

AMOUNT OF STUDY TIME AS A FACTOR IN MEANINGFUL
AND ROTE RETENTION

by

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We accept this thesis as conforming
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ABSTRACT

This study attempted to investigate the position taken by Ausubel with regard to meaningful and rote retention by determining the extent to which amount of study time influenced retention of meaningful and rote materials. Replication of part of a study by Ausubel and Fitzgerald was also attempted. Subjects were 114 university undergraduates. Meaningful and rote materials designed by Ausubel and Fitzgerald were studied for a long or short time. Retention was tested immediately and one week later with a multiple-choice instrument. Data were treated with a 2 x 2 x 2 analysis of variance and a series of planned comparisons. It was found that amount of study time and time of testing were influential variables in this study. No differences in retention attributable to type of materials (meaningful or rote) were found. It was concluded that the findings did not support Ausubel's theoretical position.


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Chapter 1

INTRODUCTION

Ausubel (1962) has advanced a theory of meaningful verbal learning the main premise of which is that

...existing cognitive structure, that is, an individual's organization, stability, and clarity of knowledge in a particular subject matter field at any given time, is the principal factor influencing the learning and retention of meaningful new materials.

He states that clear, stable, and "suitably organized" cognitive structure facilitates the learning and retention of new subject matter; conversely, unstable, ambiguous, disorganized or chaotically organized structure inhibits learning and retention.

Ausubel's main concern is with what he calls reception learning, the transfer of information from a source to the learner. Materials are presented to the learner in written or verbal form; his task is to learn what is given to him.

According to Ausubel (1963), reception learning can be either meaningful or rote. Meaningful learning is defined as "...the substantive and nonarbitrary incorporation of a learning task into relevant portions of cognitive structure" so that the task becomes imbedded with the system in a relational sense, independent of "verbatim integrity and arbitrary connections (p. 42)." Rote learning introduces the materials into cognitive structure in an arbitrary, verbatim fashion. Variables such as contiguity, frequency and reinforcement are held to come into play in rote learning

because the process is associative in nature.

A distinction also is made between meaningful and rote materials. Ausubel (1963) defines meaningful materials as those which contain "nonarbitrary relatability to relevant concepts in cognitive structure p.(23)." To be meaningful to a particular individual, materials must be relatable to his own cognitive structure. If they are not, the materials will be learned rotely. Materials which lack this relatability are considered rote. There are, of course, different degrees of meaningfulness or roteness in different materials.

It is possible for the same materials to be learned in a rote fashion by one learner and in a meaningful fashion by another, depending upon the degree to which relevant general concepts are present in the individual's cognitive structure. Thus, strict accuracy would require the insertion of the term "potentially" before the terms meaningful and rote, since it is difficult to predict how materials will be learned without precise knowledge of the individual learner's cognitive structure. In this paper the terms meaningful and rote will be used in lieu of the more cumbersome "potentially meaningful" and "potentially rote."

