

Effectiveness of Error Correction, Error Drill, Praise, Role Reversal, and Hand Signals on Correct Rate, Error Rate, and Comprehension

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The purpose of this study was to determine the effectiveness of drill, role reversal, and hand signals on correct and error reading frequency and comprehension. The participant, "Sarah", was a grade-sixth student with learning disabilities. Data were taken at the end of each session from Sarah's basal whole language reading materials. The teacher provided verbal praise (e. g. "good" and "well done") for improved student performance at the end of the session when the participant's data were charted. Effects of various procedures were evaluated in an ABAC single subject replication design. During the first intervention error correction, error drill, and praise were evaluated. After a second baseline, a role-reversal procedure where the same procedures were used but with "Sarah" functioning as the tutor and hand signals were added. Outcomes indicated that Sarah's sec/say words in context significantly increased, while error frequency decreased during both interventions. Comprehension scores also improved. Implications of the outcomes and procedures for practice are discussed.

Reading continues to be one of the most important academic skills taught to children in today's schools. Research in reading indicates that the child who reads well, has a very high probability of being successful in school (Slavin, 1989; Slavin, Madden, Dolan, Wasik, Ross, & Smith, 1994). If reading skills are not established, the child has a greater chance of later dropping out of school, as well as being incapable of performing successfully in today's society (Hart & Risley, 1995; Howard, McLaughlin, & Vacha, 1996; Vacha & McLaughlin, 1992).

Several data-based and effective procedures from Precision Teaching (Johnson & Layng, 1994; Lindsley, 1991) have been suggested to improve the literacy of children and adults. These have included allowing the student to reread the materials several times (Sweeney, Omness, Janusz, & Cooper, 1992), error drill, where students practice the words, phrases, or sentences which they read incorrectly (Brunner, McLaughlin, & Sweeney, 1993; Freeman & McLaughlin, 1984, Smith, 1982), previewing the materials to be read (Haring & Eaton, 1978; Smith 1982), employing consequences when student performance reaches late acquisition or fluency (Haring & Eaton, 1978; Smith 1982).

Precision Teaching can also permit students to increase their opportunity to respond (Greenwood, 1991; Greenwood, Delquadri, &

Hall, 1984; Morgan & Jenson, 1988). One such procedure has been assisted reading (Hagedorn & McLaughlin, 1982) which exposes the child to accurate reading patterns either with the teacher modeling through reading or by hearing teacher-made or commercially available tape recordings of the reading passage as the child simultaneously reads orally the same passage. According to Hoskisson (1975, p. 313), "... the experience in reading they [the students] need in order to acquire the visual or graphic features that will allow them to use their knowledge of the natural way they have learned their spoken language." Assisted or repeated reading has been more commonly used to build reading rate and fluency in oral reading and to decrease the number of errors (Gregori & McLaughlin, 1996; Holmes & McLaughlin, 1987; Sweeney et al., 1992; Smith, 1979; Van Wagenen, Williams, & McLaughlin, 1994; Gilbert, Williams, & McLaughlin, 1996; Williams & Gilbert, 1984) than to improve comprehension.

The purpose of this study was to implement and evaluate a package of teaching techniques that included error correction and drill, role reversal, hand signals, and praise. Data were collected for correct and error frequency for see/say words in the context with a 12-year-old male elementary

student with learning disabilities. To extend and partially replicate our recent work (Gregori & McLaughlin, 1996) data on reading comprehension data were gathered.

Method

Participants and Setting

The participant, "Sarah," was a 12-year-old female elementary student with learning disabilities. The participant was assigned to a resource room for 30-minutes each day with the goal to increase her reading and vocabulary skills. Sarah's performance was in the low average range for reading in the regular classroom. On the *Key Math Diagnostic Arithmetic Test* (Connolly, Natchman, & Pritchett, 1976), Sarah scored a 3.9 overall grade/age equivalent in the beginning of the academic year. Results from the *Wechsler Intelligence Scale for Children - Revised* (Wechsler, 1974) were a verbal IQ of 92 + 8 and a performance IQ of 80 + 9. This yielded a full scale IQ of 82 + 7. Data were collected daily in the special education classroom by Tiffany Abrams and the teaching assistant.

Dependent Variable and Measurement Procedures

The dependent variables were see/say words and accuracy of comprehension questions over the child's reading material. Passages were taken from the stories in the child's basal whole language basal reader. During a 30-minute independent teaching session, the student completed a reading assignment without being timed, and then was tested on the words Sarah missed or were difficult for her. Comprehension questions were developed by the teaching assistant and experimenter and included information related to the reading such as "right there," "think and search", "on my own" and "writer and me" questions. For example, "What does the author mean by the statement 'right there?'" or "Find the answer to this question, 'When did John come home?' 'on your own'." Data were collected at the end of each teaching session through a 1 minute timing for correct and error words and a non-timed trial when the participant answered the comprehension questions from the reading materials.

