DOCUMENT RESUME

ED 124 090 HE 007 970

AUTHOR Gottula, Penelope; Edwards, K. Anthony
TITLE Pauses in a Self-Paced Psychology Course.
PUB DATE May 76
NOTE 24p.; Paper presented at the Annual Convention of the Midwestern Association of Behavior Analysis (2nd, Chicago, Ill., May 1-4, 1976); Not available in hard copy due to marginal legibility of original document

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS Assignments; Behavior Patterns; *College Students; *Contingency Management; Educational Research; *Higher Education; *Individualized Instruction; Laboratory Experiments; Pacing; Student Behavior; *Student Motivation; Study Habits; Tests
IDENTIFIERS *Self Paced Instruction

ABSTRACT

Length of pauses between quizzes and laboratory assignments in a self-paced psychology-of-adjustment course were examined. Students (n=31) were required to take quizzes from proctors, 15 of which were unit quizzes and five of which were unit review quizzes, and to present five laboratory assignments to the instructor during the course in a specified sequence. The course design generated several patterns of responding. More students paused before laboratory assignments than students who did not pause. It was found that students paused for longer intervals prior to submitting laboratory exercises than before taking quizzes. It was also found that students paused for shorter intervals prior to taking unit review quizzes than before taking unit quizzes. It was concluded that pauses are longer in self-pace courses when material is unfamiliar (e.g., lab work) than when material is more familiar (e.g., unit reviews). (Author/JT)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED124090

Pauses in a Self-Paced Psychology Course[1]

Penelope Gottula[2] and K. Anthony Edwards

Minot State College

Paper presented at the Second Annual Convention of the Midwestern Association of Behavior Analysis

Chicago, Illinois

May 1-4, 1976

Running head: Pauses in a Self-Paced Course

US DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED124090

Pauses in a Self-Paced Psychology Course

Abstract

Length of pauses between quizzes and laboratory assignments in a self-paced psychology ~~of adjustment~~ course were examined. Students were required to take 20 quizzes from proctors, 15 of which were unit quizzes and 5 of which were unit review quizzes, and to present 5 laboratory assignments to the instructor during the course in a specified sequence. The course design generated several patterns of responding. More students paused before laboratory assignments than students who did not pause. It was found that students paused for longer intervals prior to submitting laboratory exercises than before taking quizzes. It was also found that students paused for shorter intervals prior to taking unit review quizzes than before taking unit quizzes. It was concluded that pauses are longer in self-paced courses when material is unfamiliar (e.g., lab work), than when material is more familiar (e.g., unit reviews).

Pauses in a Self-Paced Psychology Course

One of the concerns of the teacher in a self-paced course is to get students to begin responding and then to continue responding through the remainder of the course at an essentially steady pace. Ideally, students would respond at a steady rate if the student passed a quiz on alternate days in a 40-day course with 20 units. Powers and Edwards (1974) found, however, that no single pattern of responding was typical of their class as a whole. Sutterer and Holloway (1975) were in agreement with this in their studies of self-paced courses. It was found in these studies that fixed-ratio, fixed-interval, and evenly paced responding was relatively equally divided among the students. Ferster (1968) found his students generated a fixed-interval scallop, while Lloyd and Knutzen (1969) found a general fixed-ratio pattern in the responding of their students.

Edwards and Gottula (1973), when examining differences in written and oral proctoring techniques, found that students in the oral group showed varied performances while students in the written group showed less variation in response patterns, albeit non-significantly. Sides and Edwards (1972) reported test-taking increased at the middle of the quarter when one would expect self-paced students to take a break to study for mid-term exams in other classes. It was also found that a Monday holiday disrupted test-taking on Tuesday; and, in fact, test-taking

remained low for the entire week.

Goodahl (1972) reported scalloped performances for students in a self-paced course while student-proctors taking the course at the same time responded more nearly in a straight line. It was also shown that a contingency for finishing the course early disrupted "normal" responding. When Powers, Edwards, and Hoehle (1973) gave bonus points for finishing early, response patterns were drastically changed; students in the bonus group started and finished earlier than students in the no-bonus group.

