas (3R's language, gross and fine motor, self care and personal) often with some data of 5 to 11 year old (grade K-6), 12-17 years old (grade 7-11) and adults. While not always representing proficiency, the adult data offer a frame of reference for individual aim or group goal setting. Although future issues of *Curriculum Snapshots* will use Retention/Application Performance Standards (R/APS) as its criterion frame of reference, these guideline data will help teachers establish reasonable and correct performance expectations for their regular or disabled students. Graduate students will find this booklet rich in possible and intriguing research projects on either practical or theoretical issues. Available from Mary Kovacs and Associates, Box 81, Vineland, Ont., L0R 2C0.

A.B.A. Poster Awards

Bea Barrett and Cliff Bourie of the Behavior Prosthesis Lab received awards for their contributions to the poster session entitled "Precision Posters: Projects on the Standard Behavior Chart," at the recent convention of the Association for Behavior Analysis in Dearborn. Bea's poster paper was entitled, "From Accuracy to Fluency with a Standard Measure," and Cliff's (your truly as second author) was, "Exit Assessment: Diagnostic use of the chart for curriculum planning." Both are available, on request, from our laboratory address.

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So, that's about all for this month. I hope you're having a good summer. Keep those cards and letters and *charts* coming!

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#29, August, 1980

Dear Friend,

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Last Meeting

At our July 29 meeting, a number of people shared, including a distinguished visitor (Robert Orgel) from the University of Kansas, and an old friend returning after her Master's work (Ellen Harvey).

Richard McManus shared a chart based on one of his own suggestions for improvement at a previous meeting. He observed that some frequencies change in very small proportions that are difficult to see on the Standard Chart. His suggestion was to chart frequency above a specified level, e.g., count beyond 800 notes per minute blown on the saxophone, in order to accentuate or magnify small changes. That is, chart 831 notes per minute as 31, 942 as 142, etc. This approach has the advantage of magnifying proportional changes on the multiply/divide scale of the Standard Chart which might be useful in those applications where very small proportional changes are significant, e.g., in business production data. However, it could encourage teachers or other mangers to accept inadequate 'celerations simply by recharting them in this non-standard way. Moreover, problems may arise due to the mathematics of charting on a multiply/divide scale resulting in distortion of straight-line 'celerations. In any case, by recharting many data-sets in this way we should be able to decide whether Richard's suggestion is as useful as it might first appear. One thing is certain: it will *not* change flat lines (i.e., x 1.0 'celerations) into accelerations or decelerations.

Richard shared another chart, representing one of his first supervisory data projects. At the Therapeutic Center, an agency at which he consults, he's attempting to increase the charting activity of staff. He shared a count per week chart of points charted by all staff, which showed a big jump-up (I failed to record the values) and a moderate acceleration in charting after his initial training and advising efforts.

Richard Asztalos shared a chart on compliance to simple instruction (e.g., "shake hands," "sit down," etc.). He recorded 8-hour counts of compliance (response within 3 seconds) and non-compliance by a new student at the AMEGO school, a large young man who initially resisted guidance and instruction. A simple social reinforcement procedure produced a "jaws" learning picture in which instances of compliance accelerated steeply and non-compliance decelerated.

Ellen Harvey, just back from finishing her Master's degree at the University of Washington, shared what she called "a classic case of failure to attend to stages of learning." While studying with Owen White, she worked with a young girl who was unable to fasten snaps on clothing. Ellen decided to provide practice on simple grasp/release by requiring her student to grasp and remove clothespins from an upright holder. Her chart showed an initially steep acceleration (almost a jump) and then flattened out well below the aim. The initial big acceleration kept the performance above Ellen's decision-line (i.e., projected minimum 'celeration) but the procedure clearly should have been changed when it flattened out. In her

retrospective analysis, Ellen was able to share with us this early learning opportunity in her charting career.

Wayne Robb, a student in the Northeastern University Master's in Applied Behavior Analysis program, shared some charts from his work with a retarded student on a vocational task. He had been charting multiple sessions each day during which the student packaged metal hooks in plastic bags. He and Fritz Weiss were checking to see whether edible consequences plus praise (presented for task completion on some days) produced higher work rates or larger ratios of independent responses to prompts (i.e., independence ratios) than praise alone (used on other days). Each of the conditions was associated with one of the two managers who therefore served as potential discriminative stimuli. In order to make the data more manageable, Wayne decided to chart the highest ratio and the median frequency of independent responses on each day, thereby summarizing and compressing the information. The summary charts more clearly showed differences between the work rates as well as between the independence ratios under the two conditions than did the original data. They thereby illustrated one of the advantages of summary charting: accentuation of 'celerations through reduction of bounce. In this case both originals and summaries were daily charts. However, Behavior Research Co. also offers *weekly and monthly summary charts* on which one count per minute can be charted for each month. There are two principal categories of application for these charts. The first is for compression of daily charts or tabulations into weekly or monthly charts in order to remove day-to-day bounce and examine 'celerations over extended periods of time. Usually we plot middle daily frequencies for each week or month of the summary charts, although highs or lows may be appropriate in some analyses. The second use of summary charts is when only one measurement actually occurs during each week or month. Such is the case when we periodically measure to *check on maintenance* of performance or the absence of problem behaviors. Another application, that has been accelerating in recent years, is *weekly or monthly screening*, in which we chart a single measure under standard conditions of a critical skill each week or month for all students within a group or agency, providing teachers, advisors and supervisors with long-term information for planning and management. Usually data on a given skill for the entire group are charted each time as a *spread*—connected high, low, middle point and/or quarter-marks. Changes in spread from screening to screening reflect over-all program effectiveness, and allow comparisons among groups and identification of individual students' standings within groups. Generally the same set of critical skills (e.g., 5-10 skills) is assessed each time over a period of months or years.

Kevin Solsten, a principal consultant with Tools for Change, Inc., discussed an introductory-level package that he has written for teaching basic charting skills. He told us that in field-testing his trainees have gone from start to finish, meeting frequency aims along the way, in 2-4 hours. His aims include: charting frequencies, 30-20 per minute; and charting record floors with a frequency finder, 20-15 minute. We hope to offer the final version of Kevin's manual through this Newsletter in the next month or two.

Robert Orgel, a doctoral student with Og Lindsley at the University of Kansas, happened to be in town at the right time to join us in Data-sharing last time. He brought a bunch of count per year charts, as well as news of some of the more recent ideas being shared among charters in the Kansas group. He discussed learning pictures and learning picture distributions, making an especially interesting point about teachers' fear of taking "risks" with error frequencies. It seems that many teachers are afraid of allowing errors to rise above a very low level—probably as a

result of their long histories with percentage correct evaluation procedures. It is becoming apparent that maximum progress through curriculum may result from an approach that begins a segment of curriculum with relatively high error frequencies (as compared with corrects) and "teaches to learning opportunities," directing instruction to error items. Such a strategy has recently produced many "jaws crossover" learning pictures, with steep correct accelerations and rapid error decelerations. However, this strategy requires a willingness to risk failure by students and teachers alike. And it appears that both will "burn out" if pushed too quickly into such programming. Therefore, *gradual* change in instructional strategies toward an increasingly risky approach is advisable.

Robert also discussed the use of frequency spreads and distributions in educational administration. One of his more interesting comments was that as procedures and curriculum become more effective, performance spreads within classrooms or other groups should become increasingly narrow. If procedures are truly effective they should enable *all* students to reach maximum levels of performance.

He shared two sets of count per year data charted by him and Harvey Seppler. One set of charts showed relationships among personal and business bankruptcies, as well as GNP, unemployment, and consumer credit since the 1940's. Robert pointed out that many of the assumptions commonly accepted by economists and others who influence national and regional policy turn out to be faulty if examined carefully on the chart. For instance, economists (including those at the prestigious Brookings Institute) claim that personal and business bankruptcies are highly correlated. Charts show that although this appeared true in the decade following WW II when each took a large turn-down, since about 1952 personal bankruptcies have grown x1.5 per five years whereas business failures have only grown x1.2. Moreover, the details of year-to-year bounce have been clearly different.

Robert's second set of charts showed various measures of petroleum production and consumption. It was apparent from these charts that there really *is* an energy crisis, with total domestic production increasing at about x1.15 per five years but oil industry expenditures on new plants and equipment accelerating at x2.2. Also, total drilling cost has been increasing at about x4.0 during the last decade, with number of wells drilled per year lower than in the 50's and 60's. Robert stressed the personal and cultural implications of using yearly charts to understand local, national and world phenomena.

How to Order Charts and Frequency Finders

Many people ask how to obtain Standard 'Celeration Charts and frequency finders. Charts are available from the address listed on them:

Behavior Research Company
Box 3351
Kansas City, Kansas 66103

They come in six versions: daily count per minute; weekly summary count per minute; monthly summary count per minute; count per week; count per month; count per year. Current prices are $8.50 per hundred or $30.00 per ream, plus shipping. Be sure to include a purchase order number (make one up if necessary) so they cal bill you accordingly.

Tough green plastic frequency-finders (also for ‘celeration and percentage) are available for $1.30 each from

Ms. Vicki Ries
Experimental Education Unit
CDMRC
University of Washington
Seattle, Washington 98105

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Bounce and Probability of Occurrence

We should always notice dots on the chart that bounce up or down far beyond the others. Generally and extraordinarily high or low point turns out to be associated with some unusual event or condition, and if we can discover what it is, we may learn a great deal about the behaver. If we form an *envelope of bounce* by drawing lines parallel to the ‘celeration line that enclose all of the data over a period of time (10 or more dots), we can estimate what the bounce will continue to be, given stable conditions. Any dot that falls outside of the estimated bounce is worthy of careful examination. Og Lindsley has worked out a rule of thumb, based on statistical calculation, that estimates the probability of likelihood of a dot falling at various distances outside the expected bounce envelope. He says that if the dot is a given proportion of the envelope’s width *beyond* the edge of the envelope, then it has a probability of occurring by chance one out of _____ times. The rule-of-thumb values are:

1/4 bounce out = 1 in one hundred times

1/2 bounce out = 1 in one thousand times

1 bounce out = 1 in one million times

1-1/2 bounce out = 1 in one billion times

2 bounces out = 1 in one trillion times

How Much did your audience learn?