Experimental Design and Conditions

An ABAC single case design (Kazdin, 1982; McLaughlin, 1983) was employed to assess the effectiveness of the various interventions to baseline conditions. A description of each condition follows.

Baseline 1. During Baseline 1, Sarah read reading materials from her basal reader, while the first author followed along providing feedback and error correction. A recording was taken of the words the student mispronounced, or read after a pause of 5 sec. or more, and a list of comprehension questions were formulated over the material. No praise, role reversal, or hand signals occurred during Baseline 1 which lasted four sessions.

Error correction, error drill, and praise. A one-week training session was held after Baseline 1. During training, student and teacher met individually each day to determine how much progress had been made since baseline. The first intervention attempted to increase correct and decrease error rate through instruction and error drill. Tiffany and the teaching assistant monitored the student's reading performance and provided error correction as the student read her materials orally. Also, a probe sheet was developed where Sarah practiced the words which she could not initially pronounce, substituted words or paused for longer than 5 sec. Sarah was required to repeat her error words until she could say the words without an error. She then read again from the basal reader.

Baseline 2. Baseline procedures were again implemented for one school week and four sessions. Tiffany Abrams and teaching assistant continued to record data for correct and error rate, as well as the frequency of comprehension questions answered correctly. No feedback was provided.

Error correction, error drill, role reversal, and hand signals. During this phase role reversal and hand signals were added to error correction, error drill and praise procedures. Role reversal consisted of Sarah using the follow along sheet to provide error correction and drill to the teaching assistant who deliberately read inaccurately. Hand signals involved Sarah's signaling when to begin and stop reading to the teaching

assistant. Data were taken for Sarah's correct and error rates, as well as comprehension. This last condition lasted for four sessions.

Results

Chart 1: Correct and Error Rates: See/Say Words in Context During the first baseline condition, correct rate was low and averaged 57.5, range 47 to 59, and error rate was low with a mean of 59.5, range 55 to 67. With the implementation of error correction, error drill, and praise, Sarah's correct rate increased and averaged 76.25 with a range 57 to 103. Sarah's error frequency decelerated to a mean of 37.25, range 11 to 57, indicating a cross-over jaws learning picture. Return to baseline resulted in a further increase in correct rate, mean 81.25; range 68 to 91, and a small decrease in error rate ($M = 32.75$, range 23 to 46). The addition of hand signals and role reversal to the treatment package generated further increases in correct rate ($M = 101$; range 91 to 114) and decrease in errors ($M = 3.0$, range 23 to 0). Some very impressive accelerations--x5 for corrects and +10 for errors--are seen.

A Friedman Two-Way-Analysis of Variance (Siegel, 1956) across phases was calculated. Differences between phases, corrected for ties, were found to be significant ($cr^2 = 11.1$; $p = .0112$) for both corrects and errors.

Chart 2: Frequency of Think/Say Comprehension Questions For the first baseline, the number of comprehension questions correctly answered ranged from 0 to 2, $M = 1.25$. The first intervention generated an increase in the number of comprehension questions answered correctly with mean of 3.75, range 3 to 5. Return to baseline generated a decrease in the number of comprehension questions answered correctly ($M = 2.25$; range 1 to 4). Adding role reversal and hand signals increased the number of comprehension questions answered correctly ($M = 4.75$; range 4 to 5). Friedman Two-Way-Analysis of Variance (Siegel, 1956) across phases showed differences between phases, corrected for ties, to be significant ($cr^2 = 11.1$; $p = .0112$) for both corrects and errors.

Discussion

While correct and error rates were improved with error correction, error drill, and praise, adding role reversal and hand signals had the greater effect for both corrects and errors. Return to baseline did not decrease corrects or increase errors. Academic behaviors are difficult to make to return to baseline levels (Kazdin, 1982; McLaughlin, 1983). Also, the student's rate of response was approaching fluency for the see/say words in context; some maintenance of treatment effects were being seen (Smith, 1982).

Comprehension scores did return to prior baseline levels. Sarah had far less opportunity to practice comprehension skills, compared to the number of opportunities provided for see/say words in context. Other researchers have postulated greater maintenance of treatment effects when the opportunity to practice a specific skill is higher than when it is not. This procedure has been labeled "build and sustain response fluency" (Sulzer-Azaroff & Mayer, 1991). This outcome has been documented in both the basic (Weiner, 1964) and applied research (Becker & Carnine, 1981; Young, West, Howard, & Whitney, 1986).