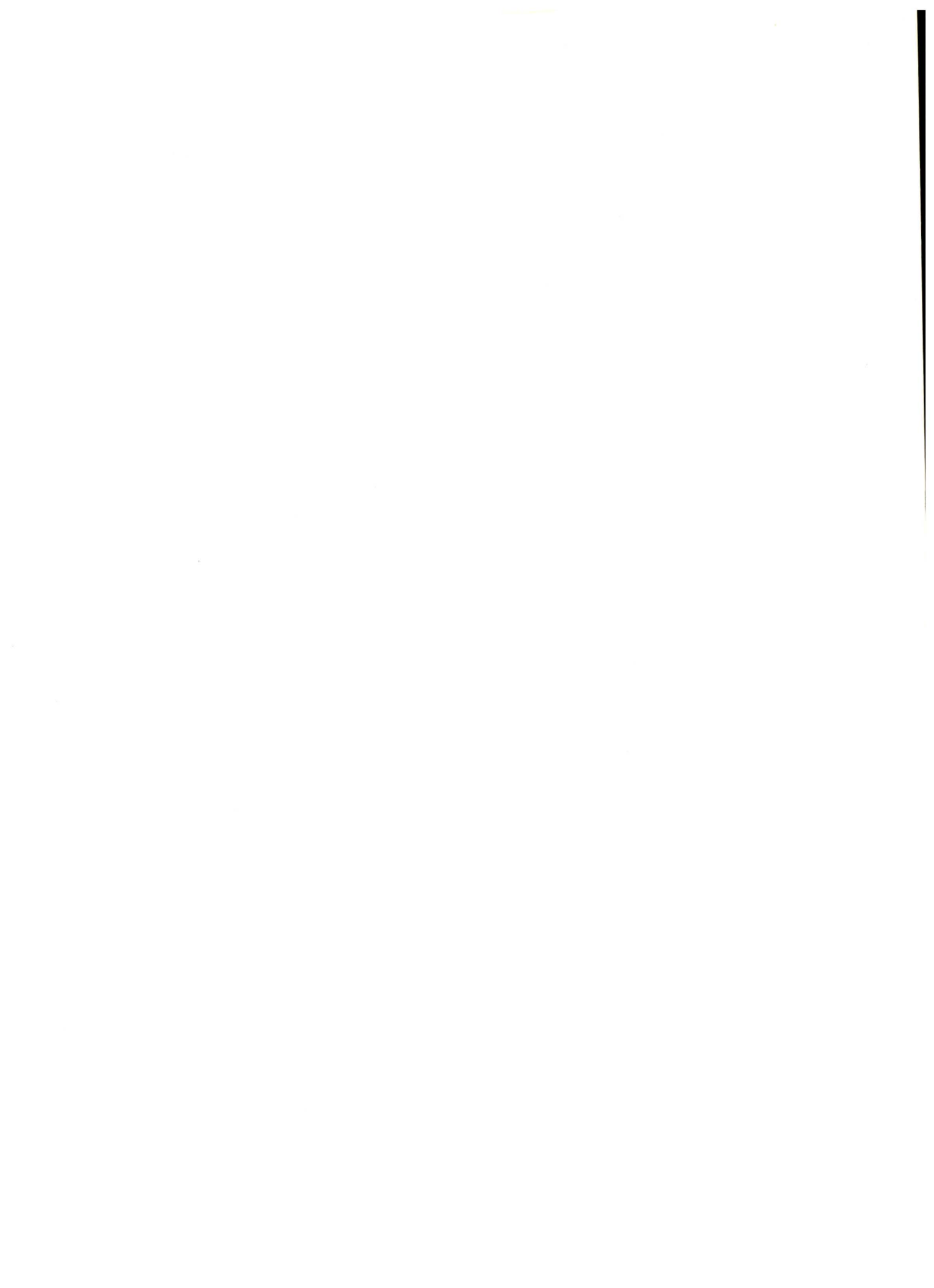
Experimental support for Ausubel's position comes from several studies which utilized materials constructed to provide or draw attention to relevant, more inclusive concepts in the learner's cognitive structure (Ausubel, 1960;

Ausubel and Fitzgerald, 1961, 1962; Ausubel and Youssef, 1966; Brandes and Shepardson, 1967). Generally, these researchers have presented materials designed to promote meaningful learning to one group of subjects (Ss) and similar materials in which no special efforts have been made to promote meaningful learning to another group. Comparisons of these two groups have generally demonstrated superior test performances for Ss learning materials designed to promote meaningful learning.

Ausubel's theory indicates that differences in test performances are due to basic differences in both the learning and the retention processes involved in meaningful and rote materials (1963). He suggests that the meaningful process is superior for both learning and retention, so that if meaningful and rote materials were learned to the same criterion of mastery, meaningful retention would be superior to rote retention. According to Ausubel (1963), expending greater time and effort on the process of rote learning would not make it equal in efficiency to meaningful learning.

Statement of the Problem

The major purpose of this study was to determine the extent to which amount of study-time influenced retention of meaningful and rote materials. Partial replication of Ausubel and Fitzgerald's (1961) study with their materials relating to Buddhism was also attempted.



Five specific predictions were formulated and tested in this study:

1. Retention of meaningful materials will be superior to retention of rote materials on immediate and delayed tests when the materials are studied for the same period of time.
2. Retention scores on an immediate test will be superior to retention scores on a delayed test regardless of type of material studied.
3. Retention scores for materials studied for a long period will be superior to retention scores for materials studied for a short period regardless of type of material studied.
4. On a test of immediate retention, short-time training on meaningful materials will be equal to or better than long-time training on rote materials.
5. On a test of delayed retention, short-time training on meaningful materials will be better than long-time training on rote materials.

Predictions 1, 4, and 5 appear to be consistent with Ausubel's theoretical position, i.e., they reflect statements he has made and experimental findings he has reported (Ausubel, 1960; Ausubel and Fitzgerald, 1961, 1962; Ausubel, 1963; Ausubel and Youssef, 1966). Predictions 2 and 3 were included to investigate variables operative in Ausubel's research that may have some bearing on his reported results:



investigation of the effects of amount of study time and time of testing on meaningful and rote materials might help to isolate the differences between meaningful and rote learning and retention.

