

Precision Teaching to Enhance Reading Skills of Introductory Psychology Students

William M. Beneke

Daily one minute timed readings (see/think) were immediately followed by one minute timed recalls (think/write). Students charted their reading and recall rates on Standard Celeration Charts, put their names on the reading, and submitted them to the instructor. This process required less than five minutes each day, produced a record of class attendance, and resulted in a 49% increase in reading rate and a 75% increase in recall rate over the semester. This procedure is a practical alternative to expansion of developmental education courses in reading and could also be used to enhance the effectiveness of existing developmental reading courses.

More students are entering college with deficient skills in reading, writing and mathematics. Plisko and Stern (1985) estimated that approximately one third of entering freshmen needs remediation. Most colleges now offer developmental instruction to meet this need. A 1985 study (Lederman, Ribaud & Ryzewic) estimated that over 60% of four-year colleges and 80% of two-year colleges in the United States offer some form of developmental instruction.

Funds available to institutions of higher education for instruction are often fixed. The expansion of developmental programs further reduces funds available for instruction in college-level courses. Current debate centers on whether developmental courses should be dropped from the curriculum and whether students with basic skill deficiencies should be admitted at all (Mickler & Chapel, 1990).

In short, colleges and universities face difficult decisions about allocating resources. Does an institution expand developmental courses in order to retain under-prepared students at the cost of reduced funding for college-level instruction? Does it maintain funding of regular academic programs and ignore the special needs of students who enter with deficiencies in basic skills? Does it deliberately exclude such students from access to higher education? Posed this way, the decision becomes a dilemma. An alternative, which avoids the dilemma, is to devise means of incorporating developmental instruction into existing college-level courses. If this can be done without degrading the quality of instruction in the college-level courses, then institutions can attempt to meet the needs of students with academic deficiencies without diverting as many resources to developmental programs.

Reading instruction seems to be a "natural" for such an approach, because reading skills are used extensively in many courses. If the content of reading instructional materials is relevant to the course objectives, reading instruction should not detract from the academic goals of a course and may even facilitate mastery of objectives. Students who are prepared should profit as well. At minimum, they would gain better understanding of the content of the reading material; optimally, they would enhance reading skills in which they are already competent.

For such an approach to be broadly adopted in higher education, it would be highly effective yet require minimum investment of time, training and materials. The time devoted to enhance reading skills in a college-level course should be limited to small portions of overall class time. Since these courses would be taught by regular faculty members who are not specialists in reading, instructional methods must be easily understood and implemented. Costly materials or equipment would divert funds away from the instructional mission, defeating a major purpose of moving reading instruction into college level courses. With these limits, the reading instruction must be demonstrably effective. Techniques of Precision Teaching offer an excellent match for these requirements. Fluency seems to be a reasonable goal for reading skills, and brief timings can be introduced in the classroom without using large blocks of time and with very little teacher training. Two studies demonstrating the efficacy of such a Precision Teaching approach have already been conducted. Staff of the Center for Individualized Instruction at Jacksonville State University (Alabama) have assisted students in improving their reading rates and

comprehension. In a study skills course, McDade, Cunningham, Brown, Boyd and Olander (1991) found that charting daily one minute timed readings alone produced significant gains in both reading rate and comprehension. John Brown, a faculty member at the Center, used Precision Teaching approaches to incorporate reading instruction into the content of a developmental writing course (McDade & Olander, 1989). Brown utilized a one minute timing of reading (*see/think*), followed immediately by a one minute timing of comprehension (*think/write*). Students charted these timings. Finally, students were given five minutes to write an essay on an assigned topic relevant to the reading of the day. This procedure resulted in students' more than doubling their average reading speed and comprehension rates in eight weeks.

My study reports an attempt to replicate and extend this line of research, incorporating Precision Teaching techniques for reading instruction into a freshman-level introductory psychology course. I adopted the approach used at Jacksonville State University, combining a one minute timed reading followed by a one minute timed recall, with daily charting.

Methods

Subjects

Forty-nine students in an experimental section of introductory psychology at Lincoln University volunteered as subjects. Lincoln University is a public, open-admissions, historically Black institution in Missouri. Introductory psychology is a general education requirement for all students seeking a baccalaureate degree at Lincoln, so it is reasonable to expect this sample to be representative of Lincoln's undergraduate student population. Six students in this group were concurrently enrolled in a developmental reading course. Composite ACT scores were available for 30 of the students. The mean ACT Composite score was 15.1 with a standard deviation of 5.3. The mean national ACT Composite score at the time was approximately 19.

