MERRIMACK SPECIAL EDUCATION COLLABORATIVE

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RICHARD J. LAVIN, Executive Director
LESLIE C. BERNAL, Director of Special Education

October 30, 1980

Dear Colleague:

Thank you for your letter concerning our application of Precision Teaching principles to the acquisition of gross motor skills in the severely/profoundly retarded. I apologize for the delay in getting this out to you.

We, as a Collaborative, have been experimenting here and there for over a year and are now beginning to use this system Collaborative-wide. The really nice thing about this technique is that it provides us with a standardized measurement system that can be used by and shared across all disciplines.

As you are all familiar, when we write an objective for one of our students, we are looking at their movements as indicators of whether or not they are achieving proficiency in a skill. Our methods of measuring these movements or of measuring progress are relatively arbitrary, i.e. 4/5 trials or percentage correct data, and usually these measurement systems vary depending on the discipline (PT, OT, Sp.) involved. Not only do our measurement systems differ but so do our criteria, or what must be achieved before we consider a skill or movement acquired. This inconsistency across disciplines makes data sharing extremely difficult if not impossible.

What we are looking for then is a standardized way of measuring movement. What precision teachers have offered us is the concept that countable movement occurs in time and time can be measured in a standardized way. Countable movement is any movement that has a beginning and an end and that can be repeated (Duration-type movements are also measurable in that you are looking at the length of time of 1 movement only.)

As physical therapists, we rarely study the time element in relation to the performance of a skill or movement. For example, a child may be able to come to 1/2 kneeling but if it takes him 15 minutes to assume the position, the skill is neither functional nor acceptable. We may be working on active dorsiflexion and a child may demonstrate normal or near normal strength following a manual muscle test but if this movement cannot be performed at normal rates then it cannot be considered normal. We tend to rely only on measures of strength for normalcy.

However, using time as our measurement system, we can keep track of how many movements occur in a specified period of time (frequency or counts per minute), how long a position can be maintained (duration) or how long it takes for a movement to begin. (latency). The quality of movement (strength, rom, etc.) is part of the definition of the countable movement. Data taken within the framework of frequency, duration or latency is then plotted on the Standard Behavior Chart which we then use to make data based programmatic decisions. (see example)

The specifics of chart usage are much too complicated for me to try to explain here but I refer you to Exceptional Teaching by White & Haring for a comprehensive explanation of the logistics. I have included a sample chart for your perusal. Suffice it to say that the Standard Behavior Chart has a logarhythmic or multiply/divide scale up the left hand side which allows us to see true changes in performance rates of learning, and relationships among different growth patterns. It has a calendar (days, weeks, months) scale across the bottom. A line drawn between data points will give us a slope that will indicate whether progress is being made. Generally, an increasing slope indicates progress and a decreasing slope indicates regression (for frequency counts). (see example).

This is a very brief explanation of only 1 important aspect of the Precision Teaching Methodology. The other important area that we need to discuss is how we are looking at movements now.

Traditionally, we examine a large movement or a complex chain of movements when assessing a child. We assess the total skill and in assessing and measuring the total skill we are often disappointed in the extremely slow progress our students may make. The solution then is to look at smaller movements, either the individual movements in a chain or better still to look at each of the elements of a movement in the chain. By addressing these elements in isolation, we hope to see growth in these elements where there was none in the chain. Once fluency is achieved in these elements, there is speculation that the entire chain will be fluent.

These elements are practiced in isolation until they reach "criterion" (now known as fluency). Criteria are no longer arbitrarily chosen but are based on normal adult or age/peer performance standards. The underlying philosphy is that specifying anything less than normal performance is accepting a handicapped "norm" which may ethically be unsound. If handicapped performances are accepted in even one of the elements of a movement, then performance of a compound movement as a whole will not be able to develop beyond that constraint. An accumulation of deficiencies in a number of elements produces a severely disfluent compound movement. This is the idea of "cumulative deficits."

The goal then, is to achieve fluency for all elements of a movement through paced (to normal rates) practice, which will then lend itself to fluency of the total movement and thereby discourage the acceptance of 'handicapped performances."