Og used another of his tricks when he spoke at the recent Association for Behavior Analysis convention. Prior to the talk he asked the participants to take out pieces of paper and prepare for a 1-minute timing. He instructed them to write as many different concepts or ideas (short-hand if necessary) as they could think/write during the minute, and then gave a start signal. At the end of the timing, he asked them to compare with their neighbors and agree upon counts of ideas for each person. He asked people to save their counts/minute aloud as he put dots in a distribution on the chart. He repeated the timing after the talk and compared the two distributions. By comparing the middle dots for the two timings, it is possible to estimate the increase in ideas on the topic resulting from the talk, (e.g., a x2.5 learning). I’ve found this to be

a good way of evaluating my own presentations, illustrating a simple use of frequency to the audience, and providing feedback to them in a way that is fun and sociable.

"The Child Knows Best"

In the development of a functional behavior analysis, B.F. Skinner learned that "The organism is always right." He saw that if the subject of an experiment – usually a rat or pigeon – behaved in a particular way, it was because the experimenter had arranged (or failed to arrange) the environment in a particular way. One could not simply say, "Behave, damn you!" One could only change the organism's behavior by changing aspects of the organism's environment and measuring to see whether the changes produced the desired effect.

As Bea Barrett has often said, behavior measurement systems enable the behaver to communicate to us the effects of our attempts at behavior change. And Ogden Lindsley, in bringing functional behavior analysis and behavior frequency measures from the laboratory to the classroom, rephrased Skinner by saying, "The child knows best." This statement is <u>not</u> a sort of crusade for removing all discipline or limits from the behavior of our children! Rather, it is a statement of *our* responsibility as teachers, parents, or managers. If children fail, it is because *we* have not developed effective teaching methods. Children "know best" in the sense that their charted learning and performance (and often their suggestions for improvement) tell us directly what we should be doing as teachers – whether we have done the correct thing or not. Thus, "The child knows best" is ultimately a demand for accountability on our parts, and an encouragement for cooperative and respectful relationships with our children. In the educational setting, it also suggests another of Og's recommendations – "Care enough to chart," for the sake of better communication.

That's about all for this month. Enjoy the last few weeks of summer!

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#30 October, 1980

Dear Friend,

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Last Meeting

Our September meeting may have been the best ever – in 3-1/2 years. It was kicked off by the presentation of a tour de force in behavior management by Richard McManus and Kevin Solsten, co-directors of Tools for Change, Inc. Responding to a call from Southbury, Connecticut, for short-term crisis intervention and staff training, they encountered a large (160 lbs.) young man whose self-injurious behavior had been accelerating x1.20 per week. The staff of his residential unit had kept him physically restrained and under medication (Haldol) until recently, when the drug was discontinued. At that point, aggressive behavior appeared, accelerating at x2.30 per week. And eight days later the self-injurious behavior (SIB) jumped x500 and leveled off at x1.00. Richard and Kevin began their intervention by charting data previously gathered by the staff and beginning a program of short time-outs for deceleration targets with constant reinforced practice to build fluency in a range of simple skills. They simultaneously began staff training in charting and behavior management techniques. In the first three days after their arrival, the SIB decelerated ÷10,000 (for all practical purposes a jump-down rather than a deceleration). They used a variety of clever techniques for staff training. For example, when training staff by role-playing aggressive behaviors, Richard and Kevin made their own "dramatized" aggression more aversive for the staff than the client's target behaviors. This encouraged staff to work with the client as soon as possible and made it comparatively easy, by comparison, for them to do so. They identified "specialists" among the staff for various resources (e.g., charting, self-defense) and specific behavior management roles for difficult situations. One of the more interesting treatment techniques was to allow the client to "earn" time-outs if he wanted to stop working. This provided a clear indication of the reinforcing value of the skill acceleration procedures. For short-term decision-making, they used 15-minute counts of target behaviors, charting each interval's frequency on a day-line. At last report, daily telephone follow-ups and data reports indicated that staff members are continuing to develop the much-improved situation.

Debra McManus shared a count per week chart from her work with an 18-year old behaver whose aggressive behavior had led to medication with 4 mg of Haldol per day. With frequencies averaging about 10 per week in the beginning, a point system had reduced the outbursts to around 1 per week. Debra's objective was to reduce the medication in increments of 1 mg while maintaining the low frequency of aggressive behavior. However, she felt that the low weekly count would not be sensitive enough to reflect the effect of Haldol elimination, particularly given the known side effects of tardive dyskinesia (bizarre, uncontrolled muscle movements) that often result. Therefore, she began collecting daily information on a series of skills in 30-second timings: see/say pictures, see-touch/grasp-release pegs, free/write 0's, see/say 1-9, hear/write letters to spell words. She tried to cover a range of input/output channels in order to assess possible differential effects of the drug withdrawal. In addition, she plans to include a placebo phase in order to determine whether pill-taking per se has any effect on the young man's

behavior. Someone in the group suggested that she also include probes of free/say reasons for doing the tasks and/or free/say personal information in order to assess possible effects on the "think channel." We'll be anxiously awaiting the results.

Jim Pollard presented preliminary results of a project (in which I am an advisor) involving occupational therapists at the Merrimack Educational Center. Cathy Connors and Lucy Cheevers conducted 7-10 day diagnostic assessments of 6 different forms of grasp-release (both left and right hands) with 20 of their severely and profoundly handicapped clients. The six "grasps," in what is considered to be developmental sequence, were: hook, cylindrical, lateral, 3-jaw chuck, pincer, and tip pinch. It is interesting that for most of the students, average performance frequencies declined across the developmental sequence, although there is no such systematic decline for normally functioning adults. Complete 'celeration and frequency distributions of these data promise to point the way for the development of systematic chart-based assessments for occupational therapists. Perhaps the most obvious message for OT's is that steep accelerations (as high as x6.50 per week) are possible as a result of minimal daily practice ("warm-up" plus 15-second timings). Thus, repeated measurement is a must for occupational therapy with the severely handicapped.

Wendy Bettencourt, a teacher at the Merrimack Education Center, shared 3 more charts of 7-10 day "grasp objects" assessments. She included palmar grasp in addition to the 6 patterns assessed by Cathy and Lucy. These charts represented an important step forward in transdisciplinary measurement and programming for the severely handicapped. We now have quite a few physical and occupational therapists who are beginning to use the Standard 'Celeration Chart in their work with severely and profoundly handicapped clients.

Precision Posters II at ABA 1981

Jim Rast and Bill Hartman have again agreed to organize a poster session at the national convention of the Association for Behavior Analysis (May 27-31, Hyatt-Regency Hotel, Milwaukee). ABA is undoubtedly one of the best places to meet charters from around the country, and Precision Poster sessions allow us to share our work with one another as well as with non-charters. Although the official submission deadline is November 15, I don't think there's ever been a year without at least a second ABA deadline.

Are Your Charts Synched?

Chart synchronization often reminds me of David Niven and Gregory Peck (or whoever it was) in "The Guns of Navaronne." But seriously, it is important for comparisons between and within behavers that we synchronize the calendar days on our daily charts. It is conventional in North America to begin a new chart each year on the Sunday closest to Labor Day. That way we can *all* compare our charts directly, rather than having to adjust for different start dates. (All charts begun during the 20 weeks following Labor Day use the same dates across the top –the dots just may not begin appearing until halfway across). Just think of all those hundreds of thousands of synchronized charts….Og must get a glow all over when *he* thinks about it!

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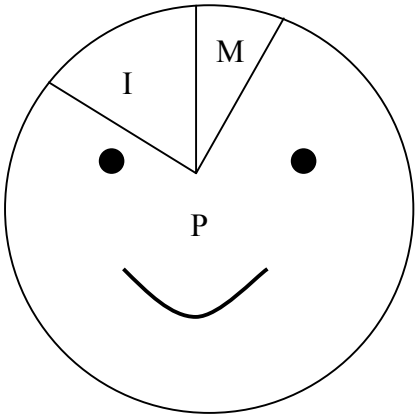
The Happy Learner

One of the ways in which most Precision Teaching programs differ from more conventional courses of study is in their emphasis on practice of previously acquired skills. Because we are interested in achieving proficiency or fluency beyond mere accuracy, we plan for lots of practice time during which students increase their performance frequencies toward proficient standards (i.e., frequency aims). For any given skill, this may mean only a few minutes of efficient practice activities per day – enough to be useful but not enough to be "boring." And within those practice periods we'll measure performance with one or more brief (e.g., 30-second or 1-minute) timings. It's important to remember that "practice" is defined as work on skills that students already know how to do, in which they can correct their own errors. (Many teachers misunderstand this, giving long assignments on skills students have yet to acquire and calling them "practice.") Overall, a student's time should be divided into a lot of practice, some instruction on new skills, and relatively brief periods of measurement. Eric Haughton and Mary Kovacs use a pie diagram called the "Happy Learner" to remind us of this:



We'll have lots more suggestions about practice in future issues.