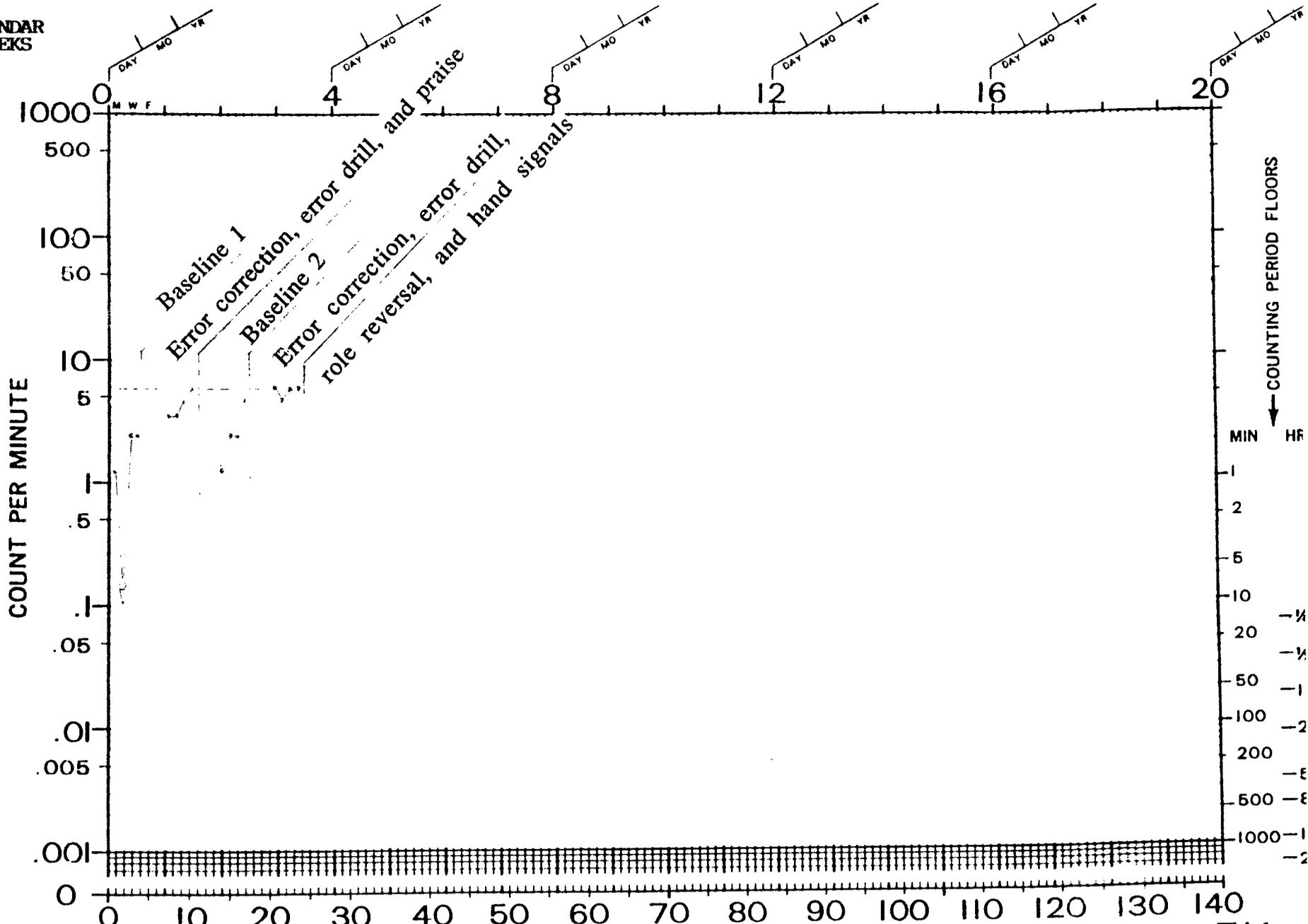
Sarah reported that she enjoyed the procedures with the words with which she had difficulty reading. She claimed they were fun and helpful; she especially enjoyed one-on-one instruction and role-reversal.

The teaching assistant also enjoyed participating in the one-on-one reading with Sarah, noting that in spite of Sarah's great difficulty with reading words, she improved her confidence with reading and learning other subject-matter areas.