Subjects. One hundred and twenty-six second-year education students from the University of Victoria, Victoria, British Columbia, were used.

Experimental materials. The materials used were those developed by Ausubel and Fitzgerald for their 1961 study. They included an historical introduction for the rote conditions, a comparative introduction for the meaningful conditions, a learning passage on Buddhism for all conditions, and a 45-item, multiple-choice test on the learning passage for all conditions.

Experimental procedure. Ss participated in two sessions. For the first session, students in each section of the course were randomly assigned to one of four conditions; a) long study time, immediate test, b) long study time, delayed test, c) short study time, immediate test, and d) short study time, delayed test. Meaningful and rote materials were randomly distributed to Ss in each condition. The immediate test was given at the end of the allotted time for study of the learning passage. The delayed test was given one week later; all Ss were tested in one place during the second session.

The dependent variable was the number of correct

responses on the test. An analysis of variance (ANOVA) was used to test for effects of type of material, amount of study time, time of testing, and their interactions. In addition, a number of planned comparisons were made to test specific predictions.

Significance of the Study

The significance of this study lies in the attempt to test part of a learning theory which purports to explain what occurs when students in a classroom are presented with content to be learned. Previous studies (Ausubel and Fitzgerald, 1961, 1962; Ausubel and Youssef, 1966; Brandes and Shepardson, 1967) were concerned with differences in organization and expression of ideational content as they affect retention scores. Amount of study time was not a measured variable. Analysis of the effect of amount of study time on meaningful and rote materials could be expected to provide some criteria against which to judge the adequacy of Ausubel's theory.

Chapter 2

REVIEW OF RELATED LITERATURE

In his theory of reception learning, Ausubel contends that meaningful learning of verbal materials is enhanced by the presence of relevant general concepts in an individual's cognitive structure. If this is so, providing the learner with general concepts or concepts related to previously learned materials should enhance learning and retention. Several studies offer support for this hypothesis.

Ausubel (1960) gave two groups of undergraduates a 2500-word passage dealing with the metallurgical properties of plain carbon steel. Forty-eight hours and immediately prior to reading the passage, both groups studied a 500-word introduction. For the experimental group the introduction contained general concepts of background material; for the control group the introduction was an historical treatment. Retention was tested three days later with a multiple-choice test. The experimental group demonstrated significantly superior retention.

According to Ausubel's definition of meaningful and rote learning, given equivalent cognitive structure for Ss, passages learned after studying the expository, or general, introduction used by the experimental group would be learned meaningfully. Passages learned after studying the historical introduction used by the control group would be learned rotely; the information in the learning passage, being new

to the learner, could not be related to more general concepts since they had not been provided.

Ausubel and Fitzgerald (1961) used a passage on Buddhism, providing three different introductory organizers: an expository one containing general concepts, a comparative one relating Buddhism to Christianity, and an historical treatment of Buddhism. University undergraduates were given the introduction two days before studying the passage to be learned. Retention was tested 3 and 10 days later using equivalent forms of a multiple-choice test. Results showed that with verbal ability held constant, Ss with more knowledge of Christianity made significantly better scores on tests. On the test given 3 days later, the comparative organizer was superior to the others in aiding retention; there was no significant difference between the effects of the expository and the historical organizers. On the test given 10 days after learning, however, both the comparative and expository organizers were effective in facilitating retention.

In a more detailed study, Ausubel and Fitzgerald (1962) used two sequential passages on endocrinology of pubescence, the first dealing with hormonal factors in pubescence and the second with pathological variations and treatments. Two introductory passages, one of which was an organizer and one a control, were given. Scores on a General Endocrinology Test (GET), on the verbal portion of the SCAT and on tests

following each of the two passages were used in the analysis. Results showed that the organizer facilitated learning and retention of the first passage, but when SCAT scores were included in a covariance analysis there were no significant differences between groups. It was found that the organizer facilitated learning and retention of the passage for Ss with relatively low verbal ability. This finding did not appear in the 1961 study; Ausubel and Fitzgerald hypothesized that Buddhism concepts may have been more explicitly relatable to previously learned concepts. They suggested that Ss of average or superior verbal ability may spontaneously have organized new ideas around relevant concepts. Learning of the first passage was found to facilitate learning and retention on the second, even when GET and SCAT scores were used in a covariance analysis.

A related study by Ausubel and Youssef (1966) found that varying the number of re-readings (0, 1, 2) of the first learning passage on pubescence did not significantly affect learning and retention of the second passage.

