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## Flexible vs. Instructor-Paced College Quizzing: An Analysis of Preference and Performance

James A. Atkins

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FLEXIBLE VS. INSTRUCTOR-PACED COLLEGE QUIZZING:  
AN ANALYSIS OF PREFERENCE  
AND PERFORMANCE

by

James A. Atkins, Jr.

Submitted to the  
Faculty of The Graduate College  
in partial fulfillment  
of the  
Degree of Master of Arts

Western Michigan University  
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The author, however, assumes sole responsibility for the content expressed herein.

James A. Atkins, Jr.

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Changes from the traditional lecture-exam format of instruction toward more personalized instructional methods have been rather rapid since the late 1960's. Possible reasons for such a noteworthy trend and its apparent success, might be indicated by a key word in the newer method, "personalized". Many who have passed through the more traditional or conventional lecture-exam method of instruction frequently describe it as one in which they have little, if any, choice regarding the how or when of learning.

Keller (1968), in discussing the development of Personalized Systems of Instruction (PSI), emphasizes that the "student is always right" (p. 88), pointing out that poor academic achievement or performance is more likely a function of ineffective teaching contingencies rather than some internal state of the student (e.g., illness, lack of sleep, etc.). Those who are products of the traditional or conventional educational system frequently testify to the lack of consideration given to competing required and/or reinforcing activities such as work and other non-academic areas of involvement. It would seem that emphasis and effort on the part of educators should be directed toward an examination of the variables which comprise potential reinforcing consequences, such as the provision of flexibility in student schedules. This might result not only in increased rates of responding and accuracy on the part of the student but also in a "reinforcing state of affairs for everyone involved" (Keller, 1968, p. 86). Attempts at the individualization of instruction might assume such forms as those described in Postelthwaite and Novak's (1967)

Audio-Tutorial Method, Mahan's (1967) Socratic-Type Programming, Ferster and Perrott's (1968) Interviewing Technique, or Keller's (1966) Personalized Systems of Instruction (Keller, 1968).

A common feature of the above methods is self-pacing. In self-paced instructional systems the student is allowed to progress through the course at a pace which is congruent with ability and allows consideration of extra-curricular demands on time, energy, and interests. The self-pacing component would seem to be a factor which contains features which might potentially increase the reinforcing properties of present educational approaches by allowing choice and flexibility. Lovitt and Curtiss (1969) offered support for this hypothesis, reporting that students responded at higher rates during self-imposed conditions than during teacher-imposed conditions, even if the latter condition was identical to (magnitude of reinforcement was held constant) the one the student imposed. Lea and Lockhart (1973) reported similar results in a study with college students in which 14 out of 17 students indicated a preference for a condition which allowed them to choose from a range of grades rather than a forced excellence condition imposed by the instructor (only an "A" or an "E" were available). It is of interest that students chose the multiple-option condition but matched a level of excellence criterion which existed under the externally imposed or forced condition. Minkin, Minkin, Sheldon, Hursh, Sherman, Wolf and Fixsen (1974) examined preference for written vs. oral-interview quizzing formats. Results of this study indicated that "without a forced-choice requirement, many students never attempted the oral-interview type of quiz" (p. 1). Once having been exposed to both



formats of quizzing however, students indicated a marked preference for the oral type of quiz. One might then ask if the provision of options or flexibility might function as a vehicle for increasing the reinforcing state of affairs for students, especially if they have previously sampled those available options through forced exposure.

The present study attempted to examine preference for a modified self-pacing (flexible-pacing) vs. instructor-pacing and to compare the effects of each on academic performance.

## METHOD

### Subjects

Eighty-one undergraduate students in two sections of an introductory Psychology course participated as subjects. Section I was divided into two groups on the basis of the last digit of their Social Security Number. Odd numbered subjects were assigned to Group A (n=16) and even numbered subjects were assigned to Group B (n=24). Students in Section II were assigned to Group C (n=41) due only to their enrollment in that particular section.

### Materials

For each unit of the quiz content there existed four alternative forms of each quiz to control for quiz familiarity and practice effects. All forms contained an equal amount of questions and covered the same content areas. Questions were all objective (multiple-choice and true-false) and answer sheets were machine scored.

### Procedure

The two possible conditions under which students could be quizzed over the material were: instructor-paced quizzing which consisted of the student being quizzed over one unit at a time on specified days within one week, and flexible-paced which consisted of the student taking quizzes over three units within a three week period. In both conditions the student had the opportunity to remediate each quiz twice.

Those students in the instructor-paced condition took their quiz on Tuesday and were able to remediate on Thursday and Friday. Those students in the flexible-paced condition were able to take quizzes on any day Monday through Friday over as many units as desired. If a quiz was not taken within a particular interval the student received a zero for the quiz (quizzes) missed. Figure 1 illustrates the sequence of conditions through which each group proceeded.

The first week of the semester was utilized to orient all students to the course, complete all necessary forms relative to the experiment (consent, biographical information, etc.) and acquaint students with the two available quizzing conditions. As can be seen from the diagram in Figure 1 a student in Group A was in the flexible condition for Weeks 2, 3, and 4. Beginning with Week 5 and continuing through Weeks 6 and 7 the student was placed in the instructor-paced condition. On the first day of Weeks 8, 11, and 14 the student chose the condition under which to be quizzed and signed a contract to do so for the three week period following each choice point. Group B, beginning with Week 2, was in the instructor-paced condition for the first three weeks, then in the flexible-paced for three weeks. These students were then provided the same opportunity to choose as was described for students in Group A. Students in Group C were permitted to choose the conditions under which they would be quizzed over the material beginning with Week 2 and followed the same time schedule for choice points as described for Groups A and B.