The control group consisted of 53 student volunteers enrolled in two other sections of introductory psychology. Included in this group were 11 students with concurrent enrollment in a developmental reading course. Other demographic information about the controls was not obtained.

Experimenter

It is important to note that prior to this study, I had no training, formal or informal, in reading instruction. I claim no special knowledge in reading in-

struction beyond my more general training in experimental psychology, learning, and operant behavior. At the time the data were collected, I had not yet been trained as a Precision Teacher. My exposure to Precision Teaching was limited to a week I had spent in the Center for Individualized Instruction at Jacksonville State University learning about the operation of their computer-assisted instructional system, several sessions on Precision Teaching that I had attended at the Association for Behavior Analysis, and limited reading of articles reporting results of Precision Teaching.

Materials

Thirty-six reading assignments, each 500 to 600 words in length, were prepared by retyping excerpts from published material. Prior to the study, measures of reading difficulty were obtained from computer analysis of each of the 36 assignments, using a commercial software product, Grammatik III (Wampler, Williams & Walker, 1988), which calculates the Flesch-Kincaid reading level. This software has been used elsewhere in research reporting the reading difficulty of public health literature (Alvord & Cheney, 1988). The 36 readings averaged 10.0 with a standard deviation of 2.2 on the Flesch-Kincaid grade-level scale.

The assignments were prepared by retyping the original material verbatim except that every 100 words, the cumulative word count was embedded in the text (i.e., if the two hundredth word of a reading were snake in the phrase, ". . . snake rattled . . .," it would be typed as ". . . snake 200 rattled . . ."). The excerpts were taken from several sources. Readings were predominately taken from psychology sources other than the students' textbook; readings also included a few excerpts from fiction and from natural history. A six cycle, semilog Standard Celeration Chart (Pennypacker, Koenig & Lindsley, 1972) was provided for each student to record individual performance.

The course final examination for subjects in the experimental group consisted of 100 multiple-choice questions drawn from the commercially available test bank (Beneke & Hancock, 1989) for the text.

Procedure

At the beginning of each of 36 class periods, the experimental students participated in a program consisting of a one minute reading (*see/think*) followed immediately by a one minute recall (*think/write*). Students indicated the number of

words read by circling the last embedded number they had encountered in their one minute reading.

In the recall session they turned the reading sheet over to the blank reverse side and listed, in chronological order, as many ideas/concepts from the reading as they could. After the recall, students charted their reading speed and recall rate (items recalled/minute) on individual Standard Celeration Charts, put their names on the reading sheets and submitted them to the instructor. While students were charting their own progress, the instructor showed the Standard Celeration Chart with the class averages, through the preceding class, on an overhead projector. Students earned five points for each of the 36 days of participation, accounting for up to 12% of their course grade. Anyone arriving late was not allowed to participate that day. The instructor told this to the students on the first day of class, and stressed the advantages of improved reading skills. Aside from occasionally praising individual improvement, the procedures included no specific reading interventions.

Control subjects had the same one minute reading and recall timings for each of the two days at the beginning of the semester and two additional days at the end. Control students did not have Standard Celeration Charts and did not chart their reading and recall rates.

Results and Discussion

The primary finding was a substantial increase for experimental subjects in both reading and recall rates over the course of the semester. Controls did not change reading speed and showed only modest increases in comprehension. Mean daily data for all experimental students are shown in Chart 1 along with Flesch-Kincaid reading levels for each of the daily readings. The fluctuations in comprehension rate over days appeared to be inversely related to Flesch-Kincaid reading levels of the material. Reading speed showed very little bounce.

Charts for individual students were remarkably similar to the class mean chart. Data for two students are shown in Charts 2 and 3. J.B.'s reading rate (see Chart 2) increased from 200 to 300 words/minute over the semester. After some initial improvement, his recall rate appeared to be stable but inversely related to the difficulty of the reading material. P.B. (see Chart 3) showed a similar

increase in reading rate. While her recall rate was inversely related to material difficulty, the recall rate also showed substantial improvement over the semester.

Comparisons based on the mean of the first two days to the mean of the last two days of participation for each student are shown in Table 1*. Analysis of variance indicated a significant group--time interaction for reading rate, F (with 1, 98 df) = 67.63, $p < .0001$, and for recall rate, F (with 1, 98 df) = 56.48, $p < .0001$. These data indicate that experimental subjects' reading speed and comprehension rate showed significant increases. Lack of corresponding increases in control subjects indicates that the increase cannot be attributed to the practice effects of the untimed reading involved in a semester's course work.