Airplane Pilot Course

Bob Spangler of Precision Teaching of Tennessee, Inc., sent me the following:

Two days (Saturday and Sunday)
Precision Taught Private Pilot Accelerated Course:
Minimum enrollment: sever per class
FAA exam arranged the following week
$125 per students within 200 miles of Tri-cities, TN
$150 per student over 200 miles of Tri-cities, TN

GUARANTEE: If you attend all sessions and do not pass the FAA private Pilot exam, you may attend the next class in your area free.

Attention FBO's: Will pay $25.00 per student to any FBO who arranges a group of seven or more if they provide classroom, overhead and screen

To set up two-day Precision Taught Ground School contact:

Bob Spangler
Precision Aviation Training (P.A.T.)
P.O. Box 343 MPO
Johnson City, TN 37601

Let's Try Doing Something Else Kind of Thing (the book)

The council on Exceptional Teaching has, over the years, produced several invaluable Precision Teaching publications. One of them was a book with the title of this paragraph, which collected a number of important early discussions of PT strategies and tactics by Og Lindsley, Eric Haughton, Ann Starlin, Charlie Galloway, et al. I've always used it for my courses – but it is about to go out of print. Until December 31, the book will be available at half price ($3.62) from:

The Council for Exceptional Children
Publication Sales
1920 Association Drive
Reston, Virginia 22091

Another useful publication is the Spring, 1971, issue of *Teaching Exceptional Children*, devoted almost entirely to PT, available for $3.50 from CEC.

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That's all for this month. Remember to send in your subscription renewal forms so you won't miss the next issue.

Sincerely,

Carl Binder

DATA-SHARING NEWSLETTER

#31 January, 1981

Dear Friend,

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Last Meeting

Our last meeting was nearly snowed out – only 8 die-hards were able to attend. Nonetheless, we shared a number of interesting charts, suggestions, and stories.

Michael Maloney, who had been visiting with Bea Barrett and me, left behind several charts from his students at the Quinte Learning Centre in Belleville, Ontario. The charts showed monthly screening data on 22 elementary academic topics. Perhaps the most interesting aspect of these data is that they reflect an increasingly happy marriage between Direct Instruction (SRA; DISTAR; Engelmann, Becker, et al.) procedures for skill acquisition and Precision Teaching strategies for practice and measurement. Michael and his associates have made practice sheets corresponding to the instructional units in SRA Corrective Reading, Morphographic Spelling, and DISTAR Math. Using common performance aims (e.g., 80-100 see/say math facts per minute), students at the Quinte Learning Center exhibit their proficiency and retention on a given topic or slice of curriculum by meeting the aims 3 days in a row on daily measurement, then 3 weeks and 3 months on weekly and monthly checks, respectively.

I shared a couple of count per week charts from a commercial weight reduction program for which I designed a measurement system last year. One of the measures in the system was a count each week of program participants, with an aim of 150. A 'celeration line drawn through the first six months of data predicted that the aim would be met in August, 1980, about five months into the future. With a projection of x1.10 the following five months' data turned down to about x1.08, coming in only slightly below the projection.

Jim Pollard brought a chart showing the results of a 5-day assessment of 3 gross motor movements chosen by physical therapists for initial screening of a 25-year old severely handicapped student at the Merrimack Education Center. The pinpoints were: lifts head in prone, lifts head in supine, and shifts weight from one hand to the other in quadriped. Three separate timings each day for *each* movement cycle measured performance with Guide, Nudge and Hear input channels respectively. The results were steep accelerations for all timings with Guide and hear inputs, and decelerations with Nudge. Jim speculated that a functional definition of "tactile defensiveness" may be acceleration of performance with Guide and Hear, and deceleration or x1.0 with Nudge. Therapists have often told us that "deep flexion feels better than light touch," and Jim's results (of which this was only one instance) may be related to this observation. For many students, especially the "tactile defensive" ones, Nudge may exert little stimulus control and/or be aversive, when used exclusively.

Debra McManus reported that in training her staff at the Protestant Guild for the Blind, she observed that teachers who had recently acquired and practiced charting with frequency-finders, using timed practice and a 12 data-days per minute aim, charted about twice as fluently as teachers who had been charting for years without the benefit of timed practice in the

beginning. New charters and trainers take note! Fluency training for charters is an important antidote for the old "charting takes too much of my time" excuse.

Kevin Solsten shared a chart of duration data (plotted as 1/minutes on the Standard Chart) from his training of staff members in a "one-quarter" house for community-bound clients. He uses lots of role-playing in teaching staff to shape specific behaviors (e.g., walking out the door) with consequence delivery (e.g., "Good!"). One trainer plays the role of student, emitting more of the behavior that exactly precedes the trainee's delivery of the consequence. The other trainer measures the time required to shape the target behavior, aiming to meet a specified duration limit. Kevin recommended this use of the chart and of role-playing for staff training in a variety of settings. It is a great example of "learning by doing," and incorporates basic behavioral principles and novel use of the chart.

Richard McManus (the other half, with Kevin, of the Tools for Change team) described another interesting procedure for providing feedback to previously trained staff during a follow-up period. A group of staff from a center several hundred miles from the TFC office were having some difficulty managing the behavior of a particular client. They videotaped a session with the client and sent it to Richard and Kevin who then produced and retuned an audio tape with comments and suggestions for improvement synchronized with the video. This is quite a cost-effective procedure, it seems to me. Richard also shared one of TFC;s self-management charts, showing counts per week of paid and unpaid work hours since their beginning last year – a nice example of organizational charting in a business situation.

Improving the "Fair Pair" Ratio

Grace Baron, of the Behavioral Development Center in Providence, sent me a note describing one of her recent administrative applications. Faced with the common problem (especially with disabled or deviant client populations) of too many deceleration targets, staff of BDC began charting counts per week of deceleration vs. acceleration charts. The aim, of course, is to increase the ratio of acceleration targets to deceleration targets. Has anyone else done this? Let us hear about it. What is a good aim? x2.00? x3.00? x10.00?

Learning Picture Charts in Kansas

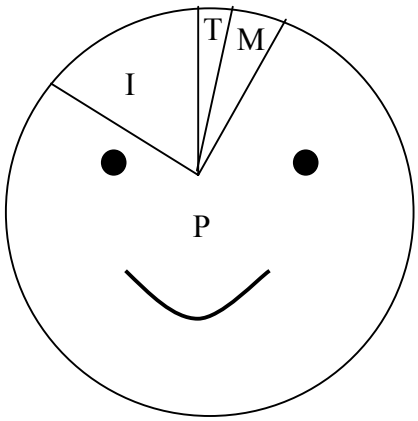
Many readers may be familiar with Learning Pictures Reports as a strategy for program evaluation (cf. article by Wood & Fisher, *Journal of Precision Teaching*, April, 1978). Managers and/or students sort Learning Pictures, formed by the most recent 'celerations on student's charts, into *growth, maintenance or regression* categories on a standard report form. Charted counts per week of pictures in each of the tree categories form the basis for evaluating the effects of program changes and decisions in a given classroom, program, or system. Pat Flannagan, a doctoral student with Og Lindsley, had been analyzing this process, and the effects of various supervisory strategies, on more than four years of learning picture summary charts. Pat is interested in communicating with others on this topic, and is also very interested in any 3-line learning pictures (e.g., corrects, errors, skips) you might have. Write:

Pat Flannagan
Rt. 1
Wamego, KS 66547

Pat: I'd really like copies of whatever summary charts you can share!

Happy Learner Revisited

In the last *Newsletter* I attributed the Happy Learner to Eric Haughton and Mary Kovacs when, in fact, Elizabeth Haughton was its inventor. Also, there is an added distinction between testing, (periodic) and measurement (frequent), in addition to practice *and* instruction. In the form of a pie diagram, the Happy Learner shows the estimated proportions of an educational program that should be devoted to each kind of activity:



Drawing 'Celeration Lines

If you choose to draw 'celeration (i.e., trend or slope) line through data on the Chart, there are several techniques you can use. With fairly non-bouncy data, doing it by eye with a straight-edge is as accurate as any. But you may choose to use the quarter-intersect method, according to which you find the mid-date of each half (left-to-right) of the dots, then find the mid-rate (up-down) in each half, and connect the two intersections formed by the mid-dates and mid-rates (cf. White and Haring's *Exceptional Teaching*, 1980). An older version of this technique (cf. Pennypacker, Koenig & Lindsley's *Handbook of the Standard Behavior Chart*, 1972) counted *days* rather than *dots* in finding the mid-dates. However, if you don't chart every day, or in a regular pattern on the claendar, using days rather than dots for your left-to-right counting may distort the resulting 'celeration line. Therefore, it is good practice to *count dots, not days*, when following the quarter-intersect mehtod fro drawing 'celerations.

Precision Teaching Conference

The Presision Teaching Winter Conference will take place in Orlando, Florida, on February 5-7 under the auspices of Precision Teachers of Orange County. This will be a major get-together of PT folks from around the continent. Skip Berquam, Project Administrator of the Orange County Precision Teaching Project, informs me that late registration will be accepted.

Also, we offer special thanks to Skip for his recent contribution of $10.00 to the MARC Behavior Research Project, which supports part of the costs associated with the Newsletter.

PT in PT

The following notice appeared in the August, 1980, edition of *Every Inch & 1/2*, a newsletter "dedicated to the practice of physical therapy where success is measured in minute progressions."

"We are currenty applying precision teaching principles (borrowed from educators and behavior laboratories) to the acquisition of gross motor skills in the severely/profoundly retarded. We would appreciate hearing from other RPT's who are using the approach." (Nancy Peatman, RPT, Merrimack Special Education Collaborative, 101 Mill Road, Chelmsford, MA 01823).

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That's it for now. We'll see you in a few weeks.