It was suspected that many factors control rates of responding in self-paced courses. In self-paced coursework taken earlier by the authors, it was observed that pausing sometimes occurred before actively responding in a particular class of materials. As in Premack's (1959) differential probability hypothesis, responding may decrease when a less probable behavior is forthcoming (Steele, 1971). The purpose of the present study was to determine if the pause before responding in a self-paced course might be longer when the response requirement was that of a different topography (i.e., unfamiliar) for students in a psychology of adjustment course compared with a familiar response topography (i.e., coursework) or extremely familiar material (e.g., unit reviews).

Methods

Subjects

Usable data from 31 students enrolled during the 1975 spring term

in a psychology of adjustment course at Minot State College were examined in this study.

Materials and Setting

The texts used in the course were Adjustment: Modification of Self-Behaviors (Edwards, 1975) and Changing Human Behavior (Schwitzgebel & Kolb, 1974). The Adjustment text was the major source for course materials and was written along guidelines suggested for courses using the Keller plan (Green, 1974). Most units began with a brief introduction, a list of study objectives, and a list of procedures. The text for the unit was followed by a set of short-answer study questions.

The outline of the coursework followed from the core text for the course (Edwards, 1975). The preface was the course syllabus. The first unit introduced the students to the course methods (Edwards & Gottula, 1976). Units 2-4, 7-10, 13-15, 18-19, and 22-23 included the text materials related to the course objectives. Units 5, 11, 16, 20, and 24 were review units covering all previous text material which had preceded the review. Units 6, 12, 17, 21, and 25 were laboratory exercises. The first four laboratory units involved steps toward a self-control project while the last laboratory unit required a final typewritten paper of 2 to 5 pages with data collected in the first four labs.

Studying and brief lectures took place in a large classroom containing about 50 movable chairs and 8 circular tables with straight-back chairs. Testing took place in an adjoining room in which three proctors were seated at a large table which held the test materials. About 20 students

could be tested at one time. No student was ever denied an opportunity for a quiz due to a lack of space. The instructor periodically monitored the students who were tested and discussed matters with the proctors. Most student-instructor interactions took place in the larger "lecture" room.

Procedures

The course was organized according to the Keller plan (Keller, 1968; 1971; 1974). Emphasis was on the written word, students were allowed to take quizzes when ready, unit mastery of 90% was required, small units were assigned, and proctors were used. Students were instructed to study each unit according to the unit procedures stated in the text and to take the unit quizzes when ready. He or she then reported to one of three proctors assigned to the section. The student signed up for the quiz, a copy of the quiz was turned over to the student, and the student took a seat in the test room. Quizzes required about 15 minutes to complete for most students. Unit quizzes were usually composed of about five multiple-choice and five short-answer essay questions. Unit review quizzes were mainly multiple-choice type.

Six proctors who had successfully obtained "A" grades in previous terms assisted in the two sections of the course. The proctors were instructed to maintain daily records of quiz-taking and quiz scores. The daily records were submitted to and reviewed by the instructor daily. Meetings were conducted once weekly and sections from the Keller Plan Handbook (Keller & Sherman, 1974) were discussed with the proctors.

All laboratory exercises were checked by the instructor, sheets dated, and submitted to the proctors for recording. As with unit quizzes, if performance was not satisfactory, students were told where they had made errors and instructed to return when the errors were corrected. When errors were made which needed correction, the attempt was recorded by the instructor on the proctor's daily records.

At the end of the term, the data were examined for mean pauses by grouping the pause lengths prior to unit quizzes for each student. Pauses are defined here as at least one session between taking quizzes or submitting a laboratory report. No pauses means that the student completed a laboratory assignment or took a second quiz on the same day as the previous unit was passed. The sums for pause lengths before all unit quizzes were divided by the number of unit quizzes taken in order to obtain the mean pause lengths. The pause lengths prior to all laboratory units were ddivided by the number of laboratory units taken in order to obtain the mean pause length for lab units. The sum of the pause lengths for quizzes an labs were analyzed by a t-test for correlated samples (Ferguson, 1976). Similarly, pause lengths prior to unit review quizzes were compared with the other unit quizzes. The sums of pause lengths for unit review quizzes were divided by the number of reviews to obtain the means for each student. The sums for pause lengths prior to unit quizzes were divided by the number of quizzes to obtain the mean for each student. Mean pause lengths for unit review quizzes and unit quizzes were compared by the t-test for correlated samples (Ferguson, 1976).