If the reading and recall rates used as dependent variables in this study are useful measures of reading skill, they should be related to other measures of academic performance. One obvious academic measure is final exam performance. Final examination scores were available for 45 students in the experimental group. Statistical analysis indicated that end-of-course reading and comprehension rates together accounted for 19.9% of the final exam variance, with a multiple regression of 0.446 ($p < .01$). This moderate correlation is statistically significant and indicates that reading and comprehension rates are indeed useful measures of reading skill in a content area.

The social validity of this technique was further evaluated by examining student perceptions. Course evaluations were administered to the experimental class only. Embedded in the student course evaluation was a question asking students to indicate the extent to which they believed that their reading improvement transferred to reading in other settings. Although 30% of the students indicated that no transfer occurred and 5% were unsure, the majority reported either "slight" (43%) or "very much" (23%) transfer to other reading activities. Unfortunately, anonymity of the student course evaluation data form precluded relating responses on this item to the actual amount of improvement on the daily reading tasks.

*Many Precision Teachers use beginning and ending celeration frequencies, which are geometrically determined middle-end-frequencies--influenced by the total data--instead of arithmetic means of first and last two days. If celeration lines are drawn, the data are known by the Chart readings. One could read the geometric middle between any two days, as well. This is a classic example of continuing arithmetical add and subtract thinking instead of using the Chart to the fullest. (an editorial comment of Malcolm D. Neely, Consulting Editor.)

Conclusions

This entire procedure required approximately five minutes of class time each day. Besides producing the desired effect on reading speed and comprehension, it generated an attendance record and a surprising percentage of students arriving early for (an 8:00 a.m.) class. With reading materials to serve as "lead-in" to the topic, the activity serves as a warm-up, interesting students in the rest of the class. Two practical limitations of this procedure were the costs of duplicating the daily readings for each student and the advanced planning to select and retype the reading assignments. The research intentions in the present study required readings that the student had not previously encountered. In a non-research setting, controlling familiarity with the reading would be unnecessary. If readings are taken from the students' textbooks, duplicating and retyping costs could be avoided by requiring students to bring their texts to class.

If the textbook is used for the reading procedure, one would have to construct a table for each reading so that students could quickly determine their reading rate without the tedium of having to count all the words and could be shown on an overhead projector.

I also would recommend placing cumulative word counts at the end of each line rather than embedding them every 100 words. This would permit students to readily determine exact reading rates. While knowing exact rates has no effect on the appearance of the Chart, it might enhance acceptance of the procedure by students (mine were distressed when they read almost to the next imbedded number). On the other hand, such distress may be consequating to achieve aim next time. Different instruction, curricula, rapid practice, aim setting, and consequation might also yield higher reading and recall fluency rates with steeper celerations--improved students--sooner.