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#32 February, 1981

Dear Friend,

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We hear through the grapevine that many of you are shy about sharing your charts – even those who regularly attend Data-sharing. As a result, the same old group winds up showing charts, talking to each other in language that new-comers may not fully comprehend. WE'D MUCH PREFER TO SEE NEW CHARTERS UP FRONT! It's really easy to show your charts – that's the beauty of the standard charting format. And as for our language or methods of analysis, PLEASE ASK QUESTIONS! We've all been self-conscious about standing in front of groups. Just *release* your anxiety and give it a try! (Note that this form of *release* is a basic "element" or component of social behavior!) Those who share their charts learn more than anyone through suggestions and helpful comments. So if you have any charts, *please* bring one or two to our next meeting and have the guts to share!

Last Meeting

At our February 10 meeting, only a few people showed charts. I shared some data from research on the relationship between endurance and performance levels. Teachers in several classrooms in Hastings County, Ontairo, asked their stdudnts (K through 8th grad) to Think/Write 0-9 repeatedly for various intervals (15 sec., 30 sec., 1 min., 2 min., 4 min., 8 min., 16 min.). The range of performance levels for the shorter intervals was between 10 per minute and 180 per minute. We found that there is a clear relationship between increasing proficiency (on a x/÷ scale) and increasing endurance (maintenance of performance levels over increasing durations) up to about 80 per minute. Beyond that point, increasing proficiency doesn't seem to improve endurance. But below 80 per minute, it is clear that students should reach high aims for short intervals prior to working for longer durations. The *proportionally* greater drop-off (or fatigue effect) among students of lower proficiency is probably related to what teachers traditionally refer to as "attention span." By the end of a work period, the less proficient students may have slowed to less than one quarter of their initial level, (÷4.0), while the more proficient students may have slowed by only an imperceptible 10 or 15%. We need to replicate these findings with other skills.

I also shared some summary charts form a 7-10 day assessewmtn of 6 different grasp/release skills conducted with 24 severely-profoundly retarded studnts by Cathy Connors (an occupational therapist) and Lucy Cheevers at the Merrimack Education Center. The summary charts showed that although the group's median performance levels fell relative to normal levels as the grasp-release skills became more refined (or developmentally advanced), median celerations (or learning rates) were about the *same* (median = x1.35 per week) across all skills. These data support the optimistic conslucsion – consistent with previous findings showing the independence of learning and performance – that even profoundly handicapped students who start with very low performance levels can learn critical skills, imporving by significant (and often "normal") amounts each week.

I also shared the most recent versions of Eric Haughton's Performance Matrices which have input channels (Think, Touch, Taste, See, Sniff, Hear, Feel) up the left, and output channels (Wave, Aim, Tap, Twist, Say, Write, etc.) across the bottom. The intersections of inputs and outputs form "Channel Sets," or categories of skill broadly defined by the Input/Output specifications. Eric's matrices are already helping us to organize, analyze, and develop our curriculum in an extremely efficient manner. For more information, contact

Dr. Eric Haughton
RR #3
Demorestville, Ontairo
K0K 1W0

Richard Azstalos shared charts from a 10-day assessment that he conducted with a new severely autistic student at the AMEGO School. He chose a wide variety of preacademic and prvocational skills, and his student showed strong celerations (i.e., learning rates) over the 10 days of brief measurement each day. These celeration data convinced the student's mother, perhaps for the first time, that her son is really capable of learning. They also demonstrated, once again, the power of the Standart Celeration Chart in several dimensions: a) it is graphic and understandable to anyone who can tell the difference between flat lines and lines that go up or down, b) it allows us to show *learning* independent of performance levels, summarized as straight lines, and c) it allows us to *quantify* learning in the first truly culturally unbiased manner yet developed.

Richard McManus shared another of his clever approaches to the management of severely aggressive or destructive behaivor. Faced with a student at the Merrimack Education Center who hit tables and other objects at a relatively high frequency, Richard worked to bring that response under auditory stimulus control (shifing from a think/hit to a hear/hit). If an apparently random response can be brought under control of an overt and identifiiable prompt or instruction, then it can more likely be managed in the ocntext of an instructional program design to accelerate other appropriate behavior. We'll be looking to see daily charts on this case at a future Data-sharing session.

We had the great pleasure of welcoming Bev Brown, Director of Speical Education in Sutton, Massachusetts, and Marie Hoffman, of The Network, to their first Data-sharing session. Marie is the Massachusetts Facilitator of the Great Falls, Montana, Precisoion Teaching Projects's outreach efforts through the National Diffusion Network. Bev has been the Network's major PT trainer in this area over the last several years. They've introduced over 300 teachers to PT – mostly in regular and resource room settings. We look forward to sharing more and more withour new friends, introducing them to the larger New England Precision Teaching Communtiy.

--Administrative Detail Deleted--

Teaching Record Floors

I've always found it difficult to teach people about record floors. The operation is not too difficult, but the concept is often confusing. One of my recent trainees, Rose Philbrook, responded to my explanation of record floors by saying, "Oh, that's just the percentage of the total measurement period encompassed by 1 minute." Try that one with your new charters and see if it works!

Think/Say (aka Free/Say) Ideas about Precision Teaching

At the beginning of a recent 2-hour workshop I conducted for some teachers working in elementary and secondary schools in Tewksbury, Massachusetts, I had a 1-minute timing during which the task was to Think/Write (i.e., write as many as you could think of) words, ideas, or responses to "Precision Teaching," based on their own classroom experience and on the previous three workshops. Afterward, we listed a few of them on the overhead:

-Happy Face (Elizabeth Haughton's Happy Learner)
-81-01-18 (the first Sunday of the current, calendar-synched daily chart)

-timing	-skills
-practice	-instructions
-fluency	-slope ('celeration)
-accuracy	-kids like it
-charts	-"i like it"
-aims	-kids chart
-mastery	-doubling (x2.0)
-channels	-stopwatch
-corrects, errors, skips, self-corrects	

Annie Desjardins Shares

Anne Desjardins recently sent me copies of several of her students' charts from the Quinte Learning Center in Belleville, Ontario. Two of them were especially nice to see, since as Annie said in her note, "I know this isn't anything new but I thought it would make you feel good to see it confirmed once again." The two charts showed the necessity of reaching high performance aims prior to application. Laurie, a 12 year old, was writng answers to basic multiplication facts (See/Write products to 81) at between 60 and 75 per minute, below the aim of 80 to 100 problems per minute. When she stepped ahead to problems with 2-digit multiplicands (aim 30-40 per minute), she flattened out at about 12 per minute within a few days. So Annie stepped her back to practice the basic facts until (within 3 weeks of practice) she was over 100 problems per minute. Returning to the more difficult problems, Laurie accelerated at around x1.40 per week from 12 problems to nearly 50 problems per minute in about a month. We've reached the level in application of our technology that we can reproduce many of the basic phenomena (especially those related to curriculum changes and aims) almost at will, with the same confidence as our predicessors – laboratroy behavior analysts – produced specific performances in their "students," and the power of our Precision Teaching is just beginning to show. Thank you for sharing, Annie!

Take care, and keep those charts and letters coming! Sincerely, Carl V. Binder

DATA-SHARING NEWSLETTER

#33 March, 1981

Dear Friend,

--Administrative Detail Deleted--

The Mechanics of Chart-sharing

The Standard Celeration Chart is, among other things, an efficient communication device. Because it is standardized and universally applicable, it provides us with a common graphic/analytic "lanugage" for sharing information about learning and performance and the effects of our attempts to change them. It saves us time in recording, decision-making and sharing: proficient charter record data at 20-30 points per minute; even beginners can decide whether a learning picture is improving, maintaining or worsening in between 3 and 6 seconds; and a proficient group of charters can share charts at the rate of one every 2 or 3 minutes.

Over the years, charter have refined the technology of chart-sharing and have developed a number of mechanical aids for improving its effiiciency. (Major credit for these developments, of course, goes to Dr. Ogden Lindsley, originator of the Standard Celeration Chart). I often receive questions about various aspect of Chart-sharing, and what follows is a summary of answers.

1. Chart data *in pencil* on the Standard Celeration Chart (aka the Standard Behavior Chart). Fill in *all* credit line and date for complete record-keeping.

   The two most redily available books on <u>how</u> to chart are:

   Pennypacker, Koenig & Lindsley's
   Handbook for the Standard Behavior Chart

   White & Haring's
   Exceptional Teaching, 2nd Ed.

2. When you put dates on the daily chart, synchronize all your charts to the first Sunday closest to Labor Day. Thus, the current chart begins on January 18, 1981, and the first one next fall will begin on August 30th. Synchronized charts (like claendars) allow us to compare differernt chart projects more quickly.

3. Share charts in 4 different ways: hand-copy, photocopy, chart-tracers, transparencies for overhead projections.

   a. To hand-copy, simply place a fresh chart on top of the original, put them against a window and trace the information. Makes a nice gift.

   b. Because pencil copies well, we can photocopy charts for sharing. However,

the blue lines (intentionally) do not photocopy very well. (In fact, with a good copy machine, we can completely eliminate the blue, leaving only what we've written in black for a publishable version.) Also, most copy machines enlarge the image very slightly, thus distorting the standard dimensions. For quick sharing, though, photocopied copies are fairly good.

c. If you want a "clean" copy, without the blue, and no distortion, use *chart-tracers* (available from Behavior Research Co.) They are peices of chart-sized tracing paper with credit lines and chart frame in blace but no other lines. For quick tracing. Useful for on-the-spot sharing/copying of charts you'd like to take home with you.

d. Transparencies

If you do all your work on charts with pencil, you can make a transparency directly from the chart with a transparency-making machine (thermal or photocopy). Be sure to line up the film with the chart *exactly*, and align the *right edges* if one or the other is shorter.