Individual records for students in the sample were grouped on the basis of five classifications: scalloping, early finishers, late finishers, late starters, and "odd-balls." Scalloping was defined roughly as those students who completed fewer than 10 units within the first 10 days of testing and finished more than 10 units in the last 10 days of responding. Early finishers were those who completed the work on or before the 25th class testing day. Later finishers were those who completed their work after the 25th class day but did not scallop. Later starters were those who began the work after the 10th testing day. "Odd-balls" were those who failed to fit into any of the above classifications. Graphs of all students were rated independently by two observers, and agreement was obtained on 84% of the graphs.

Results

Mean Pause Length

Figure 1 shows the mean pause length comparisons before responding between unit quizzes and for laboratory exercises. Using the t-test for correlated samples, mean pause lengths were shown to be statistically different ($t=3.0997$, $df=30$, $p<.01$). In all comparisons, pauses before laboratory units were greater than mean pauses before unit quizzes. The longest pause before quizzes occurred within the first 5 quizzes of the course with a mean of 1.66 days. The greatest pause before a lab occurred prior to the final lab which required a written paper with a mean pause of 2.26 days.

Insert Figure 1 about here

A second question concerned the pause length prior to the unit review quizzes compared with the pause length prior to the unit text quizzes. Comparison of the mean pause lengths for the two types of unit quizzes showed a significant difference with the pauses length prior to the unit review quizzes being less than that of the text unit quizzes ($t=8.8611$, $df=30$, $p<.001$).

Response Patterns

Patterns of responding that emerged included late starting, early and late finishing with evenly paced responding, scalloping, and some odd patterns of responding. Figure 2 shows the graph of the only late starter in this study and some "odd-balls." FW started on day 12 and finished on time on day 35. A scallop appeared as the close of the quarter term approached. One reason for this student being the only late-starter is that the other late starters dropped the course and only the finishers were included in the data reported in this study. The two "odd-balls" shown were agreed upon by both observers when examining reliability. ED paused for 5 days prior to completing laboratory exercises 2 and 3. Note also that laboratory 2 was taken out of order. DS_1 paused longer for the first half of the course creating a scallop, but the student also handed in a laboratory assignment out of sequence.

Insert Figure 2 about here

Thirty-two percent (10/31) of the students in this study were classed as early finishers. Figure 3 shows records of three typical early

finishers. HP and VP began responding on day 1 and finished on day 20. OK_1 also started on day 1 but finished on day 16. HP and VP showed a slightly decelerating curve while OK_1 showed a more varied response pattern.

Insert Figure 3 about here

Typical of the late finishers (finished after day 25) who began early and finished on time were LM, DD, and SG. Twenty-nine percent (9/31) of the students fit into this category. These students took one or two quizzes taken each day with few pauses. These patterns are shown in Figure 4.

Insert Figure 4 about here

Some students (4) started early, responded slowly at first, but finished on time. Thirteen percent of the students in this study fit into this category. This responding produced a scallop as shown in Figure 5 by LS, CL, and LV.

Insert Figure 5 about here

Pauses Before Labs

When pauses before laboratory units were analyzed, it was found that 32% of the students paused before all 5 labs. Thirty-two percent of the students paused before four of the labs, 26% before three of the labs,

and 10% before two of the labs. No student paused before fewer than two labs.

Discussion

Individual data agreed with those of Powers and Edwards (1973) and Sutterer and Holloway (1975) in general. About one-third (32%) of the students in the present study were considered early finishers. About one third (29%) of the students were classed as late finishers. The remainder were one late starter and "odd-balls" or in disagreement by the observers. It should be noted that a consistent reduction in pause length as the course progressed is apparent. This is synonymous with the "scalloped" fixed-interval response curve, the "learning curve", or the "shaping" curve.

There may be several reasons for pausing in a self-paced course. One reason might be that pause length varies with the difficulty of the response required. This may account for the variability in responding throughout the course. Although the preparer of the materials tries to maintain consistency through out the materials, a difficult unit might be detected if many students pause longer prior to any particular unit quiz. Also, the students' histories will vary enough that a particular student will pause longer on a unit where he may have difficulty alone, unlike his classmates.

Another possible explanation for pausing is interferring events. These could be classed as school-related events, natural events, and personal events. One might see pauses for most students at times of school events; such as vacations, homecoming, pep rallies, etc. One might also see pausing for most students during natural events; such as blizzards, flooding, tornadoes, flu epidemics, and the like. Less detectable may be the pausing caused by personal events; such as, weddings, births, deaths, and hang-overs.

