

# SAFMEDS Design: A Comparison of Three Protocols

by

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Individuals seeking to integrate elements of precision teaching (Lindsley, 1983) into their courses want to know the best way to use SAFMEDS. There probably are as many different SAFMEDS designs in postsecondary institutions as there are precision teachers. The purpose of this study was to compare three commonly used SAFMEDS protocols to determine if design has any affect on student preference or performance.

## Method

**Participants.** In Fall Semester, 1986, seventeen undergraduate students completed Psychology (PSY) 335: Theories of Personality, in the Center for Individualized Instruction at Jacksonville State University. All students were majors or minors in Psychology.

**Procedure.** PSY 335 was precision taught within the Personalized System of Instruction (Keller, 1968). Students were required to use SAFMEDS in each of the thirteen units of material. Two doomsday clauses were included in the course design: (1) seven of the units had to be completed before mid-term and (2) the last six units had to be completed by the last day of the semester. Mastery criterion for each unit was 30 correct responses per minute. Students were also required to plot their performances on daily standard celeration charts (Pennypacker, Koenig, & Lindsley, 1972). Using the Findley Forced-Choice Procedure (Findley, 1962), students were required to use each of three SAFMEDS protocols, with mandatory change after two successive units in the same protocol.

All SAFMEDS sessions were verbal; testing was performed by the instructor or by student advisors within the Center for Individualized Instruction. Three SAFMEDS protocols were used:

- (1) Questions and Answers (SAFMEDS: Q&A) - students were given questions and answers which they were required to write on cards with the question on one side and the answer on the other;
- (2) Student Generated (SAFMEDS: S) - students were given a list of terms; they were required to construct a question for each, as well as an answer with assistance from the textbook (DiCaprio, 1983); they wrote the questions and answers on

cards;

- (3) Instructor Generated (SAFMEDS: I) - students were tested on SAFMEDS generated by the instructor which they had not seen before their initial testing on each unit; again, questions were on one side of a card with answers on the other.

Three dependent measures were used to assess the effect of SAFMEDS design on student performance: (1) the highest frequency of correct responses on each unit, (2) the number of attempts to reach mastery on each unit, and (3) the length of time to completion of the unit in each protocol. Student preference was measured by the Findley Forced-Choice Procedure.