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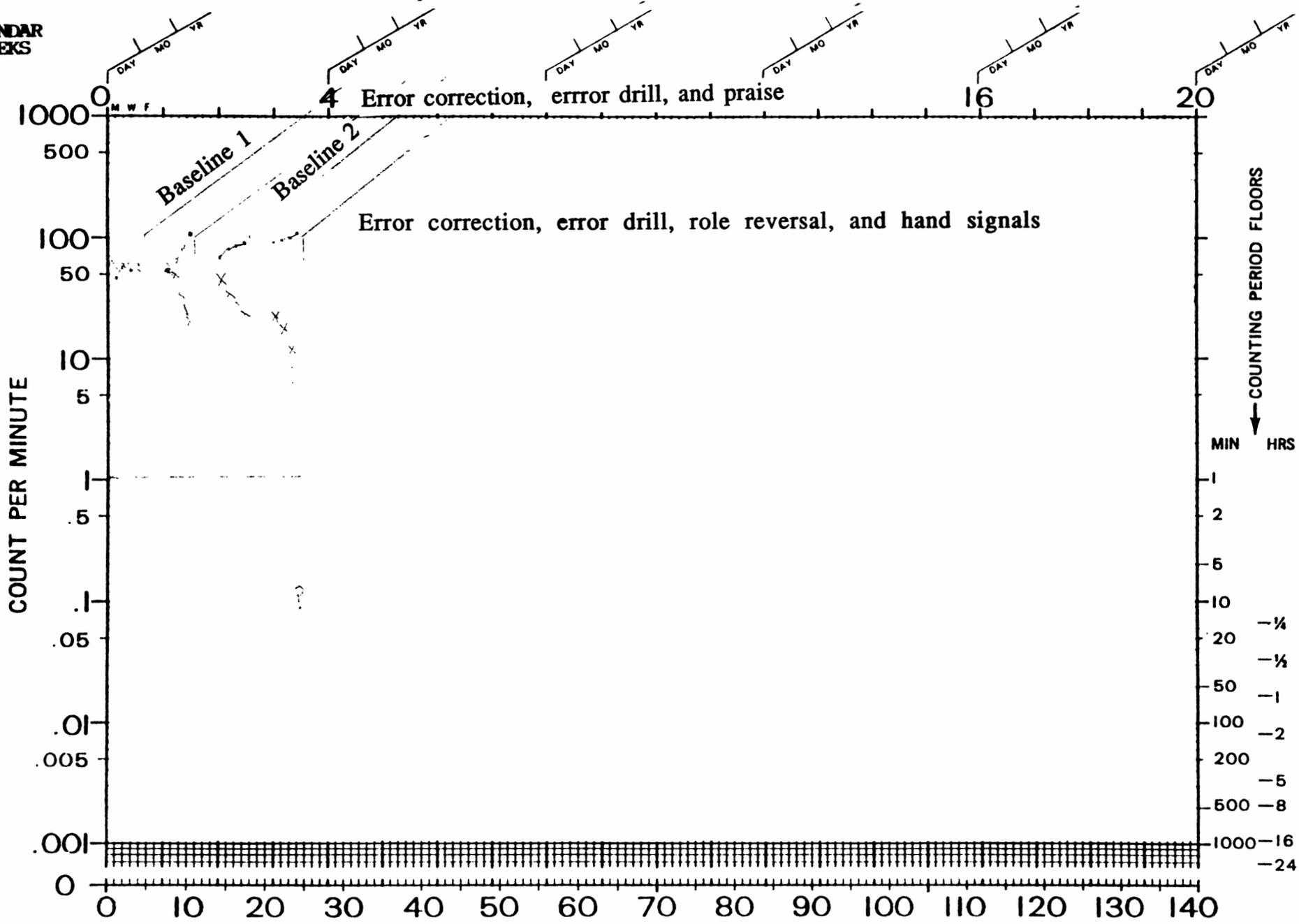
CALENDAR WEEKS



27

McLaughlin	McLaughlin	Abrams			Elementary Student	12	LD	Think to
SUPERVISOR	ADVISER	MANAGER			BEHAVER	AGE	LABEL	COUNTED
McLaughlin	Gonzaga University	Abrams	Abrams	McLaughlin				Say Ansv
DEPOSITOR	AGENCY	TIMER	COUNTER	CHARTER				

CALENDAR WEEKS



28

McLaughlin	McLaughlin	Abrams	Elementary Student			12	LD	See to Say
SUPERVISOR	ADVISER	MANAGER	BEHAVER		AGE	LABEL	COUNTED	
McLaughlin	Gonzaga University		Abrams	Abrams	McLaughlin		Words in Cont	
DEPOSITOR	AGENCY		TIMER	COUNTER	CHARTER			

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