The variables of major interest were (1) student preference, and (2) academic performance. The latter was measured by obtained first

Figure 1: Graph illustrating the sequence of conditions for Groups A, B, and C.

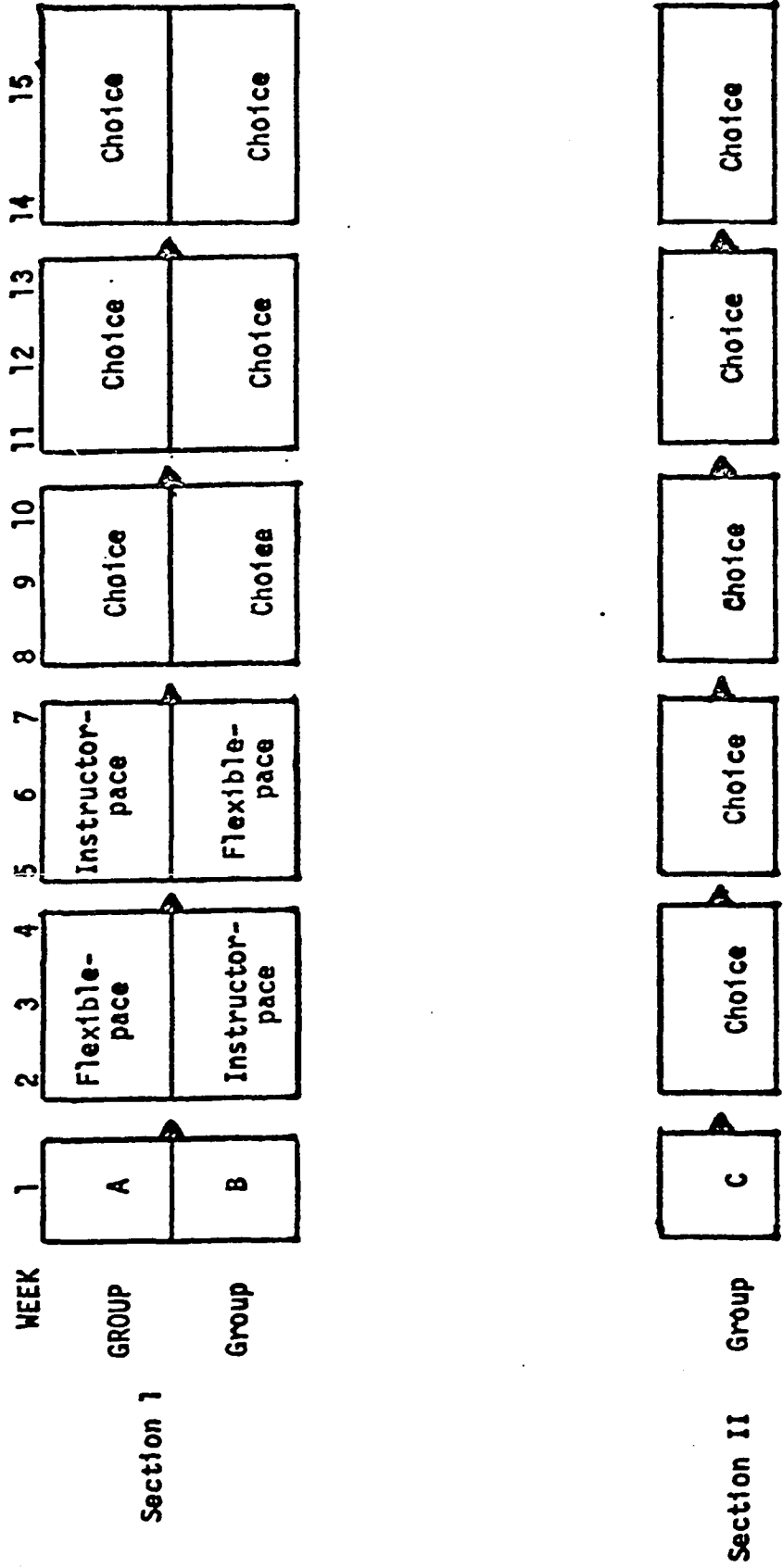


Figure 1. Diagram illustrating the sequence of conditions for Groups A, B, and C.