## Results

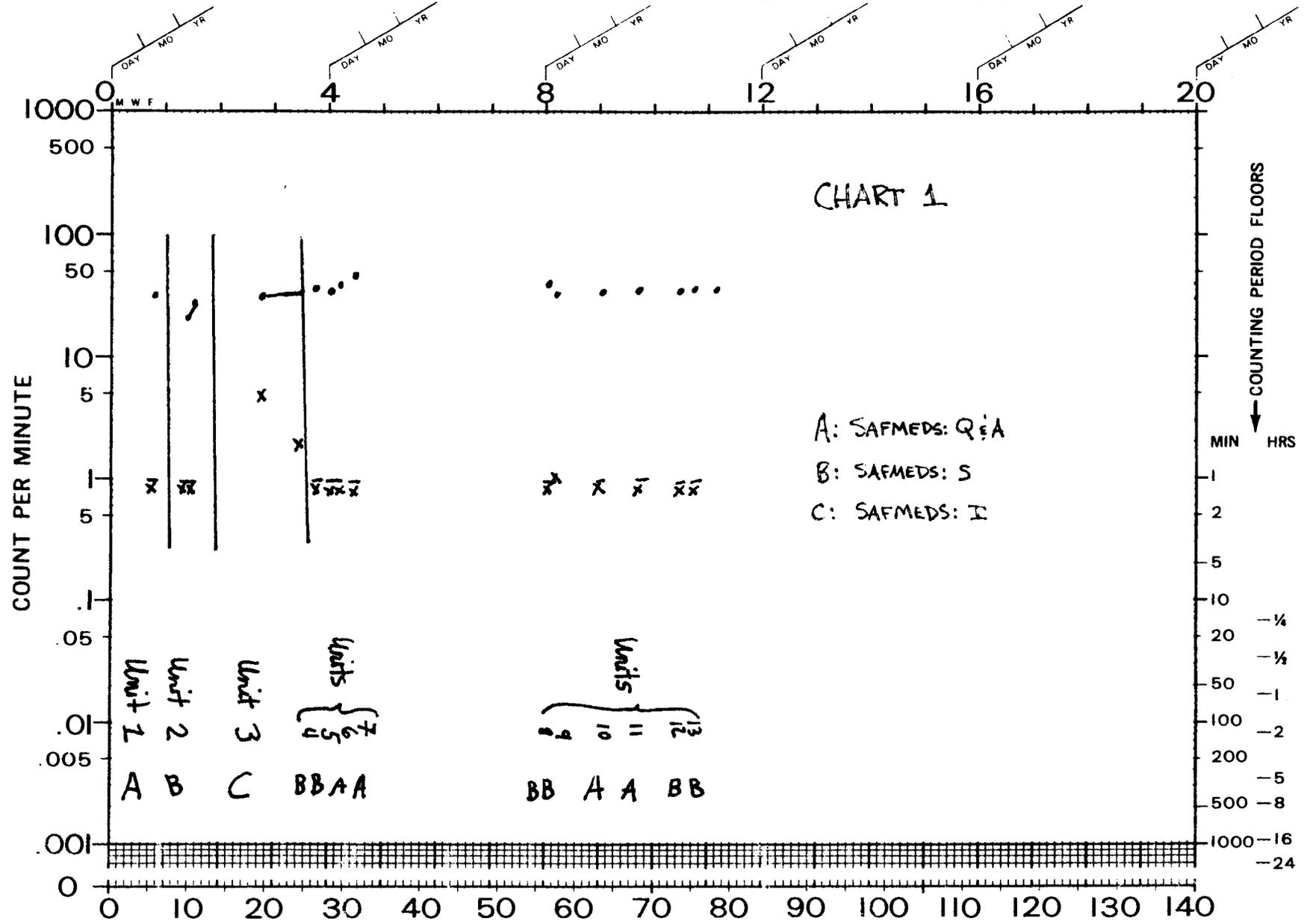
Figure 1 shows the SAFMEDS performance of one student on 13 units across the three protocols, while Table 1 indicates mean performance of students for the three protocols. Data analysis across all students indicated no significant difference in the highest frequency of correct responses on each unit. There was also no significant difference in the number of attempts to mastery on each unit. Analysis of the average time to completion of units revealed no significant difference among the three protocols either.

Even a cursory review of the students' standard charts revealed that they worked until they completed requirements for midterm, took a break, and then rushed to master the rest of the material by the end of the semester. The rest period taken by students ranged from 21 to 57 days with the average respite duration of 31 days. This break occurred regardless of SAFMEDS protocol and was positively associated with the dates of midterm and final exams. Since students were reinforced on a fixed ratio schedule, this result is predictable. When latency period to mastery in each unit was calculated with the rest period removed there was a strong correlation between student preference of SAFMEDS protocol and the period of time needed to complete the units. Students progressed faster in their preferred mode and slower in their non-preferred ones. (See Chart 2.) Their lag time in their preferred protocol averaged 2.37 days compared



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70

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SUCCESSIVE CALENDAR DAYS

J.S.  
 BEHAVIOR

Psy 335: SEE-SAY  
 AGE LABEL COUNTED

TIMER  
 COUNTER  
 CHANGER

TABLE 1

## Comparisons of SAFMEDS Protocols, Means

<u>Variable</u>	<u>SAFMEDS: Q&amp;A</u>	<u>SAFMEDS: S</u>	<u>SAFMEDS: I</u>
Highest frequency of correct response	33.82	32.78	32.77
Number of attempts to master units	1.57	1.44	1.54
Average time to master units, days	1.16	1.06	1.16
Student preference, Findley value	0.78 n = 7	0.66 n = 3	0 n = 0

with 4.14 days in their non-preferred protocol.

