An Empirical Study of Lecture Note Taking among College Students

Author(s): Edwin A. Locke
Source: *The Journal of Educational Research*, Vol. 71, No. 2 (Nov. - Dec., 1977), pp. 93-99
Published by: Taylor & Francis, Ltd.
Stable URL: http://www.jstor.org/stable/27537083
Accessed: 14-02-2018 17:40 UTC

10. Lunetta, V. N., and Tamir, P. "Cognitive Preferences in Biology of Students Participating in Secondary Science Training Summer Program." Paper presented at 50th Annual Meeting of NARST, Cincinnati, March, 1977.
11. Tamir, P. "The Relationship between Cognitive Preferences, School Environment, Teachers' Curricular Bias, Curriculum and Subject Matter." *American Educational Research Journal* 12(1975): 235-264.
12. Tamir, P., and Kempa, R. F. "Cognitive Preference Styles across Three Science Disciplines." Paper presented at 49th Annual Meeting of NARST, San Francisco, April, 1976.
13. Tamir, P., and Kempa, R. F. "College Students' Cognitive Preference in Science." *Journal of Educational Research* 70(1977): 210-218.
14. Tamir, P., and Yamamoto, K. "The Effects of the Junior High FAST Program on Students' Achievement and Preferences in High School Biology." *Studies in Educational Evaluation,* in press.
15. Williams, C., "A Study of Cognitive Preferences." *Journal of Experimental Education* 43(1975): 61-77.
16. Wish, M. *An Unfolding Analysis of Cognitive Preferences.* Princeton: Educational Testing Service, 1964.

An Empirical Study of Lecture Note Taking among College Students[1]

EDWIN A. LOCKE
University of Maryland

ABSTRACT

This is one of the few quantitative studies of actual practices of college students with respect to lecture note taking. The notes on one lecture heard by 161 students in 12 different courses were compared with a set of "ideal" notes for each class. It was found that: (a) virtually all the errors in lecture note taking were errors of omission rather than errors of commission; (b) the average student failed to record nearly half the material which the lecturer did not write on the board, but missed only 12 percent of the material that was written on the board; (c) there was some evidence that course policies affected lecture note completeness; courses in which the lectures presented a great deal of new material resulted in more complete student notes than courses in which the lectures presented little new material; (d) there was a significant, positive correlation between completeness of lecture notes and course grades, but this relationship held only for the material *not* on the board; (e) there was a significant fatigue effect, with completeness dropping steadily as the lecture progressed.

VIRTUALLY ALL BOOKS on "how to study in college" emphasize the importance of taking good lecture notes (10) and may even give specific advice on what types of errors to avoid, e.g., taking too many notes (13). Despite this plethora of advice, there are only about a dozen empirical studies of lecture note taking in the literature. Most of these are reports of controlled laboratory experiments comparing the effects on retention of no note taking versus varying degrees and types of note taking. Unfortunately, however, the results have been quite inconsistent from study to study.

Three laboratory studies (5, 6, 8) showed results generally favorable to note taking as compared with no note taking when listening to lectures. In addition, Howe (9) found that more complete notes led to better retention than less complete notes.

Aiken, Thomas & Shennum (1), in contrast, obtained mixed results. Taking notes during formal pauses given every few minutes during 8- to 16-minute lectures produced better retention than taking notes during (parallel to) the lecture or taking no notes, but the latter two conditions showed no difference. Eisner and Rohde (7), however, found that students taking notes during a 30-minute lecture showed no better learning than those jotting them down only at the end of the lecture. McClendon (11) found no difference in retention among four types of note taking groups: no notes, main points only, detailed notes, and "customary" notes. Peters (12) found that subjects who took notes on an 8- to 11-minute speech showed significantly poorer recall than those who did not take notes.

An interesting feature of these laboratory studies is that the results obtained are associated with the speed at which the lectures were delivered. In the four studies noted above which were favorable to note taking, the rate of talking ranged between 44 and 100 words per minute. By contrast, in the Aiken, Thomas, and Shennum (1) and Peters (12) studies, which showed either mixed or negative results, the talking rate ranged from 120 to 240 words per minute (no rates were reported in the Eisner and Rohde or the McClendon studies).