Otherwise, you can get some transparency pens and clear 8.5" x 11" sheets of mylar or acetate for tracing the charted information. The Sanford Company makes both washable (Vis-a-Vis) transparency pens for temporary copies, and permanent (Sharpie) pens for lasting transparencies. Again, be sure to line up the right edges of chart and acetate if there is any difference in size. (This is because the transparency will then line up correctly with the chart mylar in a chart-holder, described below). Also, after you have aligned acetate and chart, it's helpful to draw little corner marks on the acetate at the corners of the grid on the cart. This will help re-align if necessary. Even though we use pencil, with different shapes for corrects (●), errors (x), skips (Δ), etc. on the chart, it's helpful to use different *colors* when making transparencies with pens.

4. Use a *chart-holder* (available from Behavior Research Co.) for overhead projection and tracing. This is simply a Plexiglas frame that holds your charts in alignment and speeds up the process of sharing.

5. *Chart mylars* of daily, weekly, monthly, and yearly charts are available from BRCo for overhead projection. Slip one into the chart-holder, then lay the transparency on top. The chart mylars are simply blue charts on clear mylar to supply the grid for overhead projection.

Another device useful for charting is the frequency/celeration finder. BRCo sells one version. The best I've seen is a tough green plastic one available fro $1.30 each from:

Vicki Ries
Experimental Education Unit
CDMRC
University of Washington
Seattle, WA 98195

A Few Facts

Og Lindsley shared some information at the Orlando PT conference in February that should make a few waves. On the basis of samples of both published and unpublished sets of classroom learning information, he determined the median celerations per week under various conditions. (For the uninitiated, that is the average factor by which students multiply their performance rates per week). The second column of numbers indicates the *total* learning, expressed as multiplicative factor of starting frequencies, that these learning rates would produce over a 36-week school year:

Situation / Conditions	Learning per Week	Performance Multiplied per Year
Public Schools withoout Charting	x 1.007	x 1.29
Behavior Modification Classrooms without Standard Charting	x 1.11	x 42.80
Teachers use Standard Chart	x 1.25	x 3,081.49
Children Participate in Decisions using Learning Pictures on Chart	x 1.50	x 2.184,168.5
Learning Pictures and Leap-ups in the curriculum (i.e., start with very high error frequencies and teach to errors)	x 2.0	x 68,719,000,000.0

Skip Berquam, organizer of the conference, shared some other information that should be of interest to David Stockman and Ronald Reagan.

a. 6 million students are held back each year because of reading problems (and what about those who *aren't* held back?).

b. A year of public school costs, on the average $2, 070.

c. Thus, $12.42 billion is the minimum cost of our failure to teach reading proficiency. And there is very little question that precision teachers can teach reading proficiency. (How about 1st grader reading 200 words per minute with high comprehension?)

R/APS and REAPS

When we set performance aims, we'd like to be sure that they are hight enough to ensure *Retention* of skills, *Endurance* over adequate performance durations, and *Application* to more complex skills or in different circumstances. Several years ago, Eric Haughton turned us on to the terms R/APS, meaning Retention / Application Performance Standards. Since then we've begun to collect informaiton showing the relationship between performance levels and Endurance, thus the revision to REAPS. We dion't have enough data to indicate these levels for all possible skills, although a bunch of us are working on various aspects of the problem. But a good first approximation is to use the performance ranges exhibited by a normally proficient adult population, since we seem to exhibit retention, endurance, and application on at least *some* skills. Chances are that most of us are not really at solid REAPS levels on many skills. But until we gather more information, we've been defining REAPS as the normal adult range (usually showing around a x2.0 spread) and using those levels as aims as much as possible.

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Phase-Change Lines

Denise Conrad, of the Great Falls Precision Teaching Project, recently introduced me to a helpful convention concerning the use of phase-change lines on the chart. It is conventional to mark changes in procedures on the chart by drawing a vertical line from the record floor, halfway between the last dot in the previous procedure and the first dot in the new one, which slants or curves to the right somewhat below the top of the grid. A brief description of the change is then entered *to the right* of the line. Denise suggested that we use *solid* phase-change lines when the change is a step in the curriculum or a change of pinpoint, and *dashed* lines when the change is an attempt to improve learning on the same pinpoint.

Three Decision Rules

Folks in the Great Falls PT project have been using three simple rules to decide from day to day whether or not to make a change.

1. If performance is at aim 2 out of 3 days, make a change. (However, if performance is still accelerationg, consider raising the aim, adding curriculum weight or continue until it flattens out—ask the student which (s)he prefers).

2. If performance is flat (or flat/saw-toothed) for 3 days, make a change.

3. If weekly growth over the last 2 weeks is less than the desired acceleration (*minimum* expectation is x1.25 per week), make a change. If there's any doubt about it, you should probably change.

One of the most important decision-making guidelines is that if we leave students in a flat learning picture for more than 2 or 3 days it is much more difficult to come up with a change that will produce an improvement. There's some kind of motivational problem, or perhaps a kind of frequency inertia that seems to develop in flat lines – many students even begin to decelerate after 2 or 3 days flat.

It is *very* important, when making decisions, to *ask the child* what's happening, if you can.

That's about it for this month.

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#34 April, 1981

Dear Friend,

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March Meeting

At our March session, I shared several count per week charts that Psychologists from Fernald (Sue Long, Nick Mirabile) have been using to monitor toileting schedules and behavior management recording. The charts had measurement ceilings defined by the number of opportunities per week for taking residents to the toilet (7 days x 7 opportunities = 49 per week) or the number of half-hour intervals at which self-injurious residents were observed to see if they were engaging in self injury (32 observations per day x 7 days = 224 per week). Beneath the ceilings Sue and Nick charted *actual* opportunities or intervals at which staff *did* record behavior (a staff management target) and the count per week of eliminations on the toilet or intervals per week at which SIB was observed (client behavior). We've found that the count per week chart accommodates many of the data recording systems already in place in the institution, and can provide staff with effective feedback concerning *their* performance and its effects.

I also shared a couple of charts from the Kenndey Centers for Programs in Early Development (New Bedford, Foxboro) at which I've recently been a consultant. Michelle Mayer and Denise Van Eyk, Behavior Specialists at the Kennedy Centers, made phase changes in pre-academic programs which illustrated the effects of endurance problems on classroom performance. Practicing See-Hear-Nudge/Place pieces in puzzles and Guide/Put blocks in can for 1 minute sessions, their students were making errors and "resisting" (e.g. throwing puzzle pieces) at between 5 and 15 per minute while responding correctly at equal or slightly higher frequencies, with a lot of day-to-day bounce. Changes to 15 second practice sessions eliminated the errors and refusal and produced acceleration turn-ups for correct performance.

Cathy Charles, an occupational therapist working with brain injured (previously comatose) clients, also shared a chart illustrating a similar effect on fine motor skills and compliance. It is becoming quite clear in our work with various groups that non-compliance and errors can often be a function of low proficiency coupled with excessive requirements for endurance. It seems that we need to develop relatively high levels of performance for brief periods prior to expecting correct performance to maintain or accelerate for longer durations.

Richard McManus shared a chart on which he had recorded distributions of frequencies for 1-minute timings during which he asked 7 trainees to Free/Write facts about Precision Teaching before and after an introductory training session. The median frequency increased x2.5 as a result of his presentation. Many of us who have been conducting PT training over the years have used this simple before-after measurement procedure to estimate our effectiveness and have generally found that Free/Write frequencies change between x1.5 and x2.5, on the average. This is a nice way to introduce trainees to timings while providing both trainees and trainers with some positive feedback.

Yvonne, Tylinski, of the Protestant Guild and the Northeastern Master's program in Applied Behavior Analysis, shared charts from her work training the mother of a 13-year old autistic girl. The mother was using meals as a setting for teaching her daughter to sign manually to request food. Yvonne charted the girl's signing performance as well as the mother's frequency of correctly delivering praise and food for correct signs and her own (Yvonne's) frequency of prompts to the mother. This case provides a nice example of possible charting applications in parent and staff training situations where the advisor/trainer manages an ongoing program implementation *in vivo*.

Debra McManus shared several charting applications. In training handicapped clients to operate a commercial dishwasher, she conducted daily 5-minute timings of independent correct steps per minute (in a 25-step chain), errors, and prompted steps. Although there may be quite a number of chained skills in which counting steps per minute would be inappropriate (especially in cases where the "size" of steps varies a great deal), charting steps per minute does seem useful in some instances. At least it might provide a gross measure of client progress. And it could also provide the means of directly assessing the overall effects of instruction and practice on specific isolated steps or elements.

Debra shared a yearly bar graph (interval or add/subtract scale up the left) and a count per year Standard Celeration Chart version of the same prime interest rate information. A comparison of the two revealed an advantage of using the Standard Chart—only it allowed us to predict the most recent year's interest rate on the basis of a straight line projection (celeration line) through the previous years.

Finally, Richard Asztalos discussed a 15 year old autistic student at the AMEGO School for whom he conducted a series of initial 10-day screenings and designed an interesting oral reading program. The 10-day screening included a Dolch word list that Richard's student read at a maximum of 20 words per minute with tantrums, lots of bounce and an essentially flat learning line. After several attempts to accelerate the performance, Richard hit on the idea of having the student invent his own stories, dictate them and use the transcription for reading practice. There was an immediate x5.0 jump-up in performance with correct learning at x1.3 per week and learning opportunities (errors) ÷1.2 per week. No more tantrums! At this point, performance seems to have hit a ceiling at about 120-140 words per minute, probably imposed by low frequency speech (Think/Say words is about 60-90 per minute) Richard plans to work on speaking frequencies while continuing to practice new stories. (Think/Say details from the stories has been at between 20 and 40 per minute!)