Brandes and Shepardson (1967) reported results which were consistent with Ausubel's findings. They used two introductions, artistic and narrative, which were read to Ss before Browning's "My Last Duchess" was read. The artistic introduction appears to have been comparable to Ausubel's historical or control introduction; the narrative, to his expository organizer. Results from a short test of simple

retention given to 240 college student Ss after the two treatments showed that the narrative introduction facilitated learning and retention when total test scores were used in the analysis.

Ausubel accounts for the demonstrated superiority of materials organized around relevant general concepts by hypothesizing that such materials are more easily related to existing cognitive structure than materials not so designed. The meaningful process is said to be relational, and not subject to variables such as contiguity, frequency, and reinforcement which affect the associative process of rote learning. Ausubel further states (1963) that although ample evidence exists to show that meaningful learning produces superior retention, it is not known whether this is due to a) a difference between meaningful and rote learning, b) a difference between meaningful and rote retention, or c) differences in both processes.

Underwood (1964) was critical of Ausubel's methodology, terming his techniques "completely unanalytical." Studies of forgetting, according to Underwood, involve two stages, learning and forgetting, each of which requires measurement. The introduction of a variable such as meaningfulness in the first stage will affect rate of learning. Rate of learning affects rate of forgetting and thus results are confounded unless initial learning is equated or measured. Methods of equating learning on paired associate and serial tasks are

suggested by Underwood, but since they depend on continuous measures of learning (by trial), these particular methods are not directly applicable to Ausubel's frame of reference.

In the present study an attempt to control for confounding of results by rate of learning was made in two ways: 1) amount of study time for the learning passage was varied for both meaningful and rote materials, and 2) a test of immediate recall was used to provide some indication of the amount of learning that took place under each condition.

The portion of Ausubel's theory of interest to the present study is his statement that differences in results of meaningful and rote learning as he defines them are due to basic differences in both the learning process and the retention process of these two types of learning (1963, p. 46). He suggests that the meaningful process is superior in both cases, so that if meaningful and rote materials were learned to the same criterion of mastery, meaningful retention would be superior to rote retention:

...one would be unable to compensate sufficiently for basic weaknesses in rote retention span and process (by expending greater time and effort on learning) so as to equal the efficiency of meaningful learning (1963, p. 46).

In the present study, amount of study time was used as a variable to test this assertion.

Chapter 3

METHOD

Subjects

Subjects were students in Education 297, a multi-sectioned, second-year course in the Faculty of Education at the University of Victoria. This group was chosen because it was the largest available group similar to that used by Ausubel and Fitzgerald (1961). One hundred and twenty-six of the approximately 225 students enrolled in the course reported for the first session. Twelve Ss assigned to the delayed test condition failed to report the following week for testing; of these nine had been assigned to meaningful materials and three to rote materials.

Experimental Materials

Materials used were those prepared by Ausubel and Fitzgerald for their 1961 study (see Appendix A). The historical introduction of approximately 500 words used for the rote conditions contained historical and human-interest material about Buddha and Buddhism. The historical introduction made no comparisons between Buddhism and Christianity (Ausubel and Fitzgerald, 1961).

The comparative organizer used for meaningful conditions was designed to point out explicitly the principal similarities and differences between Buddhist and Christian doctrines, at a much higher level of abstraction, generality,

and inclusiveness than the Buddhism passage to be learned (Ausubel and Fitzgerald, 1961). The comparative organizer functions as an advance organizer to relate materials to be learned to the individual's cognitive structure.

The passage of 2500 words dealt with Buddhist concepts of God, immortality, soul, faith, salvation, morality and responsibility, elaborated in considerable detail (Ausubel and Fitzgerald, 1961).

The test employed as a measure of retention was a 45-item, 5-option, multiple-choice instrument. Ausubel and Fitzgerald (1961) report a corrected split-half reliability of .80 for the form which was used in the present study. Subjects were allowed 30 minutes to complete the test.

Experimental Design

The design for this study was Post-test Only Control Group Design (Campbell and Stanley, 1963), with groups added to form a complete-factorial experiment with equal replications. Three independent variables were considered: type of materials, amount of study time, and time of testing. Materials used were meaningful or rote. Amount of study time was 15 minutes or 45 minutes. These times were established from two pilot studies in which it was observed that less than 15 minutes would not allow Ss to read more than once through the passage to be learned, and that Ss became bored and distracted after 45 minutes of study.

Immediate tests were given following the study period; delayed tests were given one week later. Testing of immediate and delayed retention on different groups was done to avoid practice effects. Random assignment to groups (by sections) was used to obtain 8 groups of Ss. Table 1 shows the design of the experiment, the letter combinations used to identify each group, and the number (n) of Ss in each group.