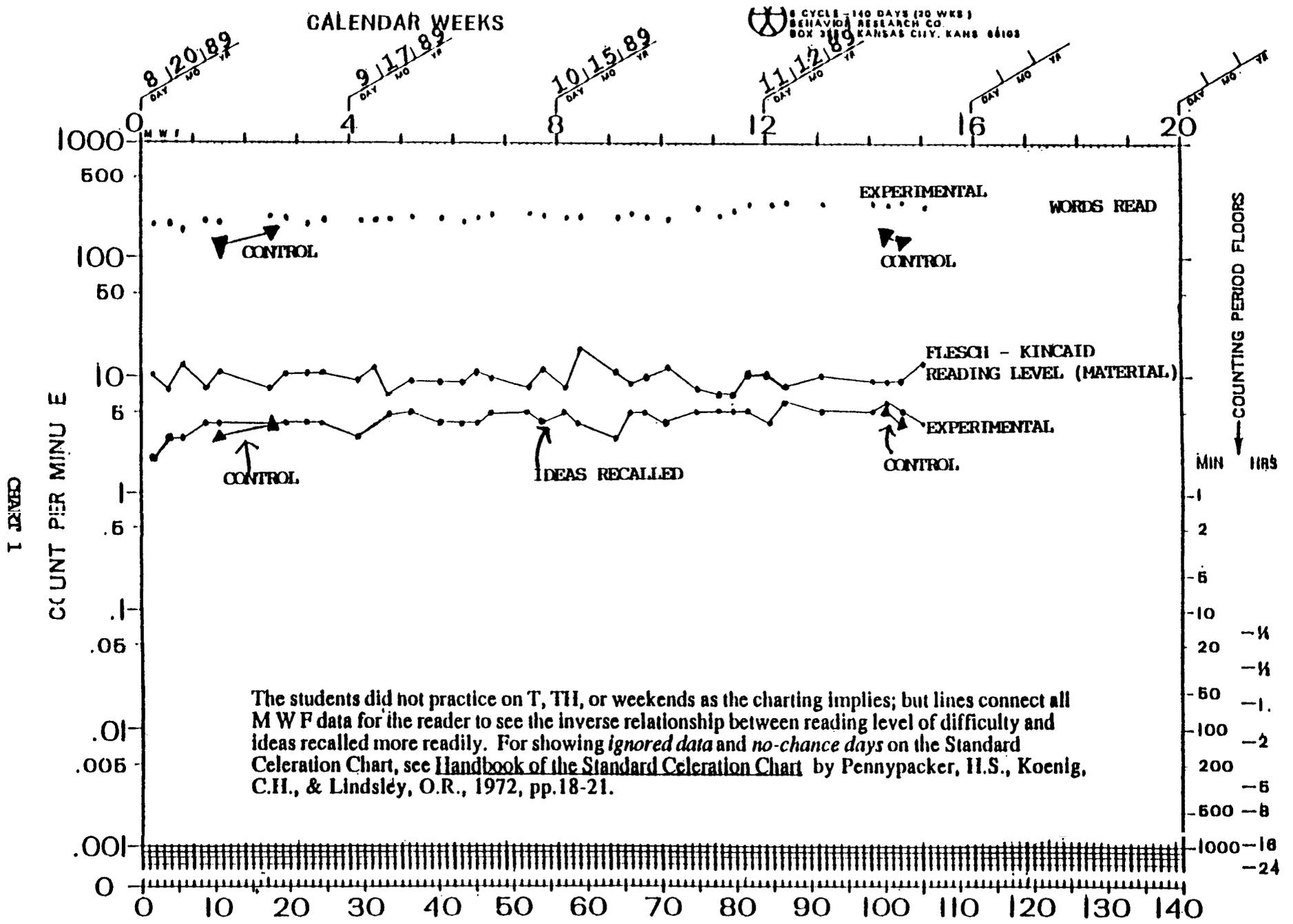
Even with the costs of selecting and providing copies of daily readings, incorporating reading activities into general education courses seems to be a promising and cost-effective alternative to expansion of developmental programs. If it were employed more generally, this approach would allow colleges and universities to meet the needs of under-prepared students without diverting funds from college-level instruction.

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Linking these instructional activities conducted in non-remedial courses to developmental instruction in reading could enhance the effectiveness of both. Students not showing adequate celeration could be referred to a developmental reading laboratory for additional timings on the same reading and other interventions as necessary.