Precision Teaching IEP's

Because pinpointing requires us to be more precise in defining performance objectives than many "conventional" educators, we often generate excessively long lists of specific objectives when preparing our students' Individual Educational Plans. At a recent all-day PT event sponsored by The Network, Inc., in North Andover, Massachusetts, Bev Brown of the Sutton Public Schools shared an interesting solution to this problem. In writing IEP's, Bev recommends that we specify quarterly objectives representing moderately sized steps or slices of the curriculum but not include all the short-term pinpoints that might be necessary to reach those goals. Then, in the student's file (or on his practice sheet folder), we keep a cumulative list of the short term objectives with starting dates and frequencies, aims, and dates that aims are met. In

that way, even if the student doesn't reach a particular objective at the designated time, we'll have a record of all the sub-objectives that *were* reached. This strategy promises relief to those of us who've been fighting with the problem of making IEP's useful but finite lists of pinpoints.

Annie Desjardins on Endurance

In this and previous issues we've discussed the importance of attaining fluency, or REAPS (Retention Endurance Application Performance Standards) for short intervals before expecting greater endurance, or maintenance of fluency for longer performance durations. Annie Desjardins reports that in working with academic skills at the Quinte Learning Center, "I've been putting some of my kids on 10 second timings. They've spent weeks on 1 minute timings and haven't made it. But within a few sessions at 10 seconds some of them attained REAPS. Now we are increasing the timings and so far they haven't dropped out of the range. I'll let you know what happens. It may be a quicker way of getting to REAPS. The endurance is the part they don't have." Thank you, Annie!

Can You Pass the Pencil Test (for bounce)?

There are many kinds of pencil tests. One of them, made possible by the standard multiply/divide scale of the Standard Celeration Chart, is a test for bounce or variability from day to day (or week-to-week on weekly charts, etc.). In general, if you can cover several weeks or more of point with a pencil, with few if any dots visible beyond the pencil, then consider the data to be fairly non-bouncy. (If there *are* points beyond the width of the pencil, check out issue #29 for a rule of thumb to estimate the probability that a given outlying dot occurred by chance.) Using the pencil to cover the dots is also a rough way of estimation the direction (i.e., 'celeration) of learning lines on the chart.

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Great Falls: PT for 20 minutes a day

Those of you who are familiar with the dramatic improvements in students performance attained as a result of Precision Teaching in the Great Falls, Montana, Sacajawea Project (20-40 percentile points improvement in achievement test scores over 3 years as compared with non-PT schools and increased real estate value around teh school) should know that those effects were a result of *10-20 minutes per day of Precision Teaching* in the midst of an otherwise more or less conventional elementary school program!

That's all for this issue. Keep those charts and letters coming. Thank you for all your continued positive responses to this Newsletter.

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

#35 July, 1981

Dear Friend,

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Last Two Meetings

Our May and June sessions were lively and chart-ful. At the May meeting Bea Barrett passed out copies of a column in the *TASH Newsletter* that contained some rather disparaging remarks about "high aims" such as 240 wipes per minute in a showering program. Those of you who've been working on behavioral elements in the Precision Teaching framework have learned the importance of setting high, normal proficiency aims for even our most handicapped students. But, as Bea pointed out, when discussing this work with those outside our usual communication network we probably need to be very careful in stating that these are "enabling skills" or something of the sort. We don't want to leave people with the impression that our only concern is high speed performance of isolated bits of behavior.

Wayne Robb shared a chart from his work in our laboratory with a 3-1/2 year-old boy. Wayne is trying to produce adjunctive play with toys, as a side-effect of arranging high ratio schedules of reinforcement (e.g., FR 75). His chart, derived from cumulative records in the lab, showed an acceleration over a series of half-hour sessions to about 50 per minute with FR10. The overall acceleraaion was x1.6 per week (3 sessions per week). A projection from the FR5 data bisected the FR10 data with nearly perfect accuracy, and there were no frequency jumps or celeration turns apparent at the change from FR5 to FR10.

I shared a bunch of charts from various adivsees and Fitchburg State College students, among them a couple of Sue Buehler's showing the effects of "coaching and cheerleading." Her 5 year-old student practiced putting large poppit beads together for 5 minutes per day and with small beads for .5 minutes. In each case performance had flattened out at between 4 and 8 per minute. But in each case, when Sue started "coaching and cheerleading," the frequency jumped up to around 10 per minute and turned up to an acceleration of about x1.4 per week. It's hard to define "coaching and cheerleading" which combines both antecedent prompts to go faster and subsequent praise, correction, and "enthusiasm." Ill-defined as it is, there's probably room for a lot more of this kind of teacher-student interaction in all of our classrooms (much like John Wooten's championship basketball coaching style at UCLA which included what was called "hustling" the players from the sidelines.)

At our June meeting Richard McManus shared a chart from one of his and Debra McManus's Fitchburg State students, Shelly Cohen-Nee. In an effort to manage her own stuttering, Shelly taped her speech for 5 minutes per day over a period of about 10 weeks. During that period words spoken correctly accelerated from about 50 to 100 per minute while dysfluencies decelerated from about 10 to 2 per minute. She (and her instructors) noticed improvements during the unmeasured periods of the day as well—apparently the results of this relatively small amount of daily practice and self-monitoring.

Nancy Hollingsworth and Cindy Thomas shared charts from a project involving a 31 year-old ruminator. Measuring for 90 minutes after lunch (and then, later, 90 minutes after dinner, in a multiple baseline design), they reduced ruminations from around 1 per minute to about .03 per minute (a little less than one every half hour) by requiring the client to brush with Listerine for 2 minutes after each rumination.

Katherine Ryan shared a couple of charts from her early intervention work with a 20 month-old Down's syndrome girl. Last fall, any attempts to get her to stand up ro walk were met with "spring legs"—a retraction of the legs up under the trunk in a squatting position. Working with a physical therapist, trying several different ways of getting her student to stand next to a table or chair, Katherine was able to extend the duration of weight-bearing (i.e., stands on legs) from about 15 seconds (4 per minute on the chart) to more than 10 minutes (.10 on the chart). After teaching her student to bear weight in a standing position, Katherine began providing opportunities to walk or cruise while holding onto a chair. With Nudges, the little girl accelerated from 50 to 120 steps per minute in 6 weeks and is now practicing on paralell bars.

Bill Hartman shared a chart from one of his consultations with parents who were trying to manage their 2-1/2 year-old's fussing and crying after bed-time. By ignoring crying and fussing, the parents were able to decelerate the frequency of episodes from .006 per minute to below .0018 per minute (a zero count for about 9-1/2 hours in bed per night (.01 on the chart) to zero (charted above an arbitraty ceiling of 1.0) in two weeks. Bill also re-charted the classic study on this problem (C.D. Williams. The Eliminaiton of tantrum behavior by extinction procedures. *Journal of Abnormal and Social Psychology*, 1959, 59, 269.). The celeration and durations reported in Willian's article were remarkably similar to those in Bill's case.

Self-assigned Homework

Elizabeth Haughton, first grade precision teacher extraordinaire, has been encouraging her students to do self-assigned homework, spending a little time each morning attending to and publically praising those who do it. Her students bring in all kinds of stuff, from art-work to complicated self-made practice sheets and combinations thereof. It's amazing how much the kids will challenge themselves (and skip TV to do it), given a littel encouragement and a few ideas.

Cheap Beeps

Og Lindsley and his students have found that the best way to generate lots of responding (and high starting levels of errors), in see/say facts on flashcards is to provide a pacing stimulus of some kind. One of the most available is your telephone. Dial your own number and get a 60 per minute busy signal. (See Bower & Orgel. To error is divine. *Journal of Precision Teaching*, 1981, 2, 3-12, for why you'd want to do this).

In the absence of cheap accurate timers, we've found that tape-recorded signals work very well. You can make your own by taping repeated intervals (e.g., 1 minute, 30 sec) of music, or music with beeps every x seconds, or simply beeps every x seconds. As a service, we of the MARC Behavior Research Project (same address as this Newsletter) will make you 1 hour tapes with your choice of repeated beep intervals on each side. We find that 1 minute, 30 seconds, and 15 seconds are most useful, but we'll make you any A side/B side combination of interval sizes

you like. Simply send us one or more blank 60 minute cassettes (you choice of brand and quality) with a self-addressed postage-paid return package and a $2.00 service fee per tape, and we'll send them back with beeps as soon as we can. Repeating beeps make for easier timing and practice.

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That's about all we have room for this month. I hope to see you at our next two Data-sharing meetings. Bring a chart! Or, if you live outside teh area, send me a chart and a note. That would make me feel real good.

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

Vol. 2(1), September 1982

Dear Friend,

Here is the first issue of Volume 2. Those of you who've been waiting since March had probably all but given up. The reason for the long delay in publication are multiple: slow response to subscription requests, summer vacation, procrastination, and real doubts about whether to go ahead rather than returning your checks. But the need for a relatively frequent communication channel for precision teacher remains, and this Newsletter has always seemed to fill that need.

A Note on Format and Content

Data-sharing will remain relatively informal, and we do not plan to publish charts. A number of you have requested that we publish charts in the past, but we have reason for not doing so. Charts can be summarized in text quite satisfactorily by stating beginning and ending frequencies, celerations, frequency multipliers and bounce evelope ratios. See Pennypacker, Koenig, and Lindsley, *Handbook of the Standard Behavior Chart*, Precision Media, 1972, if you're fuzzy on the technical details. Given these quantities it is possible to reproduce, at least schematically, the essentials of the original chart. Moreover, in order to keep costs down, we need to conserve space in the Newsletter. And full-page charts reduce overall ideas per page by a large factor. Finally, and perhaps most importantly, we want to encourage our entire community of charters to support the *Journal of Precision Teaching*, which **does** publish charts in all their splendor. The *Data-sharing Newsletter* is not meant to compete with Pat McGreevy's efforts in publishing the Journal. Rather, we hope to provide a different service to a slightly different, but largely overlapping readership. Otherwise we'd call this the *Chart-sharing Newsletter!*

I encourage you to send your practice and curriculum ideas, notes on new products or materials, conceptual breakthroughs and successes/learning opportunities to be shared in this Newsletter so that we can begin to create a network of useful communication. Also, encourage your students (both young and older) to do so.