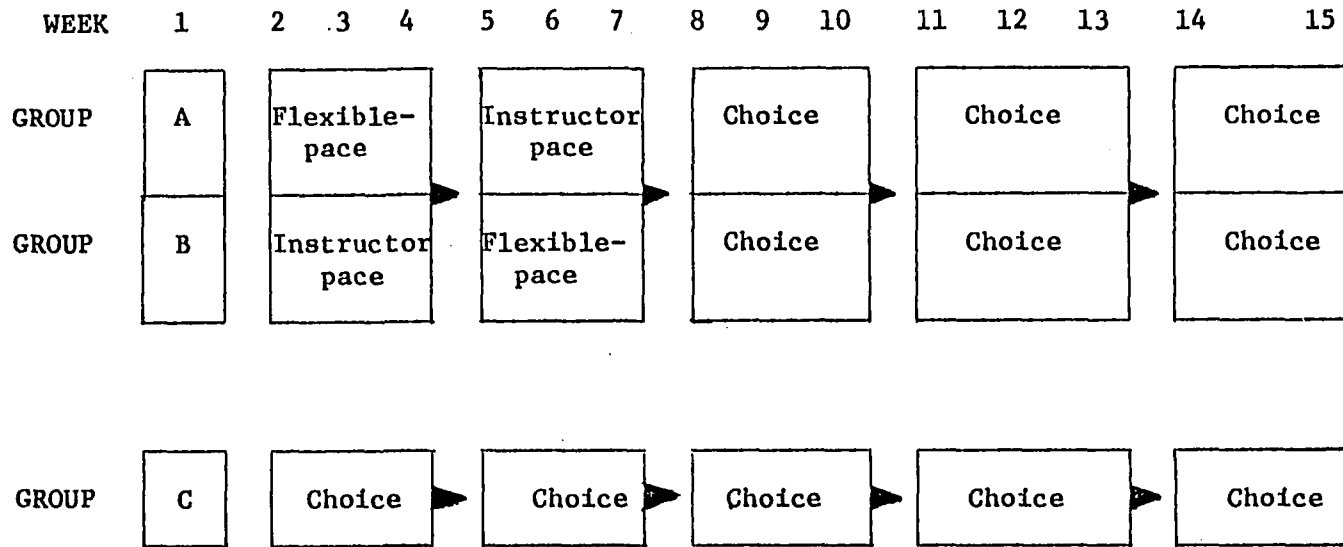


Figure 1. Diagram illustrating the sequence of conditions for Groups A, B, and C.

attempt quiz scores as well as the frequency and temporal distribution of quiz-taking. In addition, postponement of quiz-taking (defined as taking no quizzes during the first week of any three week interval) during the flexible-paced conditions was examined.

## RESULTS

Data were analyzed in terms of student preference for flexible- vs. instructor-paced quizzing conditions, academic performance and patterns of quizzing behavior. The data in Figure 2 indicate a predominant preference for flexible-pacing on the part of students in Groups A and B (89% and 99% respectively). Group C opted for the flexible-paced condition 51% and the instructor-paced 49% of the time. From these results it becomes apparent that Groups A and B indicated a preference for conditions which led to options in quiz-taking while 49% of the students in Group C demonstrated a preference for no options (if choice of instructor-paced is functionally equivalent to a lack of options or flexibility as to when quizzes could be taken). It should be noted that 61% of the students enrolled in the course refused to consent to become participants in the study. They, therefore, indicated a preference for no options as to when to take quizzes since non-participants took quizzes in the same manner as students in the instructor-paced conditions.

Academic performance was measured in two ways. The first was a comparison of first attempt quiz scores (One-Way Analysis of Variance). These scores were compared for those students in flexible-paced vs. instructor-paced during forced exposure conditions and revealed no significant differences. It was not possible to compare first attempt scores obtained during instructor- vs. flexible-paced for Groups A and B across the study since at some choice points  $n = 0$  for instructor-pacing. In examining the performance of students in Group C no



Figure 2: Graph depicting student preference for flexible-pacing and instructor-pacing.