A definite student preference among SAFMEDS protocols was seen. Seven students preferred testing with SAFMEDS: Q&A, while 3 students preferred SAFMEDS: S, and 3 students exhibited no preference. Chart 1 also indicates a student with no particular preference. No one preferred SAFMEDS: I. The students who demonstrated a strong preference (i.e., the Findley value was greater than 8) completed units in their preferred protocol at a rate of 1.7 times faster than in their non-preferred protocol.

### Discussion

As expected there was no significant difference in frequency of correct responses, in the number of attempts to mastery, nor in length of time to master across the three protocols. This is not a surprising result since students were required to perform the same task in all protocols. The data on mean time to completion of each unit among the various protocols were confounded by the doomsday clause imposed by the instructor. As has been demonstrated in earlier studies (Lea, McDade, & Olander, 1983; McDade, Austin, & Olander, 1986), students will manipulate their testing environment in order to choose a testing mode which will accomplish their individual purpose. In this study, students exhibited a strong preference for the SAFMEDS protocol in which they progressed fastest.

The implications of this study are striking. Since there was no performance difference across SAFMEDS protocols, the Precision Teacher can take political concerns into account in determining

which design to require of students. When students must be convinced of the efficacy of Precision Teaching, SAFMEDS: Q&A may assist by allaying fears of students. When skeptical colleagues must be convinced, SAFMEDS: Student Generated may be more effective because the instructor is not "giving away answers."

A major criticism of individualized approaches to instruction is the tremendous amount of time and energy necessary to develop curriculum materials. This study suggests the instructor could reduce that investment by Precision Teaching a course using SAFMEDS: Questions. The major implication of these results is that the instructor can choose among three SAFMEDS protocols which are equally effective.

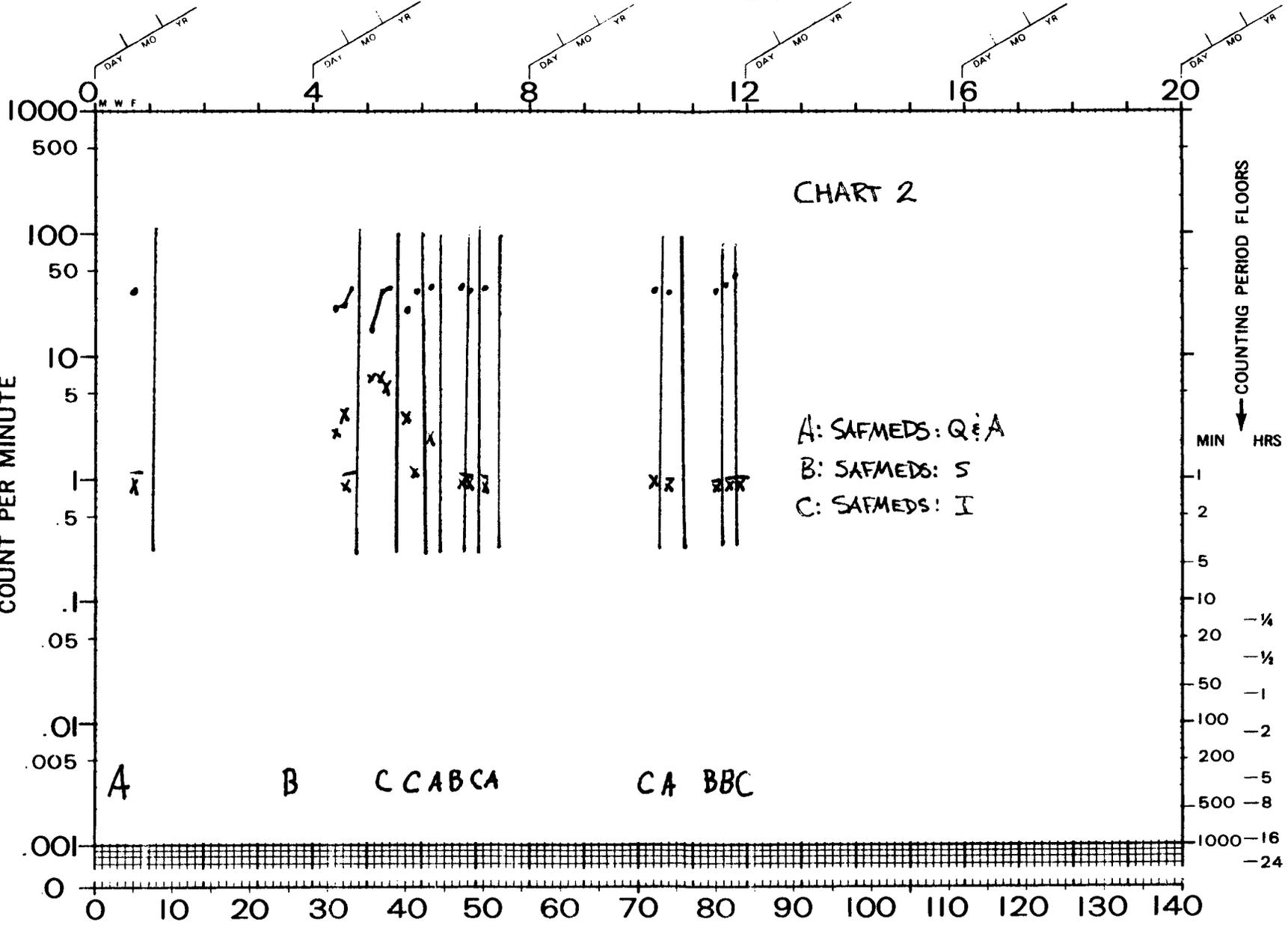
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CALENDAR WEEKS