TABLE 1

Experimental Design

	Amount of Study Time				Total n
	Long (45 Min.) (L)		Short (15 Min.) (S)		
Type of Material	Meaningful* (M)	Rote* (R)	Meaningful (M)	Rote (R)	
Immediate Test (I)	MLI (n=14)	RLI (n=14)	MSI (n=20)	RSI (n=16)	64
Delayed Test (D)	MLD (n=11)	RLD (n=13)	MSD (n=13)	RSD (n=13)	50
Total n	52		62		

* Total meaningful - n = 58

* Total rote - n = 56

Chapter 4

RESULTS AND DISCUSSION

Performance was evaluated on the basis of number of correct responses to the test. Mean scores for all groups are shown in Table 2. (See Appendix B for raw data.)

Since the design of the experiment called for equal cell n's and since the unequal cell n's were not directly related to the experimental variables, an unweighted means analysis of unequal n's was appropriate (Winer, 1962, p. 222). Results of this analysis are given in Table 3.

As shown in Table 3, significant main effects were found for Time of Test (immediate or delayed) and for Amount of Study Time (long or short). The F ratio for Time of Test was 10.63 and for Amount of Study Time it was 8.51 (.05 level, 1 and 106 d.f.). The F ratio for the interaction of Time of Test and Amount of Study closely approached significance; the F table value is 3.95 and the result of the interaction was 3.93. The main effect for Type of Materials and the interaction effects of Amount of Study and Type of Material, Time of Testing and Type of Materials, and for Time of Test and Amount of Study and Type of Materials did not approach significance.

Examination of mean scores given in Table 2 indicates that the significance of the F ratio for Time of Test was due to the superiority of immediate test performances. The mean for the immediate test condition was 16.31, the mean