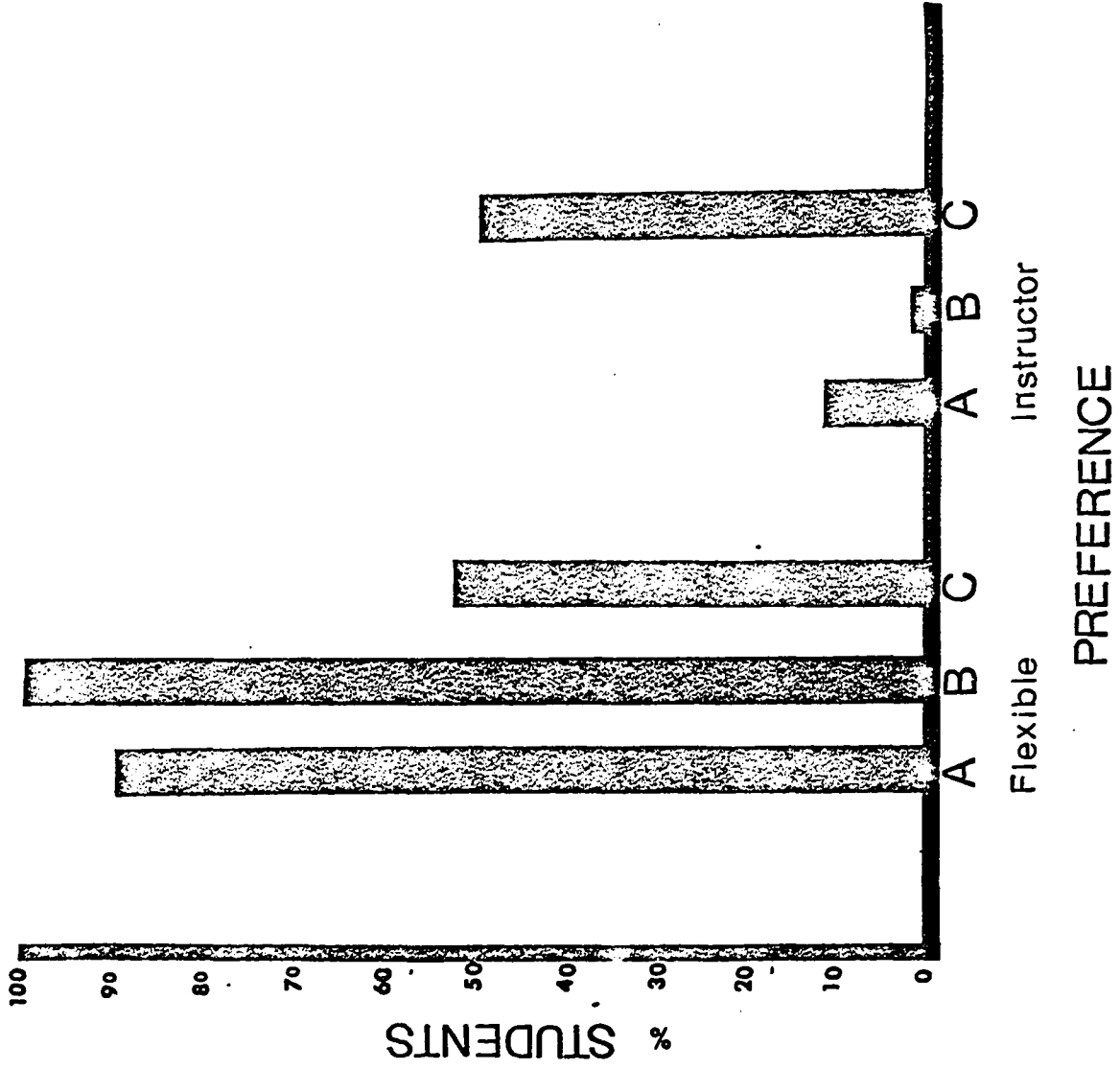


Figure 2.

significant difference was found between those adopting flexible- or instructor-pacing for the duration of the study. Figure 3 represents the mean first attempt scores for each group in each of the above discussed conditions. There was no difference between those opting for flexibility (all groups) and the non-participants' first attempt scores.

Figure 4 indicates that 25% of the students in Group A switched conditions at choice points and 27% in Group C, while only 4% of the students in Group B changed their apparent preferences. A One-Way Analysis of Variance revealed no significant differences in first attempt quiz scores between switching and non-switching students within Groups A, B, or C.

The second method of examining academic performance was frequency of remedials taken as a function of quizzing conditions. Figure 5 indicates the percent remedials taken of the total available for each group in each condition within each phase of the study. As can be seen, all three groups evidenced an initial increase in percentage of taking remedial quizzes which then appeared to stabilize near 40%. The absence of data points for instructor-pacing on the figure was a function of no students opting to enter that condition during those phases.

For all three groups an initial increase in the occurrence of postponement was noted with a subsequent stabilization (Group B) or decrease (Groups A and C) as can be seen in Figure 6. The percent of opportunities to remediate that were missed due to postponement and which could have improved a student's score, occurred in Group A 56%, Group B 44%, and in Group C 40% of the time.

Figure 3: Graph of mean first attempt quiz scores for each group and each condition.

