From Skinner to Precision Teaching: The Child Knows Best

OGDEN R. LINDSLEY
Ogden R. Lindsley, the moving force behind precision teaching, gave credit to the method's "ancestors" in his presentation. He traced the changes made in Skinnerian operant conditioning techniques and language as they moved from the laboratory to the classroom. Scientific terminology slowly gave way to precise common English that even first graders charting out their own behavior could easily understand. Lindsley also stressed the importance of those immediately involved in using precision teaching—exceptional children and their parents and teachers—in making this a usable and effective technique instead of a remote laboratory method. "We've got to put the most powerful things in the future of our culture together," he said, "and be very, very careful to share." The more simple and specific precision teaching becomes, the more people can share and benefit from its techniques.
Sources and Producers of Precision Teaching

Exceptional children, teachers, and parents produced precision teaching.

Skinner's Strategies Retained

The behavior knows best.

Frequency is a behavioral compare-all.

The source of precision teaching, of course, is the operant conditioning methods developed in the laboratory. But the real producers of precision teaching as a unique method are in special education. They are exceptional children and their teachers. If those children had not been able to communicate their skills and abilities and needs, and if their support personnel had not let the information come from child to teacher to me, I would not have had the information which forced us to change some of the strategies of operant conditioning and behavior modification into precision teaching techniques. I also want to say that one of the strong things that made me decide to leave the laboratory and go into education was the work of Sid Bijou in his lab preschools in Seattle. He had done some very interesting, very exciting work which led me to believe that maybe we could study children learning in their natural environment and that we didn’t need to put them in a box, cell, or laboratory. I’d also like to give credit here to Ted Ayllon and Eric Haughton and their work in shaping up the behavior of chronic psychotics in Saskatchewan.

Remembering that teachers and children are the real source of precision teaching, we must go back a little in history to Skinner who developed operant conditioning. From his work we derive several strategies. First and most important: the child knows best. Skinner said the rat knows best because it was the rat’s behavior he was studying. This is the principle we apply to people. The teacher knows best if we are talking about teacher behavior, but the child knows best if we are talking about child behavior.

The second important thing we get from operant conditioning is recording the frequency of behavior. Skinner called it rate, but we’ve had trouble with that word because the general public does not realize that it means “number of behaviors divided by the time it took to count it.” Thirdly, standard charting (a cumulative response record) and its efficiency were Skinner’s hallmark, Skinner himself said in 1968, “My major contributions are rate of response and the cumulative response recorder.”

The concept of rate or frequency is important to us because it is a behavior compare-all or “universal datum” in Skinner’s words. You can’t find a behavior which has no frequency, which means you can compare any two behaviors using frequency. We found recently that changes in frequency over weeks (celeration) are also universal and easy to get from our daily behavior chart. So acceleration is a learning or behavior change in frequency. We can compare, for example, the acceleration in dressing produced by smiling at a retarded child with the acceleration in algebra produced by a slight change in the mathematics curriculum of a gifted teenager. And we can say that the rewarding smile for the retarded child was one half as accelerating as the curriculum change for the teenager. Thus we can numeri-
cally measure differences in improvement between children or between curricula or between school districts.

It is only a small step from an objective acceleration number to compare child improvement to dividing it by the cost in dollars and we have our product statement for cost-benefit budgeting and the PPBE system. Using the same charts that children and teachers use to improve classroom teaching decisions for budget planning will save districts lots of money by getting two birds with one stone. Costly regular examinations will no longer be necessary.

So we’ve retained from operant conditioning the strategy of looking at frequency in multiples and the strategy of self-charting. Skinner used to say that we’ve got to externalize behavior and get it on the recorder. “It should be noted that at no point does the experimenter intervene for purposes of interpretation.” Thus you have no observer reliability problem. Another important element of the laboratory developed techniques was to record exactly what we manipulated or reinforced. In the lab that might mean the payoff electrical circuit should go exactly to the microswitch which does the recording. That is important in classroom measurement. We should record exactly what we reward and are trying to teach.