References

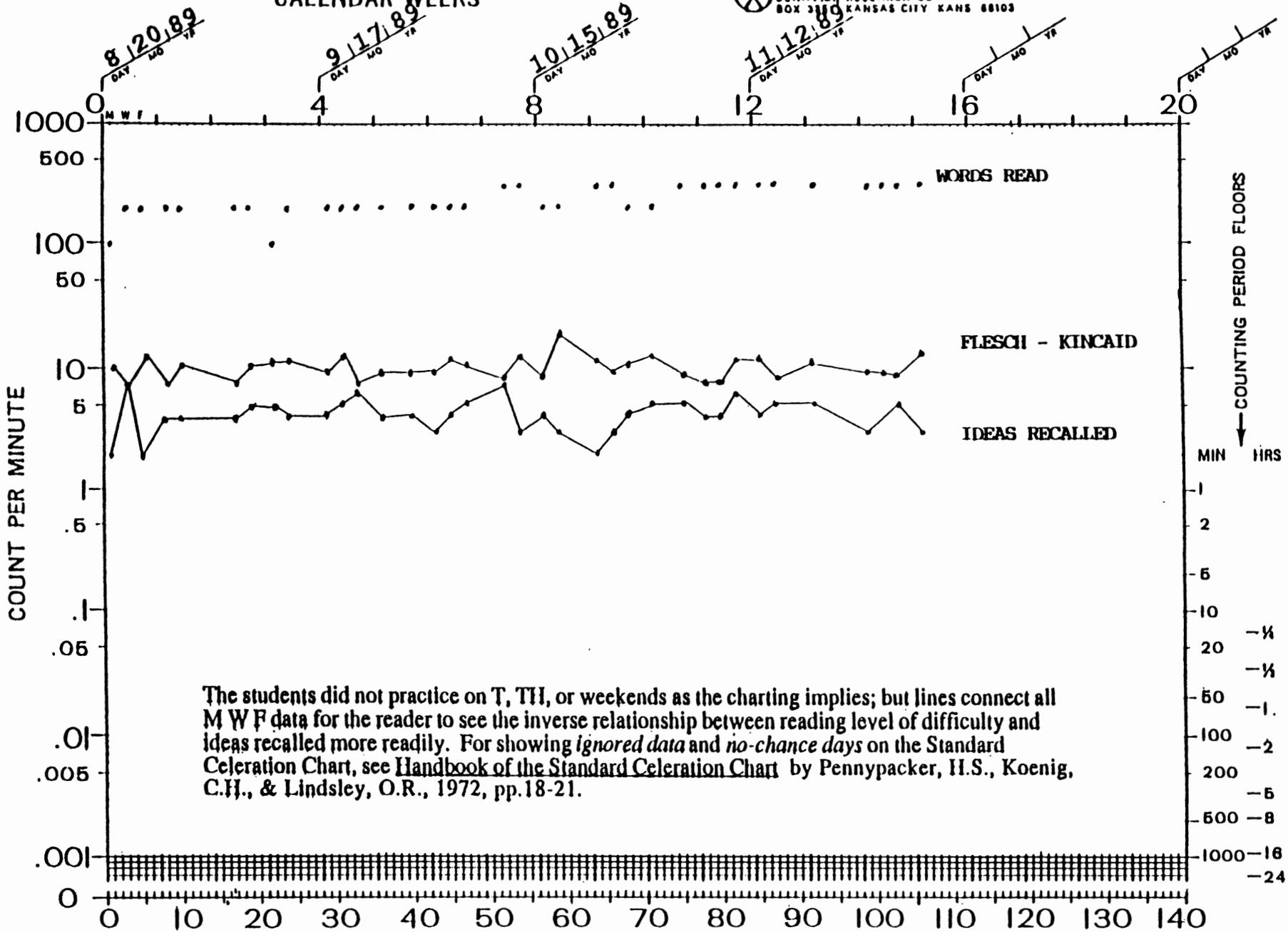
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BENEKE		BENEKE		SUCCESSIVE CALENDAR DAYS			49 PSY 101 STUDENTS			WORDS READ									
SUPERVISOR		ADVISER		MANAGER		BENEKE			53 PSY 101 CONTROL STUDENTS										
DEPOSITOR		LINCOLN UNIVERSITY		AGENCY		BENEKE		STUDENTS		COUNTER		BEHAVIOR		AGE		LABEL		COUNTED	
						BENEKE		FLESCI - KINCAID INDEX											

STANDARD CELEBRATION CHART (MCM-BEN)
 8 CYCLE - 140 DAYS (20 WKS)
 BEHAVIOR RESEARCH CO
 BOX 3189 KANSAS CITY, KANS 66103