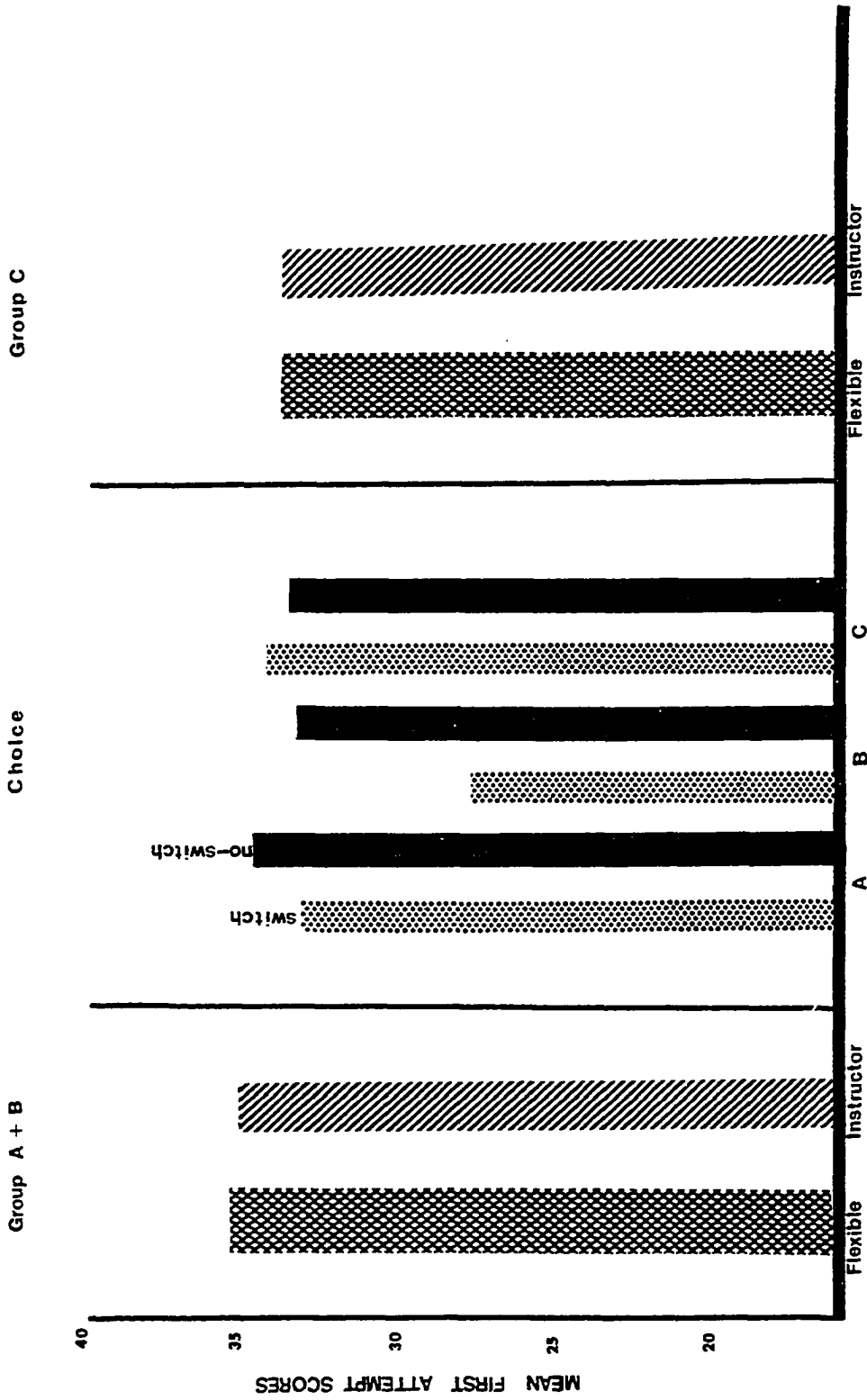


Figure 3.

Figure 4: Graph comparing percentages of students who remained in the same condition (non-switching) at each choice point to those who changed at least once (switching).

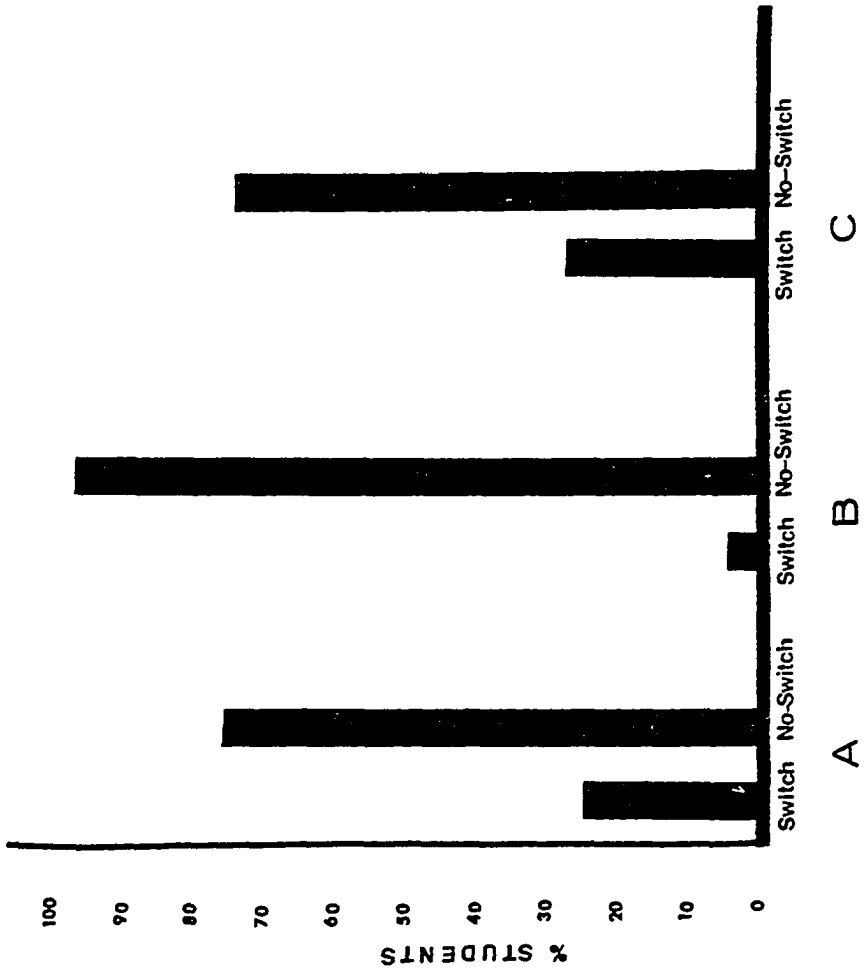


Figure 4.

Figure 5: Graph illustrating the percent remedial quizzes taken of the total available for each group within each phase of the study.