Another detail of self-recording we’ve retained from Skinner is an interest in inner behaviors. He called them “private events” and said their functions and laws were no different from those for outer behavior. He hadn’t studied inner behaviors, he said, because he hadn’t yet discovered a way to record them. People, however, as opposed to rats and pigeons, can record their own inner behaviors much the same way they record their own outer behaviors. Continuous and complete monitoring is very important for both. United Airlines has computers continually tape recording characteristics of their planes in flight. They call this “predictive maintenance.” When a carburetor—or a child—is heading for trouble, continuous monitoring gives early warning. Continuous monitoring of behavior frequency was the rule in laboratory operant conditioning. Description rather than explanation was the strategy.

This leads us to descriptive or functional definitions, one of Skinner’s major conceptual contributions. For example, Skinner functionally defined reinforcement. By putting an adjective describing the effect before the noun describing the procedure you can easily separate function from procedure in basic English. This is the easiest way to share this important distinction with children, parents, and teachers. You can have effective signals or ineffective signals, accelerating signals and decelerating signals, frequency multiplying arrangements, and cessation multiplying curricula. And you can also have rewarding rewards, ineffective rewards, or punishing rewards. If you attempt to reward and the behavior decreases, like it or not, you have a punishing reward [Figure 1].
Using our language more precisely, we separate what we did from what we had planned to do. We can distinguish our results from our hopes and thus reduce confusion in sharing our classroom experiences.

- We have also retained behavior building. Almost all of early operant conditioning involved demonstrations. In the early fifties we compelled attention by demonstrations of exceptional skill in producing dramatic and unusual behavior. We synthesized behavior in making pigeons play ping-pong. We did not analyze behavior into its parts, or succeed in finding what part of a rat was most important to its figuring out how to run through a maze. We produced behavior; we did not analyze it.

It was skill in producing behavior that convinced the pioneers. What made me an early operant conditioner was that only one month after learning the method, I was able to learn from Samson Rat how to teach him to lift over 250 percent of his own body weight in only four days of training. Skinner knew this and used to say, “The animals make operant conditioners; I don’t.”

We should also remember that in free operant conditioning the behaver is free to behave at any moment. There are no trials (as there are in controlled operant conditioning), just learning or class periods.
The pigeon in his chamber or the child in her classroom can go as fast and as far as their abilities permit—all limits are theirs alone.

Another important point which is often overlooked is personalized procedures. Skinner and I, he a full professor and I his graduate student, once spent a whole Saturday hunting for a special kind of millet for a pigeon that wasn’t performing at as high a frequency as other pigeons. Our searching for millet to fit this particular pigeon—RGY-32—was like the School Superintendent and a student teacher driving 200 miles on a weekend to find a unique curriculum for kooky Tommy. And I think this is the most important element to retain... different strokes for different folks!

☐ There are certain elements of laboratory operant conditioning we had to prune away to develop precision teaching. We had to abandon the isolated environment of the laboratory. As I said before, this was Bijou’s and Ayllon’s and Haughton’s contribution, to bring us lawful data from classrooms and wards.

Secondly we had to abandon deprivation. Although technically feasible, it is immoral to teach children by placing them in closets and depriving them of lunch, when rearranging their curricula would be as effective and less costly.

Also, we had to abandon synthetic or extrinsic consequences, except in emergencies, as too costly and unnecessary. Occasionally extrinsic rewards backfired and produced deceleration—actually being punishing rewards as shown with the M&M candy in Figure 1.

And again in the classroom improvement project shown in Figure 2, we see that “the child knows best.” I, as supervisor, and Mike Dixon, the advisor, suggested a piece of M&M candy as a reward for each numeral said correctly by Rodney, a 6 year old boy bearing the label “emotionally disturbed.” Under this “reward” his correct frequency divided by 1.5 each week—deceleration! A punishing reward!

The next person to try a helping procedure was his teacher, who suggested a star for each numeral said correctly. At first, the use of stars multiplied his frequency by 2, but as the week of stars went on, that frequency divided by 1.5. Rodney worked twice as fast, but he was losing interest at the same deceleration!