DAILY BEHAVIOR CHART (DCM-9EN)  
 6 CYCLE 140 DAYS (20 WKS)  
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A: SAFMEDS: Q: A  
 B: SAFMEDS: S  
 C: SAFMEDS: I

A                      B                      C C A B C A                      C A                      B B C

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SUCCESSIVE CALENDAR DAYS

M.L.

Psy 335: See-Say

SUPERVISOR

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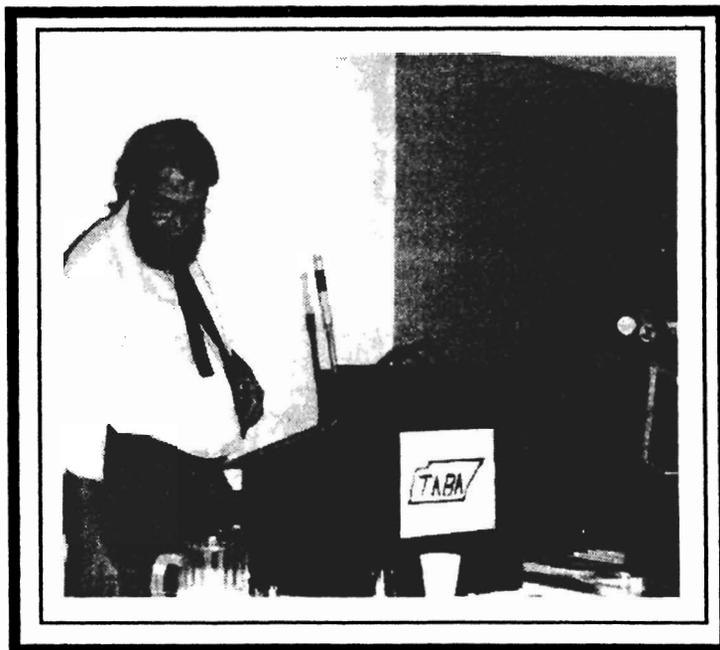
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