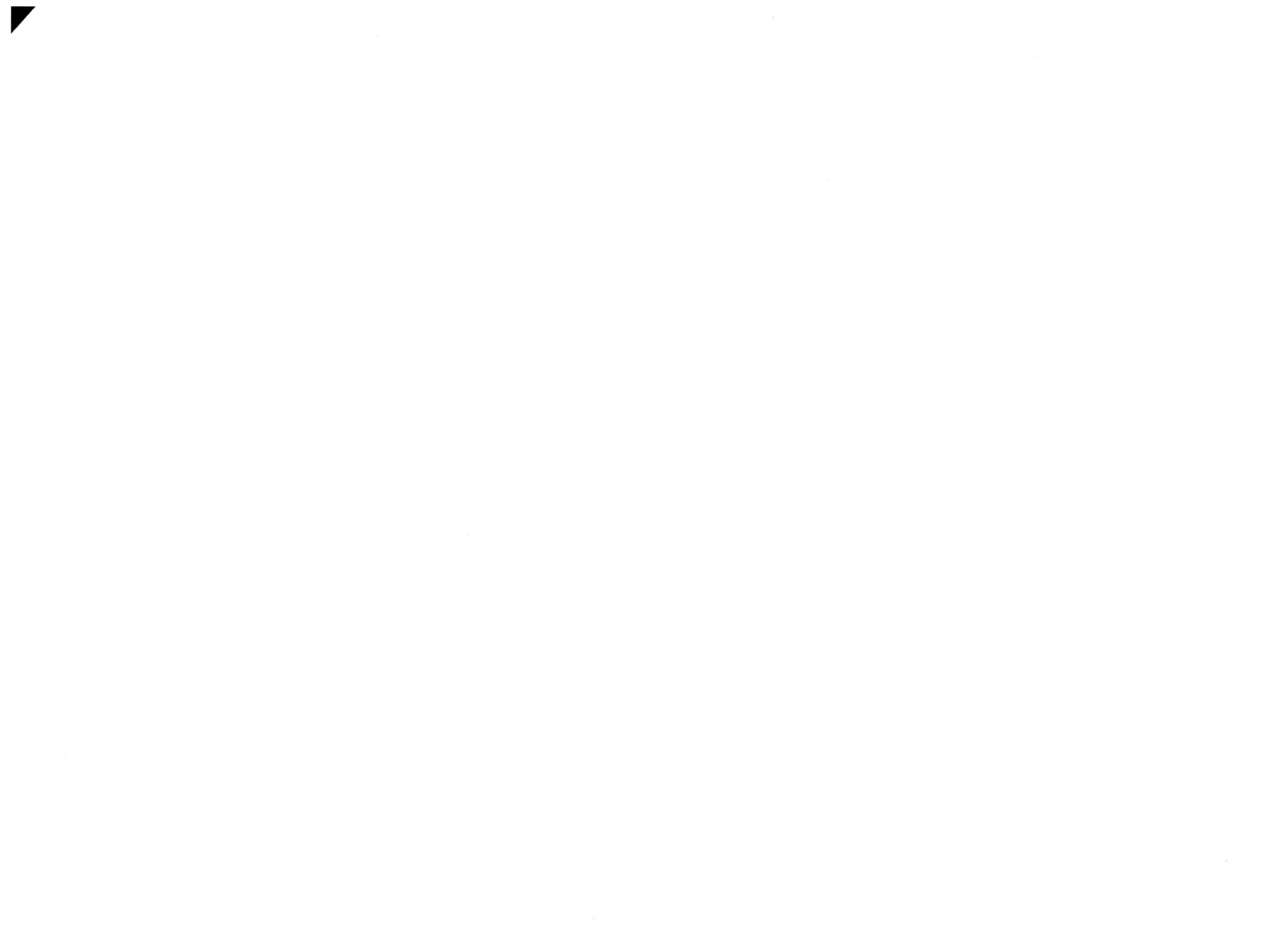


TABLE 2

Mean Scores - All Groups

	Amount of Study Time				Totals		
	Short (S) (15 min.)		Long (L) (45 min.)				
Type of Material	Meaningful (M)	Rote (R)	Meaningful (M)	Rote (R)	Meaningful (M)	Rote (R)	
Immediate Test (I)	MSI 15.40	RSI 13.69	MLI 18.21	RLI 18.70	MI 16.56	RI 16.03	I 16.31
Delayed Test (D)	MSD 13.90	RSD 13.15	MLD 13.64	RLD 14.90	MD 13.79	RD 14.04	D 13.92
Totals	MS 14.82	RS 13.45	ML 16.20	RL 16.88			
	S 14.18		L 16.56		M 15.41	R 15.11	

TABLE 3

Summary of Analysis of Variance on Test Performance:
Unweighted Means Solution

Source	SS	df	MS	F
Time of Test (TT)	187.66	1	187.66	10.63*
Amount of Study (AS)	150.24	1	150.24	8.51*
Type of Materials (TM)	.87	1	.87	< 1
TT x AS	69.46	1	69.46	3.93
TT x TM	5.19	1	5.19	< 1
AS x TM	30.72	1	30.72	1.74
TT x AS x TM	.06	1	.06	< 1
Error (within treatments)	1871.53	106	17.66	
Total	27021.98	113		

* P < .05

for the delayed test condition was 13.92. This result is consistent with what is known about retention in general, i.e., all other things being equal, the amount of information available will be greater immediately after learning than at some later time (c.f., Underwood, 1966).

By itself, this finding does not shed much empirical light on Ausubel's theoretical position that meaningful materials are retained better than rote materials. Consideration of the interaction between Time of Testing and Type of Materials might yield more relevant information. If meaningful materials were retained better than rote materials, some interaction effect could be expected. Results from this study showed an F ratio of less than 1 for the Time of Testing and Type of Materials interaction. The mean scores for groups showed that the MI groups ($\bar{x} = 16.56$) demonstrated slightly better immediate retention scores than the RI groups ($\bar{x} = 16.31$), but this relationship was reversed in the delayed test condition where the mean for the RD groups was 14.14 and the mean for the MD groups was 13.79. The differences here are so slight that they do not deserve consideration except to note that such differences were not in the direction that would be predicted from Ausubel's theory.

Examination of mean scores given in Table 2 indicates that the significance of the F ratio for Amount of Study Time was due to the superiority of the long-study-time scores. The mean for the long-study-time groups was 16.56,

the mean for the short-study-time groups was 14.18. This result is consistent with what is known of practice effects, i.e., in general, the longer the practice period the better the task is learned (Underwood, 1966).

Consideration of the interaction between Amount of Study Time and Type of Material might be expected to be useful in relation to Ausubel's (1963) contentions. He states that expending greater time and effort on the process of rote learning would not make it equal in efficiency to meaningful learning. If a retention measure can be used as an indication of the efficiency of learning, then the results of this study can be applied to Ausubel's statement. If Ausubel is correct, some interaction between Amount of Study Time and Type of Materials might be expected. Results of the present study indicate that the F ratio for the interaction between AS and TM was less than 1. Examination of group means from Table 2 indicates that for the short-amount-of-study-time groups the differences are in the direction predicted by Ausubel. The mean for the MSI group was 15.40, the mean for the RSI group was 13.69. The mean for the MSD group was 13.90 and the mean for the RSD group was 13.15. For the short amount of study time then, meaningful materials were slightly better retained.

When mean scores for the long-amount-of-study-time groups are considered, however, the differences are not in the direction that might be predicted from Ausubel's

statement. The mean for the MLI group was 18.21, the mean for the RLI group was 14.90. Under long-study conditions then, rote materials were slightly better retained.