As is so often tragically the case, the last to be asked for suggestions was the behaver, Rodney. With a gleam in his eye, Rodney said, “What I would like best is when I finish my lesson, you talk to me a bit.” This multiplied his frequency of numerals said correctly by 3.0 and his deceleration or growth by 2.0!

After many experiences like this it became clear that if we were to remain scientists we must stop advising teachers to use consequences which are not part of the classroom, and urge our teachers to get suggestions from their children. With our charts to guide us we have no fear; the data tell us when we are going in the wrong—or right—direction.
We also had to abandon mechanical recording. In 1965, in Shawnee Mission, Kansas, we surveyed a group of teachers to find out what classroom behavior they wanted us to work on most. Immediately, you see, we had ruled out the children. The teachers were most bothered, they said, by talkouts and secondly by children jumping out of their seats. Harold Kunzelmann developed an automatic recorder to screw on the bottom of the seats to record the number of times weight came off the chair. To get baseline data, teachers started counting and charting out-of-seats before the boxes were installed. The problem was that many of the teachers got rid of the out-of-seat behavior before Harold could get out to their classrooms with his recorders. So there were two alternatives: to hold up teachers while we screwed on gadgets and published on behaviors that could be mechanically recorded or to become classroom teacher oriented and work with teachers and their skills and needs. So out went mechanical recording.

The next thing that had to go was laboratory jargon. The language of operant conditioning is confusing and difficult. It is not precise. And for self-charting, we needed terms in basic English so that second and third graders would know what we were talking about.

Our first signal that we should pay attention to “the child knows
"best" happened in a classroom. We had a chart of thumb-sucks by a 12 year old boy labeled "emotionally disturbed." He was tallying his own thumbsucking, but in 1966 we didn't realize how important self-recording was, so we didn't make much of it. The thumb-sucks were accelerating on the chart before any changes were made to improve the situation. Since it was worsening, Martin Bisaha, the teacher, said, "Why don't you use this to decelerate your thumbsucking?" And the little boy took the role of scotch tape from Martin's hand and put a piece over his well sucked thumb. The chart showed a rapid deceleration of thumbsucking produced by the self-applied tape. One day Martin forgot to put out the tape roll and the boy came to him and said, "May I have my little helper?"

When Martin told me this in a teacher training class a few nights later, I thought, Wow! If the child knows best what it means to him, we can't call it a punisher. It's a helper, a reminder. It's not a hurter, not a punisher. That was one of the very first clues we got that we should change some of our words and look more closely, more precisely at what people say about their own behavior.

This going from our beloved laboratory jargon to precise common English was very difficult and took years. The process is still going on. I think it is so hard because it involves changing our own thought processes—how we have been taught, at great expense, to perceive things. Here are some other examples of the changes we made.

We gave up "rate" in favor of "frequency" because people thought we meant quality (rating sheet) or value (first rate) or speed (which is distance over time). Frequency is much less misunderstood. Also some teachers, when they heard the word rate, felt all we were trying to do was increase reading speed instead of both accuracy and comprehension.

When we referred to "steep and shallow slopes" of the frequency lines on our standard chart, many thought it had something to do with skiing. Also we had trouble separating "up-slopes" from "down-slopes." Now we talk of "acceleration" and "deceleration" which are more easily connected with changes in frequency by most of us.

Discussing a logarithmic scale scared many and confused the rest, so we went to "ratio scale" which only helped a portion of us. We've recently found that the best word for elementary teachers and children is "multiply-divide" scale (Figure 3). As you go up the left of the chart by equal distances, you multiply the numbers by equal amounts or factors. If you come down by equal jumps, you are dividing by equal amounts at each jump. This seems to tie in better with people's ordinary vocabulary and the elementary math curriculum.

We began by describing the parts of the chart by the method we had last learned—formal mathematics. Thus what went up the left we called the ordinate and what went across the bottom was the ab-
We began describing the parts of the chart by formal mathematics... and had a lot of trouble teaching it.