Another possible explanation for pausing in a self-paced course is asking for a novel response. This may be the most plausible explanation in this comparison. Crossman (1971), in examining rat's responding on multiple fixed-ratio schedules, showed that a larger ratio following a smaller ratio produced longer pauses in the interval preceding the higher ratio. The laboratory exercises in this course were simple in nature, e.g. asking the student to list 10 things about himself that he would change if given the opportunity. This seems like a behavior which could be emitted within a 15-20 minute period whereas studying for a unit quiz may take 2 or 3 hours plus class time to take the quiz. Further support for this hypothesis was generated by comparison of pauses prior to unit quizzes with pauses prior to unit review quizzes. Since students were already familiar with material covered in the review units, they should be more likely to take review quizzes after a short pause.

When a teacher prepares self-paced materials for a class, it might be well to expect pauses when different classes of responding are required. While more regular responding may be gained by sticking to reading, writing, and quizzing, not all that there is to be learned can be taught by that method. It may be possible to make laboratory work simpler and clearer. By allowing a little more time for laboratory-type exercises a teacher could insure that the majority of the students will finish on time.

References

Crossman, E. K. The effects of fixed-ratio size in multiple and mixed fixed-ratio schedules. The Psychological Record, 1971, 21, 535-544.

Edwards, K. A. Adjustment: Modification of self-behaviors. Minot, North Dakota: Morgan Printing Company, 1975.

Edwards, K. A., and Gottula, P. Proctoring oral and written performance in a motivation course. Proceedings, 81st Annual Convention, APA, 1973, 8, 911-912.

Ferguson, G. A. Statistical analysis in psychology and education (4th Ed.). New York: McGraw-Hill, 1976.

Ferster, C. B. Individualized instruction in a large introductory psychology course. The Psychological Record, 1968, 18, 521-532.

Goodahl, P. PSI as viewed by an engineering student. In K. A. Edwards (Chmn.) The personalized system of instruction as viewed by students. Symposium presented at the meeting of the Rocky Mountain Psychological Association, Alburquerque, New Mexico, May 1972.

Green, B. A. Workshop on the personalized system of instruction ("PSI by PSI"). Washington, D.C.: The Center for Personalized Instruction, 1974.

Keller, F. S. "Good-bye teacher..." Journal of Applied Behavior Analysis, 1968, 1, 79-89.

Keller, F. S. A programmed system of instruction. In W. C. Becker (Ed.) An empirical basis for change in education: Selections on behavioral psychology for teachers. Chicago: Science Research Associates, 1971, 506-522.

Keller, F. S., and Sherman, J. G. The Keller plan handbook. Menlo Park, California: W. A. Benjamin, 1974.

Lloyd, K. E., and Knutzen, N. J. A self-paced programmed undergraduate course in the experimental analysis of behavior. Journal of Applied Behavior Analysis, 1969, 2, 125-133.

Powers, R. B., and Edwards, K. A. Performance in a self-paced course. The Journal of Experimental Education, 1974, 42 (4), 60-64.

Powers, R. B., Edwards, K. A., and Hoehle, W. F. Bonus points in a self-paced course facilitates exam-taking. The Psychological Record, 1973, 23, 533-538.

Premack, D. Toward empirical behavior laws: I. Positive reinforcement. Psychological Review, 1959, 2, 219-233.

Schwitzgebel, R. K., and Kolb, D. A. Changing human behavior: Principles of planned intervention. New York: McGraw-Hill, 1974.

Sides, E., and Edwards, K. A. Testing in a personalized system of instruction. In K. A. Edwards (Chmn.) The personalized system of instruction as viewed by students. Symposium presented at the meeting of the Rocky Mountain Psychological Association, Albuquerque, New Mexico, May 1972.

Steele, D. A. Punishment: A corollary to reinforcement as defined by Premack. Proceedings of the Utah Academy of Sciences, Arts, and Letters, 1971, 48 (2), 10-14.

Sutterer, J. R., and Holloway, R. E. An analysis of student behavior with and without limiting contingencies. In J. M. Johnston (Ed.) Behavior research and technology in higher education. Springfield, Illinois: Charles C. Thomas, 1975, 303-329.