Another result that might have relevance to Ausubel's statement is a comparison between long-time rote study and short-time meaningful study. If scores on a test of immediate retention can be used as an indication of efficiency of learning, it appears that in this study long-time rote learning was superior to short-time meaningful learning. The mean for the RLI group was 18.70, the mean for the MSI group was 15.40. Ausubel's prediction is not supported in this case. Results of delayed retention tests for the RLD and MSD groups show that the rote retention ($\bar{x} = 14.90$) was slightly superior to meaningful retention ($\bar{x} = 13.90$) after an interval of 1 week.

The three specific predictions consistent with Ausubel's theoretical position and reported results were tested as follows:

1. Retention of meaningful materials will be superior to retention of rote materials on immediate and delayed tests when the materials are studied for the same period of time.

This prediction was tested by the main effect for Type of Material in the ANOVA. The F ratio for Type of Material was less than 1, therefore Prediction 1 is not supported. Failure to demonstrate superiority of meaningful materials

over rote is in direct contrast to Ausubel's theoretical position (1963) and to his experimental results with these materials (Ausubel and Fitzgerald, 1961). The difference that existed was in the direction indicated by Ausubel's previous work, however. The mean for the M groups was 15.41 and the mean for the R groups was 15.11, but this difference is so slight that it cannot be given serious consideration.

Predictions 4 and 5 were tested by planned comparisons. Because of the unequal cell n's a computation procedure involving sums of scores was used in the analysis (Edwards, 1960, p. 148). For purposes of this discussion, however, group means will be used to illustrate differences found.

4. On a test of immediate retention short-time training on meaningful materials will be equal to or better than long-time training on rote materials.

The comparison used to test Prediction 4 involved group MSI and group RLI. The mean for group MSI was 15.40, and the mean for group RLI was 18.70. The difference between these groups is significant at the .05 level, but in an inverse relationship to the prediction, i.e., long-time training on rote materials was superior to short-time training on meaningful materials. Thus, Prediction 4 was not supported. This finding is in direct contradiction to Ausubel's (1963) prediction quoted above (p. 10). It appears that in this study amount of study time was a more

influential variable than type of material studied.

5. On a test of delayed retention, short-time training on meaningful materials will be better than long-time training on rote materials.

The comparison used to test Prediction 5 involved group MSD and group RLD. The mean for group MSD was 13.90, and the mean for group RLD was 14.90. The difference between these groups was not significant; therefore Prediction 5 is not supported. It is interesting to note that the superiority of rote materials demonstrated on the immediate test was not found to be significant on the delayed test. The RLD group mean was only 1 point higher than the MSD group mean. This appears to be a tendency that lends some support to Ausubel's contention that meaningful retention is superior to rote, i.e., tests given after a longer retention interval might be expected to show greater differences in favor of meaningful retention. Results of the present study show that meaningful retention was not superior to rote retention at immediate and one-week intervals.

The two specific predictions made to investigate variables that may have been operative in Ausubel's research were tested as follows:

2. Retention scores on an immediate test will be superior to retention scores on a delayed test regardless of type of material studied.

Prediction 2 was tested by the main effect for Time of

Testing in the ANOVA. The main effect for Time of Testing was significant at the .05 level ($F = 10.63$); therefore prediction 2 is supported. The finding of interest here is that Time of Testing was a more influential variable than Type of Material in this study. What effect time of testing may have had on Ausubel's findings is a matter of speculation, but it appears that further studies on the meaningful-rota dimension may need to make some provision for the effects of time of testing.

3. Retention scores for materials studied for a long period will be superior to retention scores for materials studied for a short period regardless of type of material studied.

Prediction 3 was tested by the main effect for Amount of Study in the ANOVA. The main effect for Amount of Study was significant at the .05 level ($F = 8.51$); therefore prediction 3 is supported. The finding of interest here is that Amount of Study was also a more influential variable than Type of Material in this study. On the basis of the findings of the present study, there seems to be some ground for doubt about the distinction between meaningful and rote materials.

It is clear from the above analysis that in this paradigm there was no functional difference between performances based on meaningful materials and performances based on rote materials. There are several possible explanations for this

finding. It is possible that no learning at all took place, under either condition. There are some data to test this possibility. Twelve Ss who had not been given the materials were tested at the second session. The mean score for this group was 9.8. The chance score for a 5-option, 45-item, multiple-choice test is approximately 9. It would seem, then, that the possibility that no learning took place under either condition does not merit serious consideration.