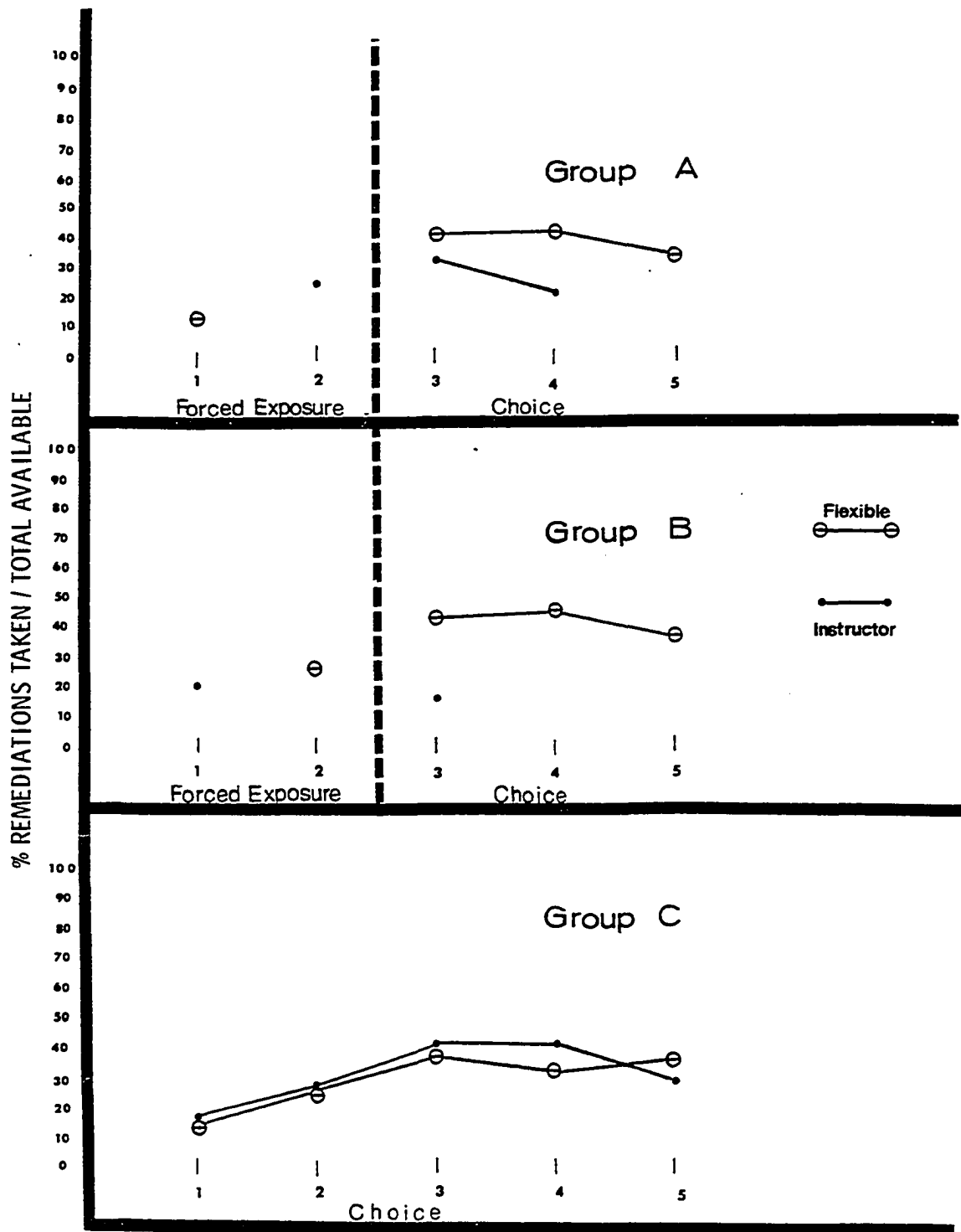


Figure 5.

Figure 6: Graph showing the percent occurrence of postponement during flexible-pacing for each group within each phase of the study.

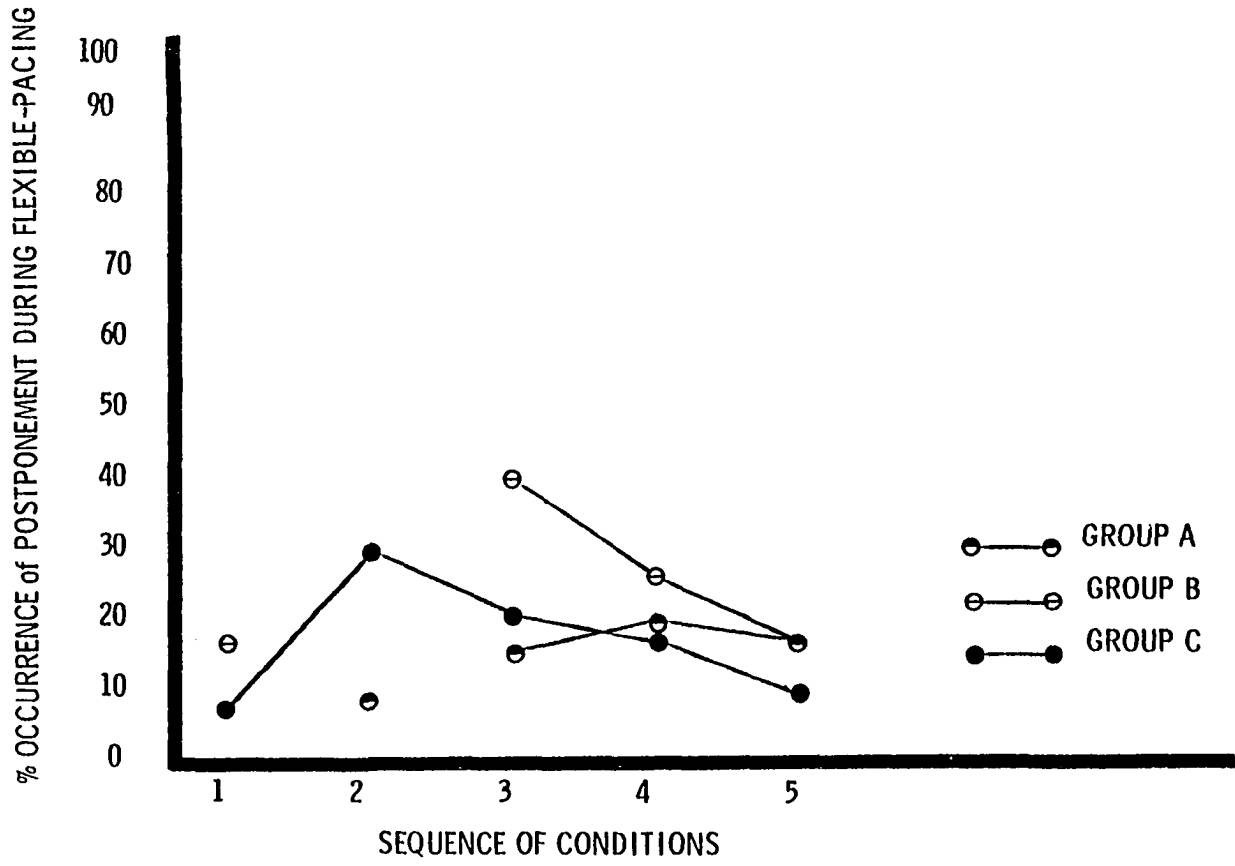


FIGURE 6.