Footnotes

1. Thanks are expressed to Dottie Young, Carol Brooks, Curt Krebsbach, Steve Klungvedt, Greg Oeder, and Marghi Eidsness for their proctoring.
2. Now at the Department of Special Education, Minot High School (Magic City Campus), Minot, North Dakota 58701. Reprints may be obtained from the senior author at the above address or from Dr. K. Anthony Edwards, Division of Education and Psychology, Minot State College, Minot, North Dakota 58701.

Figure Captions

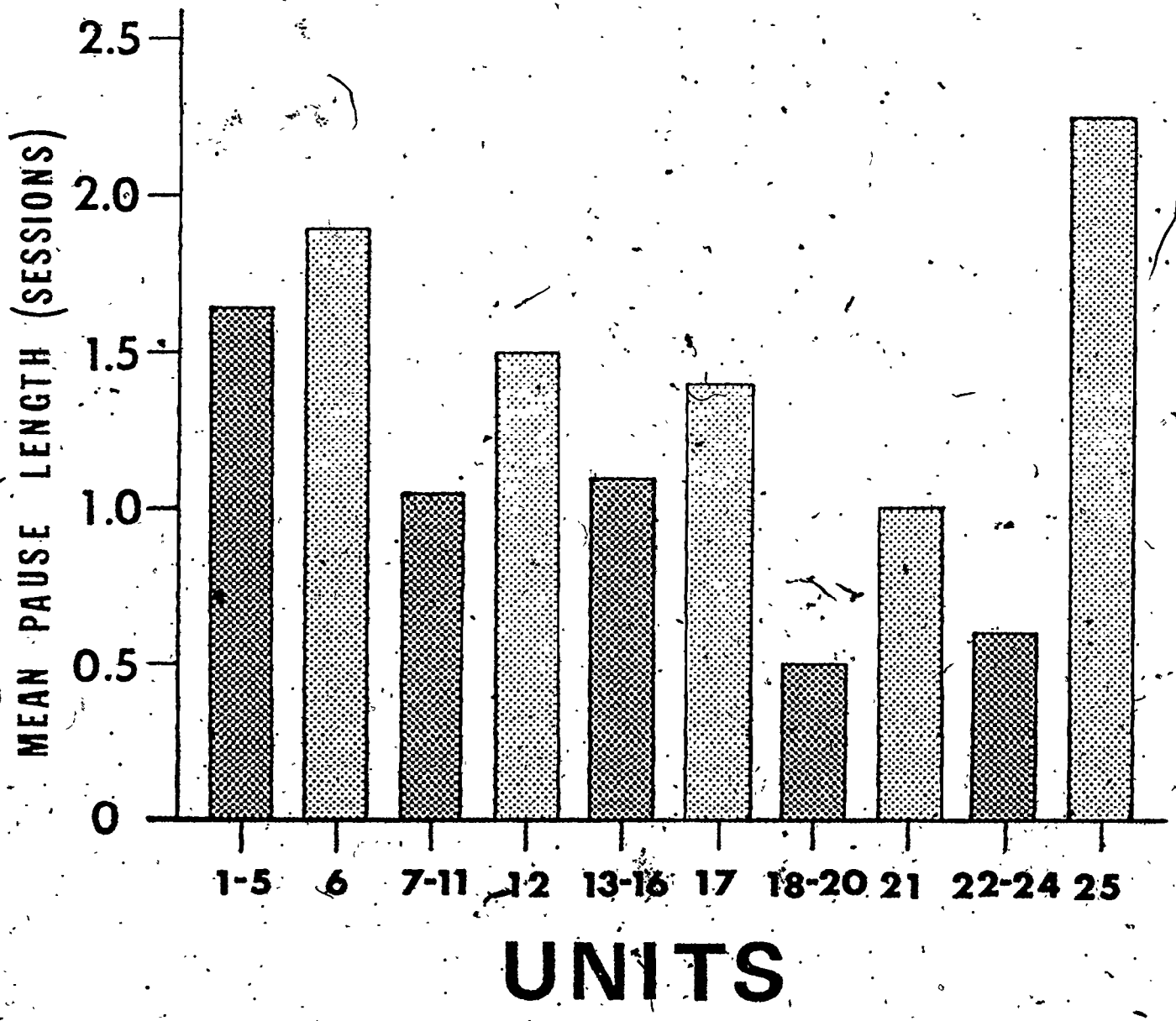
Figure 1. Mean pause lengths before unit and unit review quizzes (dark stippled bars) and laboratory unit quizzes (light stippled bars).