A Few Thoughts from Ogden

When our last free issue (July, 1981) was ready for mailing, we were told that the Commonwealth of Massachusetts would no long subsidize it. We had included a few of Og Lindsley's ideas of that period which clearly bear repeating, for those who have not heard them. Several ideas are expressed as acronyms. For example, we need to *stop* SLOBS. That is, the idea that small or handicapped people need:

Slow presentation or talking
Loud speech
One at a time (rather than self-paced)
Big materials
Simple material

He points out that *we* learned our first language at speed, with many errors, without understanding and with full complexity.

> With respect to curriculum and methodology, Ogden says that many teachers and administrators think:
>
> HINIBU: Horrible if not invented by us.
> WINABU: Worse if not altered by us.
> ALWAMSI: At least we always must select it.

These attitudes seem to produce an aversion to using a universal measure of behavior (frequency) or a standard chart. Options for the sake of options bolster professional "identity" in the poorly trained or insecure, and preserve mediocrity in the practice of education.

Two of Og's most interesting recent statements are: that "the loss of support money is possibly the greatest thing that has happened to behavioral science," since we'll now have to produce products in the private sector rather than process; and that "the reason you do science is to stop yourself from doing ineffectice things, not to sell the data." The *products* sell. "Use charts to change your own behavior."

There are an increasing number of us who are following Og's advice to move into the private sector. Bob Spangler conducts ground training for aspiring pilots, Kent Johnson and Michael Moloney run private schools that evolved from tutoring agencies, and I'm developing staff training for a national health maintenacne coporation. Certainly ther are others of us who are beginning to take science into the marketplace. And although many of us came to education or psychology with a kind of anti-money attitude, it's becoming clearer all the time that our technology is so powerful and so needed by the culture that we have an obligation to market it, and to recognize it ourselves an an extremely valuable commodity.

Decimal-to-fraction Equivalences

In my years of teaching the chart I've always found record floors to be the most difficult part of the sequence. You can teach a few by rote (e.g., 1 minute, 30 seconds, 10 minutes), and you can show people how to chart them with frequency-finders. But many people have a very difficult time understanding what a record floor is. Among other things, I've noticed that most people are quite dysfluent at converting fractions into decimals (e.g., 1/10 into .10) and seconds into fractions of a minute. So I created a set of 75 flashcard facts that are decimal-to-fraction equivalences and session-length-to floor equivalences. If you can say the answers at 40 per minute you'll probably never have trouble with record floors. You can create your own set easily. Or, if you'd like mine, send $1.00 to the newsletter address and I'll send you a copy.

Behavioral Valence

Eric Haughton brought us the analogy between chemistry and skill development by describing relationships between skill *elements* (the smallest identifiable movement cycles) and

compounds. An interesting extension of that analogy has to do with the abiltiy of elements to form compounds. We know that smooth combination of behavioral elements requires that they occur at relatively high performance frequencies. In chemistry the combinatory capacity of atoms is dependent on their *valence* which is related to the number of high energy (also high orbiting frequency) electrons occupying the outer "shells" or orbits surrounding the nucleus. Perhaps we can begin to speak of behavioral valence in terms of relationships between standard performance frequencies and existing frequencies of behavioral elements.

Some of our recent work with severely handicapped students suggests that there many be important frequency/topography relationships affecting the synthesis of behavioral elements. Especially with learners who tend toward behavioral stereotypy, prolonged practice on a single well-defined topography (e.g. squeezing a specific rubber toy) may ultimately produce very high-rate performance of such a narrowly defined response class that the small topographical adaptations required for synthesis with one or more other elements are virtually impossible. On the other hand, if we develop practice plans that explicitly include a variety of material requiring some topographical variations then the resultant response class may provide a greater range of adatation for synthesis. That is, the learner will have acquired a more general *operation*, applicable to a broader variety of applications and linkages.

Another suggestion in need of furhter testing is that synthesis or compounding may occur most easily when elements have reached intermediate performance levels rather than their ultimate aims. We need to discover the best point along the continuum from acquisition to proficiency to begin combining elements. We know that elements do not combine easily until they have reached a minimum level of performance, but it is not clear that we should wait until all elements have reached their maximumm performance levels before starting to synthesize. Probably the best plan is to begin synthesis somewhere in the middle range while continuing to provide practice on elements in isolation. We need further exploration in this area, a fine one for many teacher's projects, Master's theses, and dissertations.

"Time Samples"

We're distressed that a lot of precision teacher have been referring to timings as "time samples." You should know that in the practice of applied behavior analysis time-sampling is a *discontinuous* measurement procedure in which an observer glances at the end of each in a series of repeated intervals to see whether or not the behaver is engaged in a specific behavior or (more often) emplaced in a particular "state" (e.g., "on task", "hands down"). The data are generally transformed into "percentage of intervals" figures. Time-sampling is very problematic and, by and large, a very unsatisfactory procedure. By appropriating the term "time sample" for referring to our *direct and continuous measurement* procedure we risk severe miscomminications. Please stop saying "time sample" when you mean "timing." (For an excellent discussion of the problems with time-sampling see: Springer, B, Brown, T., & Duncan, P.K. Current measurement in applied behavior analysis. *The Behavior Analyst*,. 1981, 4, 19-31. For an analysis of time-sampling on the standard celeration chart see: Binder, C. V., & Jameson, D. An analysis of interval size in a momentary time-samping procedure. *J. of Precision Teaching*, Vol. III, #1, Spring, 1982, 9-15).

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On Statistics

Precision teaching, with its roots in single-subject experimental design, preserves the individual learner as its object of quantitative evaluation. Most statistical procedures, as we all know, reduce groups of individuals to means or average quantities. The bulk of so-called educational research relies on such statistical procedures for its claims of "significance." The error in basing individual educational programs on average statistical outcomes is an error in statistics. Even though educators proclaim their concern with individual differences, "learning styles," etc., they continue to adopt curricula, materials, and teaching methods to be used as given with entire groups on the basis of explicit or implicit statistical evaluations. As Sir Ronald Fisher, one of the grandfathers of modern statistics, pointed out, parametric statistics and their statements of probability and significance are meant to infer average characteristics of a population from those of some smaller sample, *not* to predict individuals' responses from that of a larger group. The beauty of precision teaching is that our day-to-day educatinal "experiments" are truly individualized. And when we make general recommendatins we do so because the particular intervention has been effective with so many different individuals that we suspect it might also work in the given case. Thus, unlike most educators, we are practitioners of *inductive rather thatn hypothetical-deductive science*. (For a very sophisticated discussion of these issues and others, see: Johnston, J. J., & Pennypacker, H. S. *Strategies and Tatics of Human Behavior Research*. Lawerence Erlbaum, Hillsdale, N. J., 1980).

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Subscription to the Newsletter

Now that we have finally gotten started with this Newsletter again, we plan to keep it coming on a regular basis. At the moment, there are only 70 subscribers, a jump-down by a factor of 5 from when it was free. That's one of the reasons it's taken so long to get going....we wondered whether it was really worthwhile. But now that we're committed, we need to get more subscriptions. It only costs $10 for the year which is less than you might spend on a movie plus popcorn for two in some towns. Count the new ideas and useful pieces of information. Don't you think it's worth the money? And the more people involved, the more ideas we're likely to have. Also, if we can triple the subscription, we can cut costs through bulk mailing which means more pages per issue. Tell your friends and collegues to subscribe (e.g., Og Lindsley, Richard McManus). Include a subscription for the teachers' room in your consultant's agreement. Tell your students and your students' parents to subscribe. And *please* send in your ideas and stories and useful information so we can have more per page. This is *not* a profit-making venture, so the only reason it will keep going is if its publication is reinforced. Think about it and then see if you can help.

That's all for now. We'll have more in about six weeks. In the mean time, care enough to chart!

Sincerely,
Carl V. Binder

DATA-SHARING NEWSLETTER

Vol. 2(3), February 1982

Dear Friend,

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"Active Stimulation"

Some precision teachers who work with severely retarded students may have heard the term "active stimulation" in reference to the use of portable operant conditioning equipment with multiply handicapped learners. Dr. Edmund Zuromski, a Rhode Island psychologist coined and began to publicize this term in the mid 1970's. He proposed to counteract the passive "sensory stimulation" approach used by many developmentalists when working with the severely handicapped by encouraging teachers to arrange automated contingencies of "sensory reinforcement" for rudimentary responding. With simple operant conditioning technology and a batch of concepts taken form developmental theory, Zuromski was able to bring simple consequences (e.g., tape recorded music, battery-operated toys) under the control of very low-functioning people by building switches (e.g., press-panels and squeeze switches) that they were capable of operating. His idea was that such people, whose regular enviromnent so seldom reliably responds to their behavior, could learn "contingency awareness" by using his simple equipment.