Figure 7 indicates the percentage of students who received final grades of A, B, C, D, E (fail), I (Incomplete) or Drop for each of the three experimental groups as well as for those who did not participate in the study. As can be seen from the graph, grade distributions were "similar" for the three experimental groups and non-participants. Some noteworthy exceptions exist however, such as a larger percentage of earned "A's" in the experimental groups. Also, 10% of the non-participants received an "E" as did 7% of the students in Group C. A grade of "I" was given to 3% of the students in Group C and 1% of the non-participants. No "Drops" were received by students in any of the three experimental groups while 3% of the non-participants did "Drop" the course.

Figure 7: Grade distribution for Groups A, B, and C and non-participants.

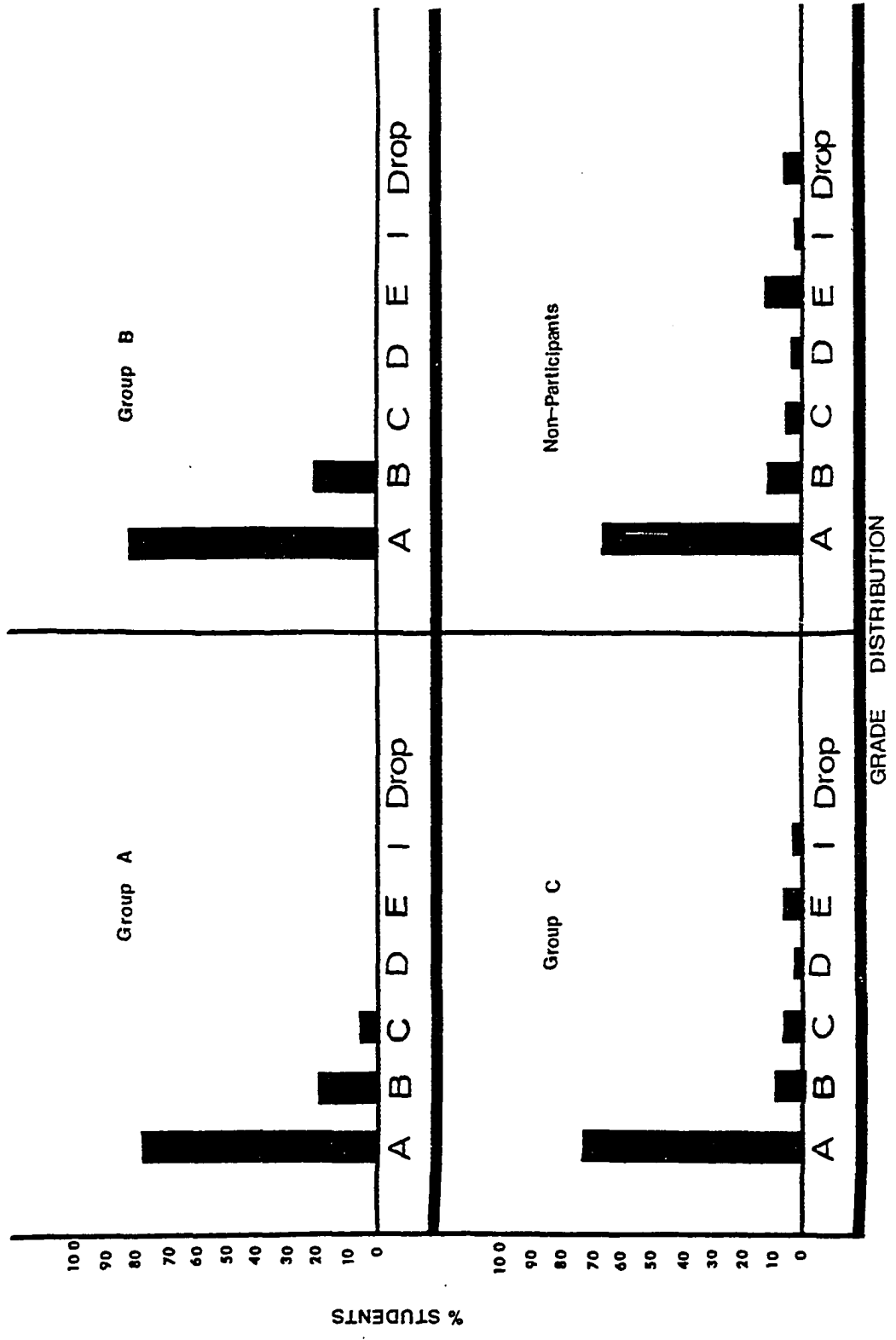


Figure 7.

## DISCUSSION

When given the opportunity to choose between flexible-pacing and instructor-pacing conditions, after having undergone forced exposure to both, students demonstrated a strong preference for flexibility. Those who had not experienced forced exposure (Group C) exhibited a minimal difference in preference. It is of interest to note that only 39% of the students enrolled in the course consented to become participants and thus put themselves in a situation in which flexibility was available. The 61% who refused to participate, as well as almost one-half of Group C, apparently preferred conditions which led to no flexibility as to when to take quizzes (instructor-pacing).