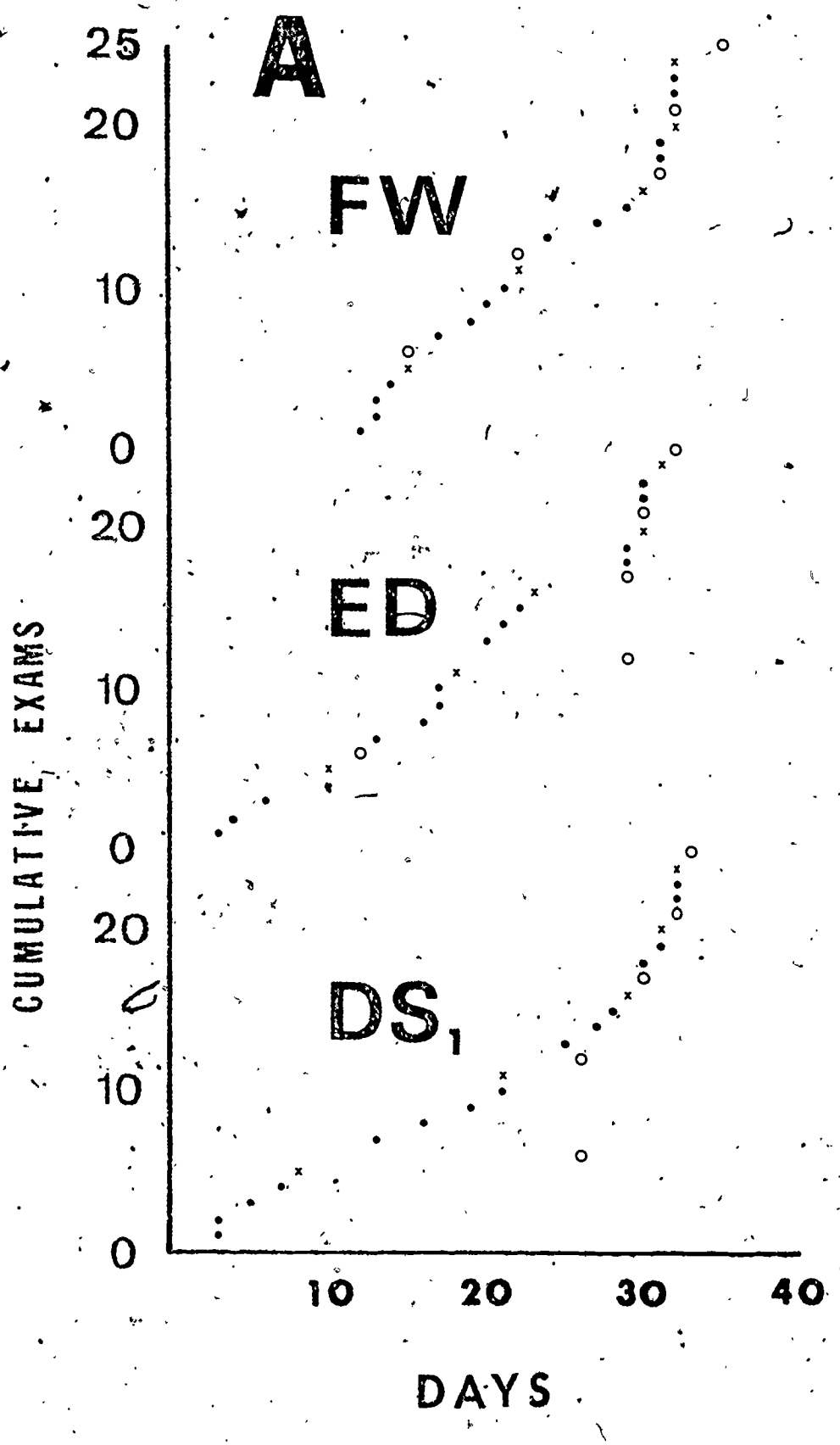
Figure 2. Cumulative exams for a "late starter" and "odd-balls" during the course. Open circles indicate laboratory units, closed circles indicate text units, and "x's" indicate review units.