It could be hypothesized that note taking during lectures which are both rapid and nonredundant is less beneficial to recall than no notes, because note taking in such cases causes the listener to miss some of the material.

However, it is questionable whether the overall conditions of these laboratory studies accurately reflect the conditions of students enrolled in college courses. For example, in the lab studies (1) the lectures were short (all but two were under 20 minutes) and nonredundant; (2) they were often on intrinsically interesting topics (i.e., the psychology of stage fright or survival among sharks); (3) retention was measured either by a test given immediately after the lecture or by a delayed recall test for which the subjects could not prepare because the lecture notes were usually collected right after the lecture; (4) the tests were on one lecture or several consecutive short lectures only; and (5) there were typically explicit instructions to the no note (as well as the note taking) subjects to retain as much of the material as possible. All of these factors would tend to minimize the difference between the note taking and no note taking conditions.

In contrast, for students in actual college courses (1) the lectures typically last 50 minutes or more and are deliberately redundant; (2) the topics are often boring to many of the students; (3) tests may be given weeks after the lecture, during which time the students are allowed time (and encouraged) to study their notes; (4) the tests include material from a number of different lectures plus readings; and (5) there are typically no explicit instructions to memorize each lecture.

In view of these differences, it is not clear whether the results of the laboratory studies can be generalized to real college situations, especially in view of the inconsistent findings.

Interestingly, the few studies that have been done of note taking in genuine classroom settings have consistently found that note taking facilitates recall and that better notes lead to better course performance than poorer notes (2, 3, 4). Since Brown's report (2) is too informal to qualify as a reliable source of evidence, this means that more than 50 years have passed since the actual lecture note taking practices of students and the consequences of these practices have been systematically examined.

The present study, based on data gathered from actual course lectures, provided an opportunity to replicate some of Crawford's findings (3, 4). In addition, the present study addressed several issues not heretofore studied. This study was designed to answer the following questions: How

Table 1.—Description of Sample, Coder Agreement and Completeness of Notes for Students in Each of 12 Courses

	(1) No. Enrolled at End of Course	(2) No. in Attendance	(3) No. Notes Scored	(4) No. with Scored Notes & Grades	(5) % Coder Agreement	(6) Length of Lecture (min.)	(7) Total Thought Units	(8) No. of Units Per Min.	(9) % Thought Units Correct: All	(10) % Thought Units Correct: On Board	(11) % Thought Units Correct: Not on Board
Art History	39	35	29	28	92.8(4)[a]	67	97	1.45	64.1	91.3	57.5
Business Administration (Org. Theory)	NA[b]	15	14	11	94.4(7)	60	70	1.17	71.0	88.1	62.1
Business Administration (Personnel)	28	21	18	15	95.1(9)	50	45	0.90	60.4	92.5	40.9
Dramatic Art (History)	NA[b]	13	12	12	92.3(7)	70	146	2.09	66.4	86.0	62.9
English (Amer. Lit.)	13	14	11	8	91.3(7)	70+[c]	108	1.54	39.0	86.4	35.2
Entomology	32	26	20	20	84.9(10)	65	147	2.26	57.3	77.3	44.0
History (China)	NA[b]	20	11	9	93.4(5)	65	164	2.52	52.2	75.4	49.5
History (Western Civ.)	NA[b]	6	6	6	92.5(6)	62.5	89	1.42	75.7	96.1	70.8
Philosophy (Ethics)	12	14	11	11	91.9(11)	65	76	1.17	50.6	78.8	32.2
Psychology (Intro.)	507	NA[b]	29[d]	22	95.0(10)	50	92	1.84	51.0	98.7	40.8
Psychology (Personality)	18	13	11	10	87.5(5)	66	123	1.86	51.9	90.9	51.6
Textiles	11	9	9	9	93.0(5)	50+[c]	100	2.00	76.0	97.4	71.6
		Σ=186[e]	181	161	$\bar{X}$=92.0 (86)	61.7	104.8	1.68	59.6	88.2	51.6

[a]Number in parentheses indicates number of sets of notes used in reliability check

[b]Not available

[c]Exact length of lecture not determined, but in no case was it more than nine minutes more than number shown

[d]Based on a 15 percent random sample of the 198 students who handed in notes

[e]Not including Psychology (Intro.)

complete are the typical student's lecture notes? Are errors of commission or omission more frequent? How do course policies affect lecture note quality? Do students who take better lecture notes receive higher grades than those who take poorer notes? How does writing parts of the lecture on the board affect their probability of appearing in the students' notes? Is the relationship between grades and lecture note quality different for material which the teacher writes on the board than for material which is not written on the board? Is there a fatigue effect in lecture note taking?