In general Zuromski and his followers set up one of two types of arrangement between the behaver's movements and the types of music or other subsequent events. Either a single *movement cycle* against a switch would provide a brief episode (e.g., 4 or 8 seconds) of the subsequent event, or the *maintenance of a position* against the switch would hold on (or off) an ongoing event (e.g., continous music, operation of a toy, fan, etc.). In many cases they did indeed, demonstrate that the students' movement cycles were responses capable of coming under the control of reinforcing consequences, and that the subsequent events chosen for specific individuals were, indeed, reinforcing or accelerating consequences. However, there were (and are) serious limitations inherent in the "active stimulation" conceptual framework and its technical implementation. First its goals were limited. "Contingency awareness," which roughly translates as the discovery by teachers of functional responses and consequences for specific students, is a good start with the profoundly handicaped for whom it is often difficult to identify either responses or reinforcing consequences. But if we are to use these tools to develop *skills*, we must have a greater purpose than merely "awareness." Communication, transportation, motor proficiency-building, and computer-assisted instructional applications are possible goals toward which the elementary conditioning procedures might point. Second, proponents of "active stimulation" techniques, like most other educators, have by and large ignored the importance of response frequency in skill development. Those devices that require maintenance of a posture in order to maintain an ongoing event (e.g., music, fan) don't even require repeated *movement cycles*! "Active stimulators" use them because they are less expensive than episodic reinforcment programmers and because of their misconception (common among teachers of the handicapped) that stable posture is prerequisite to skill development. I've had many heated discissions with such people about the "dead man's test" (i.e., a behavioral objective must be a movement cycle,

something a dead person cannot do) and about the futility of requiring "on task" or "posture" in the absence of a *performance* (i.e., repeated movement). Devices that present an 8 second interval of music for each response limit response frequency to less than 10 movements per minute. And continuous reinforcment schedules don't encourage high frequency responding in any case. A few of the available devices allow for ratio schedules which require more than one response to produce a consequence. But even ratio schedules are weak proficiency-building strategies, it turns out. The bottom line is that most proponents of this technology do not appreciate either its laboratroy orgins or its educational implications. And precision teachers working with the handicapped may be among the few educators well-prepared to make use of these portable operant conditioning devices.

Ogden Lindsley, our progenitor, published "Direct Measurement and Prosthesis of Retarded Behavior" in 1964 (*Journal of Education*), a paper that sowed the seeds for precision teaching as well as presenting the clearest conceptual framework to date for the use of operant conditioning with the retarded. This paper should be required reading for everyoine interested in using protable automation for instruction or prosthesis. He also invented the *conjugate schedule of reinforcement* whereby a certain minimum frequency of responses is required to turn on a continuous event such as music, and the intensity of the music increased up to a maximum with the frequency of response. Although Ogden used conjugate schedules in a wide variety of laboratroy applications (e.g., to measure drug effects, depth of sleep and anaesthesia, effects of advertising, etc.), by far the most prevalent use of conjugate reinforcment has been in infant research . Infants will acquire and maintain relatively high frequencies of sucking, kicking, or other simple responses to hear mother's voice, keep pictures in focus, etc. Conjugate schedules are a natural for work with the handicapped.

With the advent of inexpensive microcomputers, we're allready beginning to see applications with the severely handicapped. Until now, however, "active stimulation" devices have been didicated machines with rather narrowly adjustable hard-wired capabilities. By far the best buy in this category is the adjustable Interval Reinforcement Timer (AIRT), available from Behavioral Devices Co. The AIRT costs under $200, is relatively flexible in its parameters, includes a built-in response counter, can arrange a "pseudo-conjugate" schedule, and will double as a potty alarm for toilet training. The Timex-Sinclair microcomputer, which sells for less than $100, seems a likely candidate for a more flexible control device if interfaced with the appropriate input/output connectors and used with cassette tape software. You'll hear more about such applications in the future.

Professional Self Management

As one of our Boston area data-sharing meeting we discussed the use of standard celeration charts for professional self-management. I, for example keep count per week and monthly charts of dollars earned and paid consulting hours. they help me to plan, and prompt me to make calls and arrange appointments in order to meet miminum performance standards and/or celeration in my consulting business. Cher Allen, of the Massachusetts regional DMH office, discussed some possible applicaitons in her own work; reports/pages written per week, per month, phone calls in/out in various categories, count and duration of unplanned interruptions. There are certainly many others that might be useful.

We'd appreciate your sending in lists of any self-management pinpoints that you or your colleagues have charted or even thought about charting. We'll publish a list in a future newsletter. Surely we should be able to apply the powerful technology to our own self-management problems!

Kent Johnson

Ono of our recent great success stories is Kent Johnson. Kent arrived at the Fernald State School several years ago with a Ph.D. in educational psychology from U. Mass. Amherst, a varied background in behavioral instruction (Charles Ferster, Fred Keller, Beth Sulzer-Azaroff, et al), a significant publication record and seemingly endless energy. We (Bea Barrett and I) turned him on to the chart and precision teaching. Subsequently, he was influenced by Eric Haughton, Owen White, Og Lindsley, and Michael Maloney. He also developed a sophisticated understanding of concept formation and Direct Instruction from the work of Engelmann. After leaving Fernald, he did a stint at Central Washington State University in the Pacific Northwest. He learned to love Seattle, on the other side of the mountains. In 1980 he moved to Seattle and found a local bank to lend him around $11,000 to start a tutoring agency in the dining room of a big old house (his rented home). He began by advertising in community newspapers and printing a brochure. After a shaky start his Morningside Learning Center began to take off. He combined precision tecahing and DISTAR techniques in an increasingly effective mix. By the fall of 1981 he had the support of enough parents to begin a full-time school. As his reputation grew and the school produced *results*, he was asked to start a second school for the 1982 school year in another part of the metropolitan area (Bellevue). Anne Desjardins, an exceptional teacher (and Haughton protege), joined him, along with other talented staff members. After less than three years Kent has a pair of successful schools that not only represent a significant success in selling our technology to the private sector, but also constitute a "laboratory" for unbridled instructional research and development. Michael Maloney, founder of his own school in Belleville, Ontario, helped Kent in his early efforts. I suspect that Kent, in the few minutes he might have free from his busy schedule, would be happy to lend others the benefits of *his* experience.

I'm sure we'll be hearing a lot from Seattle once Kent takes a pause from his development efforts to begin writing. (He is a *very* fluent writer!)

Teacher-imposed Ceiling?

Are you using more words than necessary in your receptive language instruction? If I were teaching you to tear-see/tap pictures that correspond to Japaneese words, I wouldn't keep saying "Tap this....", or "Show me....." after you knew what the task was, I'd simply say the Jananeese words, letting you tap the pictures in turn as fast as possible. We slow down our students by taking the time to repeat the same words over and over again. Also, we may actually be teaching them to ignore much of what we say. Once they've learned the task, they don't *need* to attend to the repeated phrase ("Tap the...) in order to perform correctly. Try all your procedures with a friend or colleague before using them with students and you'll be more likely to weed out the unnecessary or counter-productive components.

Concepts, Operations, and Non-instances

Concept formation is based on learning to distinguish instances of a concept (e.g., chairs) from non-instances (things that are *not* chairs). The same is true of operations. For example, we learn how to write a "Z" by practicing Z's and by receiving feedback (or no reinforcement) when we write 2's and other non-Z's. These are basic behaviroal processes of stimulus discriminations and response differentiation. Engelmann, Becker, and their associates have developed these principles into a sophisticated instructional technology represented by DISTAR and other "Direct Instruction" methods/materials. (See: Engelmann, S. *Preventing Failure in the Primary Grades*, Chicago: SRA, 1969.) For a nice application of this approach in teaching the Standard Celeration Chart, see: Maloney, Michael. Teaching the Standard Behavior Chart: a direct instruction approach. *J. of Precision Teaching*, Vol. II (4), Winter, 1982.

The DISTAR people, however, have not been attentive to fluency-building, and their measurement technology is archaic. Precision teachers, on the other hand, have the most powerful measurement and decision-making methods in the world, and have developed practice and proficiency-building into a relatively refined science. But precision teachers, until recently, have not been very attentive to acquisition methods or to the principles of concept/operation training. Fortunately we are seeing a marriage between the two. One of the firest to bridge the gap was Michael Maloney. Trained in DISTAR methodology, Michael learned about precision teaching from Eric Haughton with whom he worked at the Hastings County Board of Education (Ontario). Michael's school, the Quinte Learning Center, combines the two approaches.

Kent Johnson's schools are involved in the same integration. We are beginning to see the development of practice/measurement materials to accompany DISTAR lessons, as well as teaching (acquisition) sequences to accompany previously existing P.T. materials. In the Orange County (Florida) public schools, a number of projects have involved the two approaches and we expect to hear the results of some of that work at the upcomming Winter Conference. (Ron Stearns described some rather interesting preliminary results to me in a recent phone converation—a study in which a straight precision teaching approach seemed to have had more effect than a combination of PT and DI. We'll see what develops from that.)

Another major effect is the work of Mada Kay Morehead, Ken Howell and their associaltes at the University of Arizona. At last year's Winter Conference Mada Kay presented a criticism of traditional PT materials from a DI viewpoint and suggestions for improvement. The basic argument was that PT practice materials have often failed to include sufficient non-instances of concepts or operations to insure that students will be able to distinguish instances from non-instances in the future. A simple example is an arithmetic curriculum that never measures performance on mixed operations. If the student never works on sheets that combine addition and subtraction, for example, (s)he won't learn to look at the operation sign. We have a lot to learn from the principles of concept and operation training, and we've only just begun to integrate them with precision teaching. One of the more interesting connections is between DI's emphasis on non-instances and our renewed excitement about errors as "learning opportunities." Apparently we need to program *systematically* for errors so that they may serve as non-instances, thereby functioning most effectively as learning opportunities. As Lindsley once pointed out:

> "You don't know how he's learning to cope with errors unless you're having him make some."

We seem to be just about out of space. Please pass this issue on nto a friend and encourage him or her to subscribe.

Until next time, remember our old slogan:

"Care enough to chart!"

Sincerely,
Carl V. Binder