When first attempt quiz scores were compared for those students in the flexible-pacing vs. those in instructor-pacing, during the forced exposure phase of the study (Groups A and B), no differences were noted. Thus students in flexible-pacing did as well as or better than those in the instructor-paced conditions. A comparison of first attempt quiz scores between those who remained in either flexible- or instructor-paced conditions throughout the study (non-switch) and those who changed their preferred conditions at least once (switch) revealed no significant differences within Groups A, B, or C.

While there appeared to be no notable differences between groups along the dimension of percent remedials taken/total available, all three groups seemed to reduce the frequency of remediation. Although all groups averaged about 40% of the total available remediations no

decrements in final grades were evident.

The percent occurrence of postponement during flexible-pacing for Group A was initially 40% but subsequently decreased to levels similar to those of Group B and Group C. The percent occurrence of postponement could be viewed as representative of a reduction pattern for all three groups, or stated another way, students initiated work earlier within the interval as the study progressed.

No student in any of the three experimental groups received a grade of "Drop" while some of the non-participants did. Some students in Group C and a fair portion of the non-participants received an "E".

Research which has specifically examined methods of controlling student progress through a course could be divided into those predominantly using aversive control and others using more positively oriented contingencies. The aversive methods typically used deadlines or target dates for unit/lesson completion or minimum amount of accrued points. Failure to meet these contingencies led to receipt of an "E" grade (Malott and Svinicki, 1969) or being dropped from the course (Sutterer and Holloway, 1974; Miller, Weaver and Semb, 1974). Semb, Conyers, Spencer and Sosa (1974) used a combination of point loss and point gain contingent upon relative position to a minimum rate line. Bitgood and Seagrave (1974) assessed the effects of increasing, fixed, and decreasing point contingencies upon student progress in a self-paced course. The present study could be viewed as a method containing some aversive control measures since quizzes had to be taken within prescribed intervals or the student received a zero for



that unit quiz.

Two factors appear to be of crucial concern when evaluating the efficacy of methods to control the rate of student progress through a course. One would be the effect of that method upon academic performance (final grades continue to be viewed as a most important outcome within current educational systems) and the other being the number of students who do not complete the course. The present method of controlling student progress would seem to have functionally dealt with both issues while providing flexibility and options to each student. The studies reviewed reported similar grade distributions to the present study but varying percentages of student drops. Those described as utilizing primarily aversive control methods reported from 0% (Miller et al., 1974) to about 33% drops (Sutterer and Holloway, 1974). Semb et al. (1974) reported drop rates of 10% for a group with no contingencies and 19% for the remaining three groups with combinations of point loss and gain. In the present study, no students in the three experimental groups dropped the course and only 3% of the non-participants dropped.

Due to the predominance of preference for flexible-pacing conditions in Groups A and B, it seems plausible to postulate that providing students with options in their quizzing schedules prevented the necessity of "dropping" or being unable to complete the course due to conflicting demands of other classes and/or activities.

Postponement has been reported to be a major criticism of personalized instruction since it frequently results in large numbers of drops and/or incompletes. It appears that, for students who experienced

forced exposure to both conditions and opted for flexible-pacing conditions most of the time, the occurrence of postponement did not disrupt academic performance. The data from this study suggest that students adjust the frequency of taking remedials as a function of preparation for quizzes while maintaining flexibility or options in their quizzing schedules.

Future research might be directed at (1) development of methods to further improve student progress through university courses, such as the determination of optimal lengths of intervals within which students exercise flexibility, and (2) examination of variables affecting student preference (i.e., individual history, qualitative features of available options, etc.). It is the author's hope that these efforts will stress the use of positive contingencies and increased flexibility as these would see to be more congruent with the goals of effective teaching.

## REFERENCES

- Bitgood, S. C. and Seagrave, K. Comparison of graduated and fixed point systems of contingency managed instruction. In Johnston, J. M. (Ed.), Behavior Research and Technology in Higher Education. Springfield, Illinois: Charles C. Thomas, 1974.
- Keller, F. S. "Good-bye, Teacher...". Journal of Applied Behavior Analysis, 1968, 1, 79-89.
- Lea, C. R. and Lockhart, K. A. Behavioral analysis of forced-excellence and grade choice criteria. In press, Georgia State University, Atlanta, Georgia.
- Lovitt, T. C. and Curtiss, K. Academic response rate as a function of teacher- and self-imposed contingencies. Journal of Applied Behavior Analysis, 1969, 2, 49-53.
- Malott, R. W. and Svinicki, J. G. Contingency management in an introductory psychology course for one-thousand students. Psychological Record, 1969, 19, 545-556.
- Miller, L. K., Weaver, F. H. and Semb, G. A procedure for maintaining student progress in a personalized university course. Journal of Applied Behavior Analysis, 1974, 7, 87-91.
- Minkin, B., Minkin, N., Sheldon, J., Hursh, D., Sherman, J., Wolf, M. and Fixsen, D. An analysis of student preference and performance on written and oral quizzes. In press, Georgia State University, Atlanta, Georgia.
- Semb, G., Conyers, D., Spencer, R. and Sosa, J. J. S. An experimental comparison of four pacing contingencies in a personalized instruction course. In Johnston, J. M (Ed.), Behavior Research and Technology in Higher Education. Springfield, Illinois: Charles C. Thomas, 1974.
- Sutterer, J. R. and Holloway, R. E. An analysis of student behavior in two courses with and without rate limiting contingencies. In Johnston, J. M (Ed.), Behavior Research and Technology in Higher Education. Springfield, Illinois: Charles C. Thomas, 1974.