Method

This study was conducted during the summer session at the University of Maryland. Professors in 78 undergraduate courses were asked by letter to participate in the study. These courses were selected by first eliminating all courses involving lab work, creative writing, performing, mathematics and the natural sciences (i.e., where lecture notes would either be irrelevant, non-existent, or unscoreable based on our knowledge of the subject), and then by choosing courses in as many different fields as possible. Seventeen of these professors offered to participate. Due to time limitations and the nature of the course content (e.g., to avoid overlap), only 11 offers were accepted. One of the present writer's own fall semester courses was added to the list, making a total of 12 courses.

Procedure

Permission was obtained from each professor for a research assistant (a highly competent undergraduate student) to come to his class on a specific day. The assistant then attended the class as though he were an ordinary student. He took detailed notes on the lecture and also tape recorded it. In addition, he indicated which items had been written on the board by the professor, marked 10-minute intervals within the lecture, and counted the number of students in the class. At the end of the class the professor announced that a study of lecture note taking was being conducted and asked every student present to sign their names and then hand in their notes for that lecture for xeroxing. In return the students would get back their own notes plus a copy of an "ideal" set of notes for that lecture (described below). The great majority of the students in each class agreed to participate.

Subsequently the research assistant typed up a "clean" set of lecture notes based on his own notes and the tape of the lecture. This set of notes was then shown to the professor, and he was asked to correct them based on the standard of what he would consider an "A" student's notes to look like, i.e., what he considered to be "ideal" notes for that lecture. In all cases this "ideal" set of notes corresponded very closely to what the research assistant had initially written in class.

At the end of summer school, each professor was asked to provide the course grade obtained by each student.

Student Sample

The lecture notes of 181 students in 12 different courses were obtained. The first four columns in Table 1 show the student sampling statistics by course. The first column gives the number of students officially enrolled in each course at the *end* of the course (where available); the second column shows the number in attendance the day the notes were recorded; the third column gives the number for whom notes were both obtained and scored. There were three reasons for the lower figures in column 3 than in column 2. Seven students handed in incomplete or illegible notes; three came in late so their notes were not scored; the remainder (13 percent of those in attendance) did not hand in their notes. Column 4 shows the number for whom there were scored notes and for whom course grades were obtained. In all cases of missing final grades, the students had dropped the course.

Figure 1.–Sample of Part of One Lecture Divided into Thought Units

Psychology 100

1 (*What is Science?*)

2 (The systematic study of the facts of reality;) science studies

3 ((a) what exists (i.e., the nature of that which exists)) and

4 ((b) causal relationships among things that exist; cause and effect) (Science as different from art which deals with things as they could or should be).

5 (Different sciences study different aspects of reality) (astronomy: celestial bodies; (psychology: conscious, living organisms, etc.))

7 (*Basic Premises of All Science*)

8 1) (*Objective reality:*) (reality exists 9 independent of man's knowledge of it or of his wishes, hopes, fears, beliefs, etc.;)

10 (the facts of reality are not "created" by man but must be discovered by him.)

11 2) (*Identity* of reality:) (everything that 12 exists is something particular;) 13 (it has specific attributes and characteristics (a specific nature))

14 3) (*Causality:*) (every event has 15 a cause; there is no causeless action in the universe.) (What a thing can 16 do and will do in a specific situation is determined by its nature) (see #2).

17 4) (*Man can know reality:*) (by the 18 use of his senses) and (his conceptual faculty (reason).)