What is fluency? As mentioned in the previous paragraph, fluency is based on normal adult performance standards, also known as retention/application performance standards (R/APS) of that movement. We have observed that normal adults perform most elements of body movements at a pace of 100-200 counts per minute comfortably. In general, the more complex a movement, the slower the normal count/minute, so that gross motor body movements occur at 50-150 counts/minute. The MR population traditionally performs at rates lower than these norms. It is interesting to note, however, that while movements of the MR population are typically disfluent, there are some that are performed at high frequencies e.g. self stimulatory behaviors. Flapping, twiddling, rocking etc., all occur at relatively high frequencies It may be that performing movements at high frequencies (proficiently) is innately reinforcing. We have observed some of our more aggressive and noncompliant students smiling and asking for more when practicing movements in isolation at relatively high paces.

Through the use of various channels, always with normal performance rates as our aim, we can work on building fluency of the elements of more complex movements in isolation. Any movement or element of movement can be described through the use of input/output channels. Examples of input channels include guide, touch, hear, see, think, among others. Output channels include say, do a movement, point, touch, write, etc. For clarity, let me give you a few examples of activities and what channels they would include.

1. Passively moving a leg through hip flexion would be:

   guide/flex hip

2. Initial physical cues to perform hip flexion would be:

   touch/flex hip

   Oftentimes two input channels are used with the aim of decreasing or fading one of them. So that:

3. Passively moving a leg through hip flexion with verbal cue would be:

   guide.hear/flex hip

   You may want to fade the input to just a verbal cue:

   hear/flex hip

4. Verbal imitation is:

   hear/say

   The child hears what he is supposed to repeat and then says it.

5. Motor imitation is a:

   see/do

   The child sees the movement, then performs it itself.

6. If a child could imitate motor actions but was not able to follow directions for the same motor act it is possible to pair verbal cue with visual cue to get the action you want. In channel language it would look like this:

   hear.see/clap hands

   The see could eventually be faded so that the child would be responding only to the auditory cues:

   hear/clap hands

7. Various input channels can also be used to move a child from total physical assisstance to verbal cue only:

   Initially - guide.hear/put shoes on
   Interim - touch.hear/put shoes on
   Final - hear/put shoes on

   All 3 channels can and should be worked on simultaneously for fluency.

   A few more examples of channel language would be:

reading out loud	see/say
rote counting	think/say
writing name repeatedly	think/write

To summarize: What we are now addressing ourselves to is working on fluency (to normal performance standards) of the elements of a complex or compound skill in isolation through the use of many channels. These data are kept on the Standard Behavior Chart which allows us to make data-based programmatic decisions and allows us to share our information across all disciplines.

I realize that this is a very brief explanation of a complex area but I hope I have been able to give you some idea of what we are doing. For more information, please refer to the attached bibliography and feel free to contact me with specific questions. I will be happy to share any information we have.

Nancy Peatman:R.P.T., M.Ed.
Merrimack Special Education Collaborative

Bibliography:

White, O. R. and Haring, N.G. Exceptional Teaching
Columbus: Charles E. Merrill, 1976

For those of you who are not aware of it, Carl Binder, at the Behavior Prosthesis Lab located at WEFSS publishes a monthly newsletter to share results of data projects and new ideas in the field. Although not all pertain to gross motor skills, valuable information and new ideas are always included.
If you are interested please fill out the lower section and return it directly to Carl.