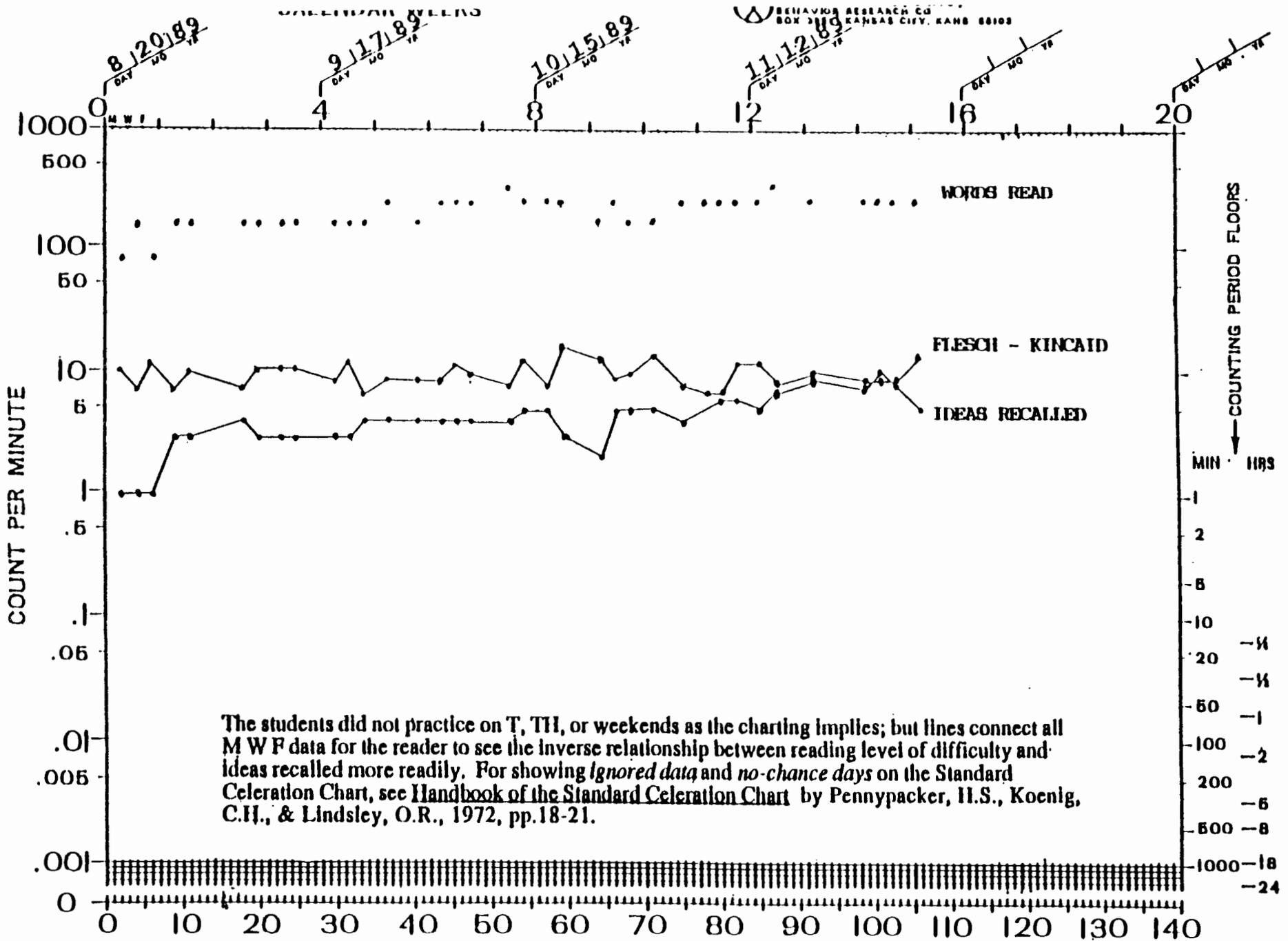
CALENDAR WEEKS



The students did not practice on T, TH, or weekends as the charting implies; but lines connect all MWF data for the reader to see the inverse relationship between reading level of difficulty and ideas recalled more readily. For showing *ignored data* and *no-chance days* on the Standard Celebration Chart, see *Handbook of the Standard Celebration Chart* by Pennypacker, H.S., Koenig, C.H., & Lindsley, O.R., 1972, pp.18-21.

BENEKE		BENEKE		J.B.		WORDS READ	
SUPERVISOR	ADVISER	MANAGER		BEHAVIOR	AGE	LABEL	COUNTED
LINCOLN UNIVERSITY		J.B.		J.B.		FLESCI-KINCAID READING	
DEPOSITOR	AGENCY	TIMER	COUNTER	CHARTER		LEVEL OF MATERIAL	

CHART 3



The students did not practice on T, TH, or weekends as the charting implies; but lines connect all M W F data for the reader to see the inverse relationship between reading level of difficulty and ideas recalled more readily. For showing *Ignored data* and *no-chance days* on the Standard Celeration Chart, see *Handbook of the Standard Celeration Chart* by Pennypacker, H.S., Koenig, C.H., & Lindsley, O.R., 1972, pp.18-21.

BENEKE SUPERVISOR **BENEKE** ADVISER **BENEKE** MANAGER
DEPOSITOR **LINCOLN UNIVERSITY** AGENCY **BENEKE** TIMER **P.B.** COUNTER **P.B.** CHARTER

P.B. BEHAVER AGE LABEL **WORDS READ** IDEAS RECALLED
 FLESCH-KINCAID READING LEVEL OF MATERIAL COUNTED