20 (*Basic Methods of Science*)

21 (a) *Observation:*) (systematic, selective 22 observation of things)

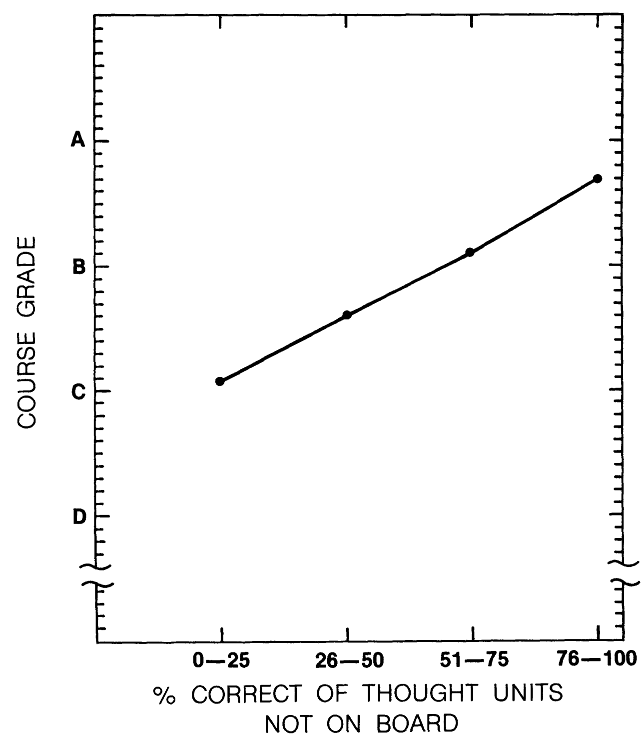
23 (using the unaided senses) and 24 (special instruments (telescopes, microscopes, etc.).)

Lecture Note Scoring

For scoring purposes the "ideal" set of lecture notes for each course was divided into "thought units." Each thought unit consisted of either: the name of a person, place or concept; the definition or description of a concept; or some other fact (e.g., a date, an example). This division was done jointly by the present author and a research assistant, although the division into thought units for the Introductory Psychology course was done solely by the author. Agreement was not difficult to reach in any of the lectures. A sample set of divided notes for part of one lecture is shown in Figure 1. The units were numbered consecutively as shown in the figure.

Each student's lecture notes were scored, unit by unit, using the "ideal" set for his class as the standard. Separate scores were obtained for each student for: just those thought units written on the blackboard; just those units not appearing on the board; and all thought units combined. These data were obtained for the lecture as a whole as well as for each 10-minute interval of the lecture. Initially a record was also kept of whether each error was one of omission or of commission. All scoring was done without knowledge of the students' grades.

Figure 2.—Course Grades as a Function of Percent of Correct Thought Units in Lecture Notes (for Material Not on Board)



Results

Scoring Reliability

Scoring reliability was estimated by having two different coders score a sample of the notes in each course. On the average, approximately half of the notes in each course were scored independently by two persons for this purpose, although in no case were fewer than four sets of notes scored in a given course. For those sets of notes used in the reliability check, disagreements were resolved by re-checking the notes and by discussion. (In most cases of disagreement, one of the two coders had failed to see something the student had written).

The percent of coder agreement for each course (based on a total of 86 sets of notes) is shown in the fifth column of Table 1. In almost all cases agreement is above 90 percent, with the unweighted average being 92 percent.

Lecture Length and Number of Thought Units

Columns 6 through 8 in Table 1 show the length of each lecture attended, the total number of thought units per lecture, and the average number of thought units per minute, respectively. Note the large differences in the latter figure among the different courses. Thought units per minute ranged from a low of less than one per minute in the Personnel course to a high of more than two and one half per minute in the History of China course.

Completeness of Notes

Columns 9 through 11 of Table 1 give the percent of thought units correct for each course, for all units combined, for only those units on the blackboard, and for only those units not on the board, respectively. It should be mentioned that errors of commission were so rare that these were not recorded after the first few courses. Thus, for all practical purposes, all of the data in columns 9 through 11 pertain to errors of omission.

The results (column 9) show that the average student had only about 60 percent of the material in the "ideal" set of notes in his own notes, while the range among courses was from 39 percent to 76 percent. There was no relation across courses between number of thought units per minute and average number correctly recorded (*rho*=-.02).

Writing lecture material on the blackboard had a considerable impact on the probability of a thought unit's appearing in the students' notes. This impact can be seen by comparing columns 10 and 11. Eighty-eight percent, on the average, of the material on the board appeared in the students' notes, whereas only 51.6 percent of the material not on the board was recorded by the students. Thus, writing a thought unit on the board increased its probability of being recorded by almost 37 percentage points.