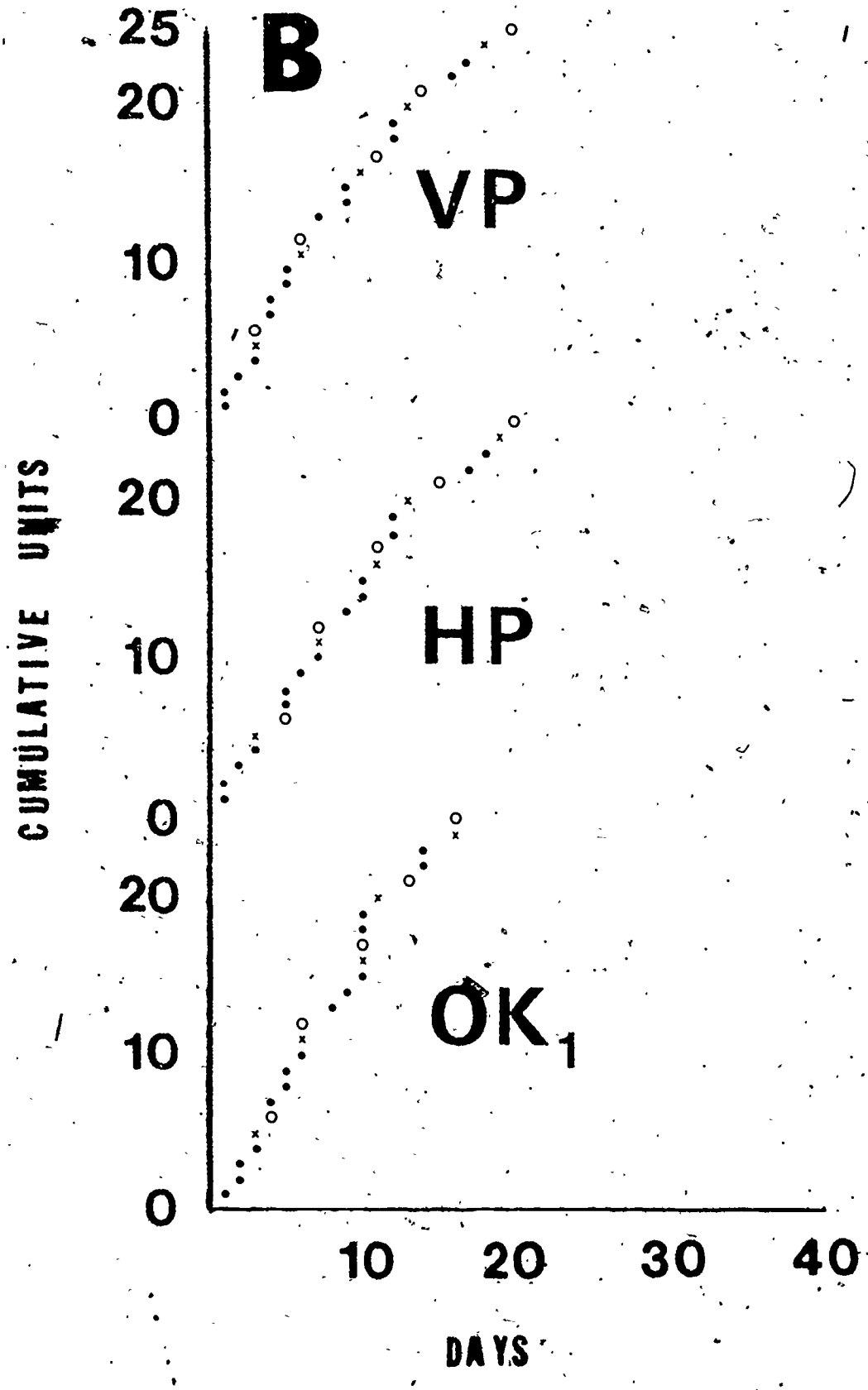
Figure 3. Cumulative exams for "early finishers" during the course. Open circles indicate laboratory units, closed circles indicate text units, and "x's" indicate review units.