We were brought back to precise basics by our children and teachers.

We had been remembering our plane geometry and not paying attention to what we did on the chart. In exactly this way we abandoned the abstractions we had learned and were brought back to precise basics by our children and teachers.

We went from "operant level," which was our old laboratory word for what the behavior frequency was before you rewarded it, to "base-line" and finally to the simple "before." A similar simplification trip was from "experimental conditions" or "independent variable" to "intervention" to "during," as in during SRA level 2.5 or during five minutes of listening to language tapes for each 10 math problems correct. "Extinction," which described taking out the procedure to see if the effect was durable and confusingly also described the disappearance of the effect if it was not durable, became merely "after."
There was even difficulty with the name of our whole system. In the Midwest, the most common response to the words “free operant conditioning” was that it was a way of waterproofing shoes. We didn’t want to have to unteach shoe waterproofing so we went to “behavior modification.” Many parents said that didn’t say anything. They thought we were saying, “We are going to modify your child’s behavior by behavior modification.” That meant nothing to them. Thinking that what was really new in our procedure was precision, we decided to use that as an adjective in front of whatever it was one was doing: hence, in our case, “precision teaching.”

“Subject” was our first word for the person whose behavior was being charted or improved. Its most common meaning is “one who is placed under the authority, dominion, control, or influence of something else. One who is bound in servitude to a feudal superior; a vassal.” Since we didn’t want to vassalize children, that had to go. So for several years we used the term “protege” for the person whose behavior was being charted and improved. In an inservice workshop in Hibbing, Minnesota, a lovely teacher told me at the coffee break, “Dr. Lindsley, that word protege is too high-brow, it just has to go! Find a word that has something to do with behavior.” So I got the courage to search again, and it was like a breath of fresh air when we discovered the word “bceiver.”

We had to discard the word “reinforcer” along the way. This also hurt because the word was introduced to the academic community by my dearly beloved teacher, B. F. Skinner, and was one of our old hallmarks. Regretably though, to most practitioners the most common meaning was “bridge abutment.” In the plural it produced “military troops” as the most common understanding. Awkwardly we played around with “accelerating consequence” for a while, but it is hard to say and harder to teach. I think that now, with our charts and 12,000 behavior improvement projects stored in the Behavior Bank’s computers, we have enough hard science to be secure enough to talk like people again. We can start using basic English precisely with functional adjectives like effective reward, untried consequence, punishing reward, and rewarding punishment.

The term “pinpoint” was suggested by Ed Sebastian, one of the fathers in our first parents’ class in 1965. The class was rapidly being turned off by my scientific jargon. Pinpoints are the things you have selected to count in behavior improvement projects. As Ed said, “You pinpoint a behavior for action.” And the things you use to change behavior we now call simply “procedures” or “changes.”

“Experimentally analyze” was a term dear to my heart, for I had been a victor in the academic war that introduced the term to professionals. But our teachers didn’t want to experiment and they don’t like to analyze. And to make matters worse, the things we called experimental analyses (note the difficult plural spelling) were neither
Something Else Kind of Thing
true experiments nor analyses in the strict laboratory sense. In laboratories you pay thousands for the controls required for true experiment and analysis.

So we talked about “pragmatically selecting” things for a brief while and soon translated that into my grandmother’s law: “Try, try again.” As Grandmother Lindsley used to say, “Ogden, you will not at first succeed, so you just try, and try again.” Figure 1 shows two of these tries: the M&M’s and the marks on the child’s hand. Figure 2 shows three tries: the M&M’s, the stars, and the talk at the end of the lesson.

To cover briefly a few more changes in terminology, we went from “private events” to “mental events” to “inner behavior,” and from “public events” to “physical behavior” to “outer behavior.” From “self-control,” which implies a false duality, we went to “personal management.”

So these were some of the ways we dispensed with our laboratory jargon and still kept our priceless concepts alive, but now in a more communicable form. This gave us our four steps to success: pinpoint, chart daily, change something, and try, try again. Mix them well with your humor and love, and your children’s successes will be yours.