At the time each set of "ideal" lecture notes was checked over by the course instructor, he was asked to indicate (a) the average percentage of each lecture that was devoted to presenting new material (i.e., material not in the course readings) and (b) the percentage of the next exam in the course that would be based on the lecture material. These policies had allegedly been announced to the students.

The 12 courses were rank ordered on the above percentages and the ranks correlated with the ranks of these courses with respect to completeness of lecture notes for the material not on the board (Table 1, column 11). The *rho*'s were non-significant in both cases. The same test was not made for the material on the board since there was comparatively little variation in this measure.

However, the *rho* for the percent of new material in the lectures was of borderline significance. By far the largest source of error was the Introductory Psychology course, in which the lectures consisted almost entirely of new material and yet the lecture note quality was quite poor (see Table 1). Certain unique features of this course may have contributed to this discrepancy. First, the students in this course (which the present writer taught) consisted almost entirely of first semester freshmen. Secondly, the lecture that was scored was the first regular lecture in the course (and only the second class meeting). Thus there is good reason to assume that these students were not yet "wise" to the requirements of college. In contrast, all the remaining courses were given during summer school and thus presumably taken by students with previous college experience. Furthermore, in only one case out of 11 was the lecture given during the first week of classes.

If, on the basis of the above arguments, the Introductory Psychology course is removed from the analysis, the *rho* between percent of new material in the lectures and lecture note quality (material not on board) becomes .65 ($p < .05$, one-tailed). Thus there is some evidence to indicate that course policies affect lecture note quality.

Relation of Lecture Note Completeness to Grades

Lecture note quality based on the material not on the board was expressed as a percent of the total units in the lecture appearing in each student's notes. The data were divided into four equally spaced categories: 0-25 percent (N=15), 26-50 percent (N=72), 51-75 percent (N=58), and 76-100 percent (N=16). Figure 2 shows the mean grade obtained as a function of lecture note quality based on the material not on the board. The relationship, based on a one-way ANOVA, was highly significant, $F(3,157)=11.84$, $p < .001$. The linearity of the trend was significant, as shown by a Pearson correlation of .42 ($p < .001$) between lecture note quality and course grade. The same four lecture note categories could not be used to test the relationship between grades and lecture note quality for material on the board, since nearly all students were in the top (76-100 percent) category. Thus the subjects were divided into three equal groups (top, middle and bottom third). A one-way ANOVA showed no relationship between lecture note quality (material on the board only) and grades, and the non-significant trend was in the wrong direction. These analyses are summarized in Table 2.

Lecture Notes and Grades: Replication

It might be asked whether any of the findings obtained in this project could be replicated using self-scored (i.e., student-scored) lecture notes. This was tried in two sections of one of the present writer's undergraduate courses. The 52 students were given a scoring key (of the type shown in Figure 1) for one lecture and told to score their own notes. The average student claimed to have noted 76.5 percent of the material not on the board, as compared with an average of 51.6 percent for the 12 courses in this study which were scored independently. This suggests, though does not prove, the possibility that students greatly overestimate the adequacy of their own lecture notes.

However, it was found that the self-scored notes were still meaningful on a relative basis. Those who claimed to have 76 percent or more of the material which was not on the board (N=32) received significantly higher grades on the first hourly examination (which included this material) than those who claimed to have 75 percent or less (N=20) of this material in their notes, $t\,(50)=3.60$, $p < .001$. This relationship did not hold up, however, for grades in the course as a whole (t=1.61; see Table 2).

Fatigue Effect

As noted above, the assistant who recorded the lectures marked off ten-minute intervals during each lecture. This