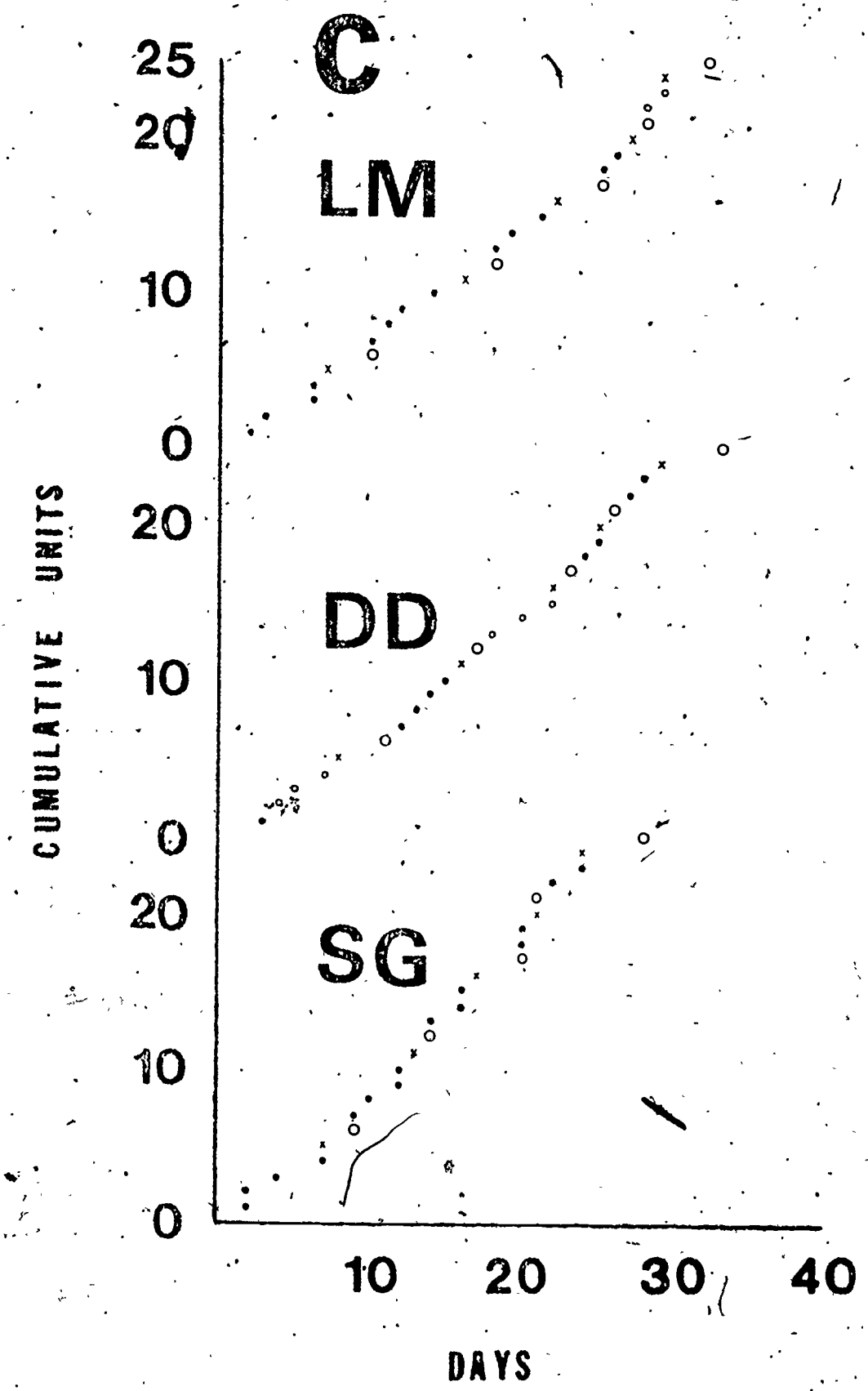
Figure 4. Cumulative exams for "late finishers" during the course. Open circles indicate laboratory units, closed circles indicate text units, and "x's" indicate review units.

Figure 5. Cumulative exams for "scallopers" during the course. Open circles indicate laboratory units, closed circles indicate text units, and "x's" indicate review units.


MEAN PAUSE LENGTH (SESSIONS)
2.5
2.0
1.5
1.0
0.5
0
1-5
6
7-11
12
13-16
17
18-20
21
22-24
25
UNITS


A
FW
ED
DS1
25
20
10
0
20
10
0
20
10
0
CUMULATIVE EXAMS
10
20
30
40
DAYS


B
25
20
10
0
20
10
0
20
10
0
VP
HP
OK1
CUMULATIVE UNITS
10
20
30
40
DAYS


C
LM
DD
SG
25
20
10
0
20
10
0
20
10
0
CUMULATIVE UNITS
10
20
30
40
DAYS

D
25
20
10
0
20
10
0
20
10
0
LS
CL
LV
CUMULATIVE UNITS
10
20
30
40
DAYS