NAME: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

PHONE: _____

PROFESSIONAL AFFILIATION: _____

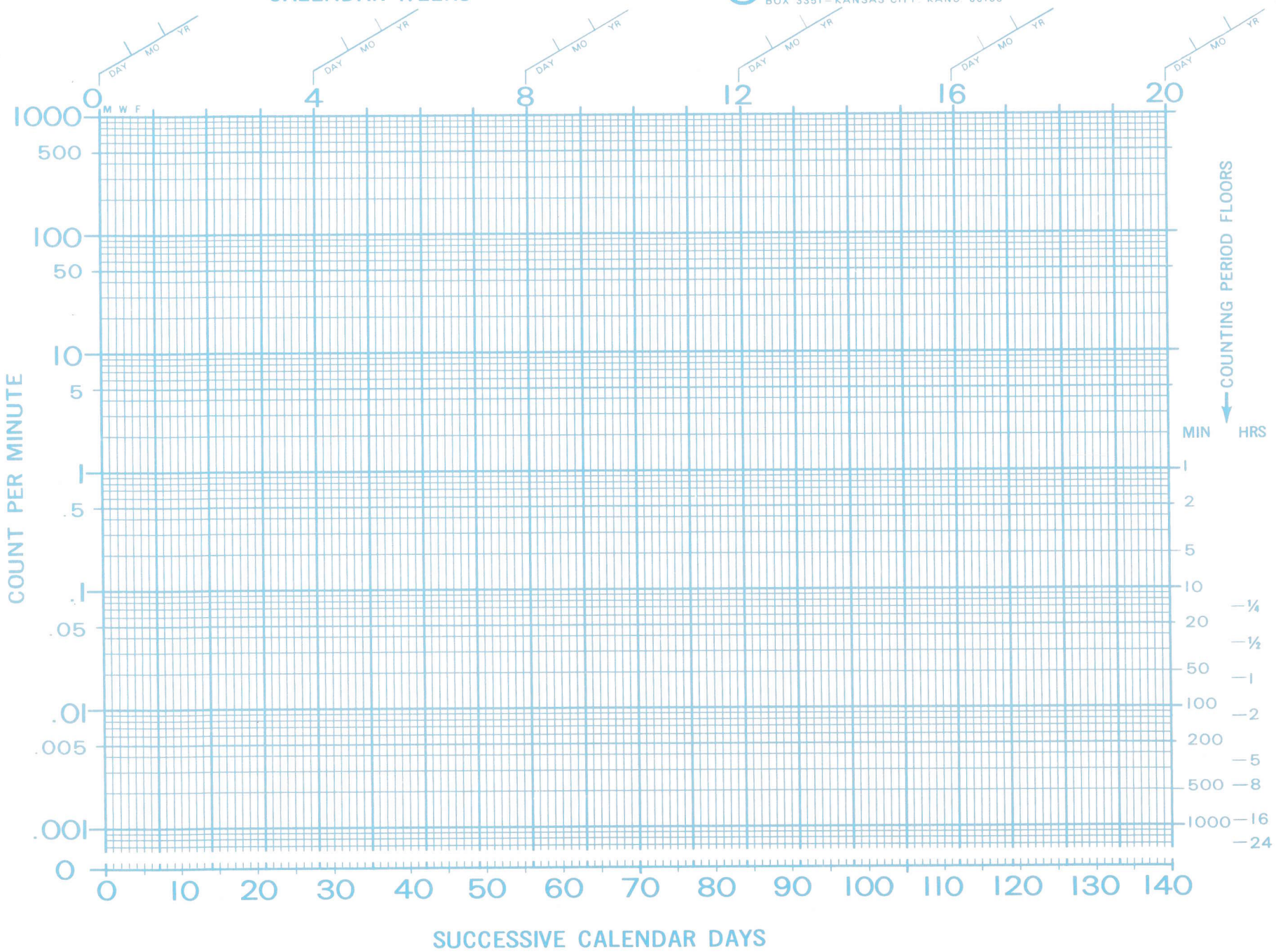
POSITION: _____

CHANGE OF ADDRESS _____ OR NEW _____

PLEASE RETURN TO:

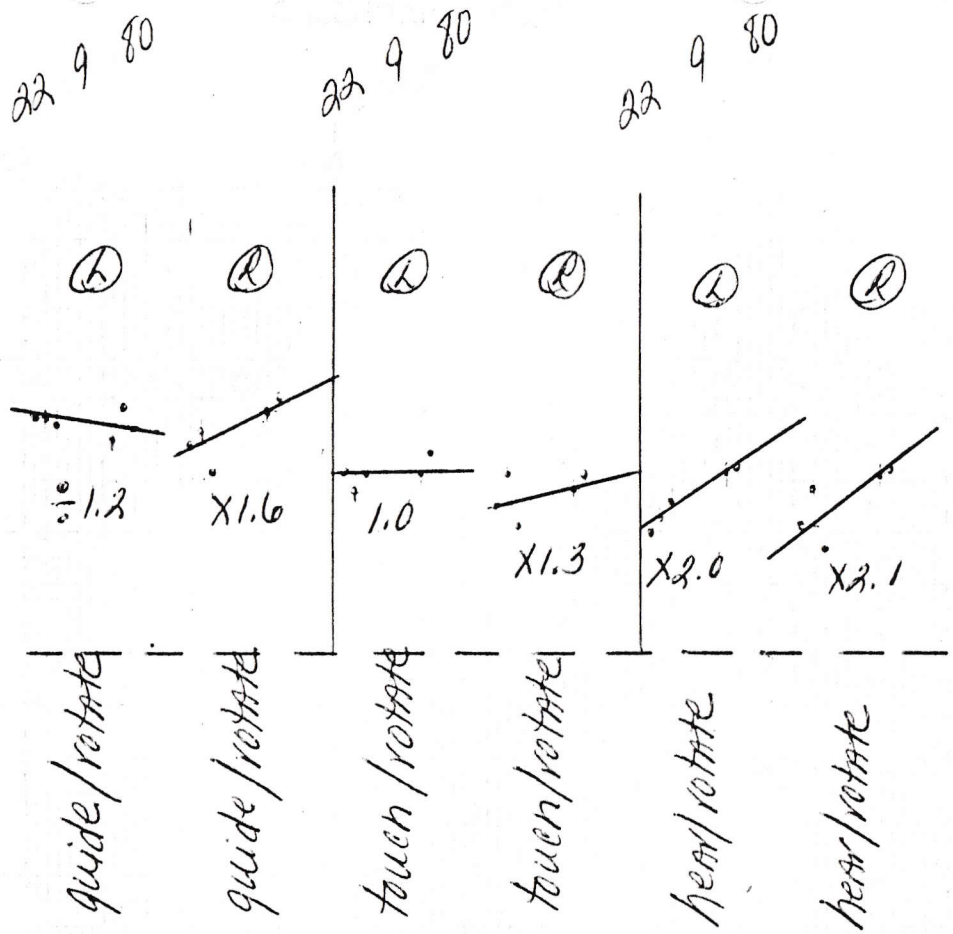
Carl V. Binder
Behavior Prosthesis Laboratory
Walter E. Fernald State School
Box 158
Belmont, Massachusetts 02178

DAILY BEHAVIOR CHART (DC-9EN)
6 CYCLE–140 DAYS (20 WKS.)
BEHAVIOR RESEARCH CO
BOX 3351–KANSAS CITY, KANS. 66103



SUPERVISOR ADVISER MANAGER BEHAVER AGE LABEL COUNTED

DEPOSITOR AGENCY TIMER COUNTER CHARTER

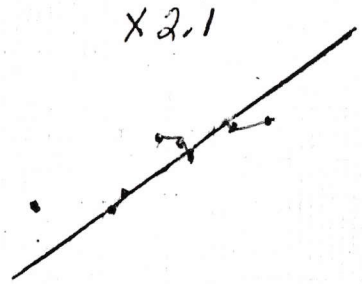


This is an example of an assessment done this fall, through 3 different channels.

Note that although rates were lower in the hear channel, the rate of growth was better.

Kunze. Pollard Merrimack Sp. Ed. Peatman Imbriglio Peatman Imbriglio Peatman Imbriglio KH Peatman Imbriglio 12 CP spastic di trunk rotations

5 10 80 2 11 80



This is a sample of a program that began Oct 5, 1980.
The accelerating slope indicates that progress is being made.

Pollard Peatman
Kunze Merrimack Sp. Ed.

Peatman Gange

Peatman Gange

JH 9 MR hearing impaired

Peatman/Gange

toe/heel touches @ foot