Table 2.—Relation of Lecture Note Completeness to Grades and Length of Lecture

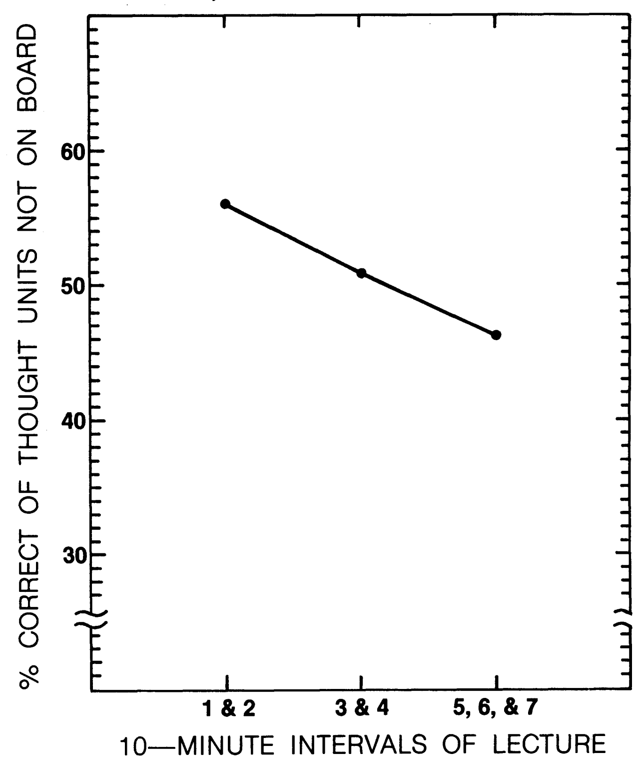
Relationship Tested	Sample	F	t	df	p
Lecture Note Completeness vs. Course Grades					
a) Materials not on board	original	11.84		(3,157)	.001
b) Material on board	original	<1.00		(2,153)[a]	ns
Self-Scored Lecture Note Completeness vs. Grades (material not on board)					
a) Grades on following hourly	replication		3.60	50	.001
b) Grades in course	replication		1.61	50	ns
Lecture Note Completeness vs. Lecture Length (material not on board)	original	15.67		(2,302)	.001

[a]Note: Equally spaced categories could not be used with the material on the board, since most students had nearly all of it. Thus for this analysis, the subjects were divided into three groups of equal size. Also, five subjects were inadvertently omitted from this analysis. However, inclusion of these five subjects would not affect the results.

made it possible to test for a within-individuals fatigue effect. For two reasons, however, some intervals had to be combined before this could be done. First, the number of thought units within certain ten-minute intervals of some lecturers was quite small, which meant that the data would be unreliable on a single-interval basis. Second, not all the classes were of the same length (they ranged from 50 to more than 70 minutes), which meant either that subjects in the shorter lectures would have to be dropped from a within-subjects design if seven 10-minute intervals were used, or that all the information from the longer lectures would be lost if five 10-minute intervals were used.

These problems were avoided by combining the intervals into three groups: Intervals 1 & 2 (first 20 minutes), Intervals 3 & 4 (second 20 minutes), and Intervals 5, 6, & 7 (last 10 to 30 minutes). For this analysis all the students with scored notes were used (Table 1, column 3), with the exception of the 29 students in Introductory Psychology for whom the interval data were not available. The resulting N was therefore 152. The results are shown graphically in Figure 3 and in Table 2. A one-way, repeated measures ANOVA, using the percent of thought units not on board correctly written by each student for each combined interval, found a significant fatigue effect, $F(2{,}302)=15.67$, $p < .001$. The trend of the data is clearly linear; there was a progressive decrease in completeness of lecture notes over time. The average drop from the first 20 minutes to the last 10 to 30 minutes was 17 percent.

Figure 3.–Percent of Correct Thought Units in Lecture Notes (for Material Not on Board) as a Function of Lecture Interval



Discussion

The results of this study strongly agree with those obtained by Crawford (3) more than 50 years ago. Not only was lecture note quality (number of units correct) related to course grades in both cases, but both studies found that there was a negligible number of errors of commission. Similarly, in both studies it was observed that students do not take very complete notes. The average student's notes contained only 53 percent of the relevant lecture material in Crawford's study (3: Table IV, columns 4 and 5) as compared with about 60 percent in the present case (including material on the board; see Table 1, column 9).

Possibly the standard of an "ideal" set of notes in this study was too stringent in that the notes of students who received A's in their courses contained, on the average, only about 62 percent of the thought units not on the board. On the other hand, it may have been the course grading that was too lenient. The existence of grade inflation (i.e., lowered standards) in our colleges and universities in recent years has been well documented.

Original to the present study were the findings: (1) that writing material on the blackboard dramatically increased its probability of appearing in students' notes; (2) that there was no relation between note content and grades for lecture material written on the board; (3) that course policies affected lecture note completeness; and (4) that there was a fatigue effect in note taking.

While the present findings are not particularly surprising, they do have practical implications. Teachers might improve student performance by stressing the importance of including material in their notes that is not written on the board. They could also announce explicitly the precise role which lectures play in the course and indicate the beneficial effects which good notes have on course grades. The fatigue effect might be combatted by a rest break or by suggesting that students monitor their state of fatigue and guard against its effects during the latter parts of the lectures.

Future studies of lecture note taking habits would be useful in order to fill in the remaining gaps in our knowledge. For example, little is known about individual differences in note taking competence. It is plausible to assume that such factors as intelligence, motivation, and beliefs regarding the importance of good lecture notes would affect note taking. Similarly, we know little about what students do with their notes once they are written. Nor do we know much about how instructions from the teacher and feedback on note taking competence affect such habits.

This study does not offer any definitive resolution to the theoretical issue posed in the laboratory studies (e.g., 5, 6) as to whether lecture notes facilitate learning and recall due to the encoding process (the actual taking of the notes) or due to serving as an external storage mechanims which the student can later study.

No doubt both factors play a role, but it seems likely that the latter function would be more important [as Crawford (3, 4) implies] in typical college situations where students must recall information from many lectures in a variety of different courses days, weeks, or even months after the lectures are given.

There is no reason why the role of each factor could not be resolved by future studies conducted in a controlled laboratory setting. However, if such studies are to simulate typical college situations accurately, they would do well to increase the amount of material presented to the subjects and to allow them time, *after* a period of delay, to study their notes at some length. Presentation speed and redundancy should also simulate typical college lectures.

NOTE

1. This research was supported in part by a grant from the General Research Board of the University of Maryland. The author gratefully acknowledges the help of James Carr, Charles Foreman, Anne Locke, and Dena Schneier in analyzing the data for this study, as well as the support of the University of Maryland Computer Science Center in performing the statistical analyses.

Requests for reprints should be sent to Edwin A. Locke, College of Business and Management, University of Maryland, College Park, Maryland 20742.

REFERENCES

1. Aiken, E. G.; Thomas, G. S.; and Shennum, W. A., "Memory for a Lecture: Effects of Notes, Lecture Rate, and Informational Density." *Journal of Educational Psychology* 67 (1975): 439-444.
2. Brown, J. I. "Evaluating Student Performance in Listening." *Education* 75 (1955): 316-321.
3. Crawford, C. C. "The Correlation between College Lecture Notes and Quiz Papers." *Journal of Educational Research* 12 (1925): 282-291.
4. Crawford, C. C. "Some Experimental Studies of the Results of College Note-Taking." *Journal of Educational Research* 12 (1925): 379-386.
5. Di Vesta, F. J., and Gray, G. S. "Listening and Note Taking." *Journal of Educational Psychology* 63 (1972): 8-14.
6. Di Vesta, F. J., and Gray, G. S. "Listening and Note Taking: II. Intermediate and Delayed Recall as Functions of Variations in Thematic Continuity, Note Taking, and Length of Listening-Review Intervals." *Journal of Educational Psychology* 64 (1973): 278-287.
7. Eisner, S., and Rohde, K. "Note Taking during or after the Lecture." *Journal of Educational Psychology* 50 (1959): 301-304.
8. Fisher, J. E., and Harris, M. B. "Effects of Note Taking and Review on Recall." *Journal of Educational Psychology* 65 (1973): 321-325.
9. Howe, M. J. A. "Using Students' Notes to Examine the Role of the Individual Learner in Acquiring Meaningful Subject Matter." *Journal of Educational Research* 64 (1970): 61-63.
10. Locke, E. A. *A Guide to Effective Study.* New York: Springer, 1975.
11. McClendon, P. I. "An Experimental Study of the Relationship between the Note-Taking Practices and Listening Comprehension of College Freshmen during Expository Lectures." *Speech Monographs* 25 (1958): 222-228.
12. Peters, D. L. "Effects of Note Taking and Rate of Presentation on Short-Term Objective Test Performance." *Journal of Educational Psychology* 63 (1972): 276-280.
13. Robinson, F. P. *Effective Study.* New York: Harper & Row, 1972.