It is also possible that Ss in the rote condition spontaneously organized new ideas around relevant materials, i.e., their learning was meaningful. This possibility was advanced by Ausubel and Fitzgerald (1962) in another study using different materials, to account for the finding that an organizer introduction facilitated learning and retention only for those Ss with relatively low verbal ability. If, in the present study, Ss in the rote condition had higher verbal ability than those in the meaningful condition and were able spontaneously to organize new ideas under relevant subsumers in their cognitive structures, the failure to discover differences in test scores attributable to type of material would be accounted for.

The same argument can be used for the possibility that Ss in the rote condition had relevant, more-inclusive concepts present in their cognitive structures as a result of previous learning and that Ss in the meaningful condition did not have relevant concepts. The use of random assign-

ment to groups entitles the assumption that such variables as verbal ability and previous learnings have been equally distributed all conditions, but there is no guarantee that this was in fact the case.

The possibility that Ss in the meaningful condition were unable to relate the new ideas presented to concepts already established in their cognitive structure is another that cannot be dismissed on the basis of the available data from the present study. However, the possibility that rote materials were learned meaningfully or that meaningful materials were learned rotely requires either an hypothesis of some sort of compensating process in learning and retention under one condition or the assertion that there was in fact no potential difference in the materials. The latter assertion would be the most parsimonious explanation of what occurred in the study.

Chapter 5

SUMMARY

The present study was an attempt to investigate the validity of the position taken by Ausubel (1963) with regard to meaningful and rote retention by determining the extent to which amount of study-time influenced retention of meaningful and rote materials. Replication of a part of Ausubel and Fitzgerald's (1961) study also was attempted using the same materials. The design used was Post-Test Only Control Group Design (Campbell and Stanley, 1963), with groups added to form a complete-factorial experiment with equal replications. Eight groups of Ss were used. Independent variables were type of material (meaningful or rote), amount of study-time (15 min. or 45 min.), and time of testing (immediate or delayed). The dependent variable was the number of correct responses on a multiple-choice test.

Data were gathered from 126 Ss, students in a multi-sectioned second year course in the Faculty of Education at the University of Victoria, Victoria, British Columbia, in two sessions. At the first session 126 Ss met in four groups for learning of the materials. Sixty-four immediate tests were given at this session. At the second session all Ss were tested and test scores for 50 Ss in the delayed-retention conditions were obtained. In addition, 12 Ss who had not been given the materials were tested at the second session, although this was not part of the design of the

study. Data were treated by a 2 x 2 x 2 factorial ANOVA and by a series of planned comparisons.

Five specific predictions were made and tested:

1. Retention of meaningful materials will be superior to retention of rote materials on immediate and delayed tests when the materials are studied for the same period of time.

This prediction was tested by the main effect for Type of Material in the ANOVA. Since the F ratio for Type of Material was less than 1, Prediction 1 was not supported. This finding is in direct contradiction to Ausubel's theoretical predictions and experimental findings.

2. Retention scores on an immediate test will be superior to retention scores on a delayed test regardless of type of material studied.

Prediction 2 was tested by the main effect for Time of Testing in the ANOVA. The main effect for Time of Testing was significant at the .05 level ($F = 10.63$); therefore Prediction 2 was supported. It appears from this finding that time of testing was a more influential variable in this study than type of material.

3. Retention scores for materials studied for a long period will be superior to retention scores for materials studied for a short period, regardless of type of material studied.

Prediction 3 was tested by the main effect for Amount

of Study in the ANOVA. The main effect for Amount of Study was significant at the .05 level ($F = 8.51$); therefore Prediction 3 was supported. It appears from this finding that amount of study time was a more influential variable in this study than type of material.

4. On a test of immediate retention, short-time training on meaningful materials will be equal to or better than long-time training on rote materials.

Prediction 4 was tested by planned comparisons which showed that the rote group was significantly superior to the meaningful group on the immediate test; therefore Prediction 4 was not supported. This finding is in direct contradiction to a theoretical prediction made by Ausubel (1963).

5. On a test of delayed retention, short-time training on meaningful materials will be better than long-time training on rote materials.

Prediction 5 was tested by planned comparisons which showed that there was no significant difference between the meaningful and rote groups on the delayed test; therefore Prediction 5 is not supported. This finding is in direct contradiction to a theoretical prediction made by Ausubel (1963).

It was concluded that in this paradigm, there was no difference between meaningful and rote retention attributable to type of materials studied and that amount of study time and time of testing were the influential variables

involved in differences in retention scores. Several possible explanations for these findings were discussed.

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APPENDIX A

Experimental Materials

Comparative OrganizerDIRECTIONS

This is some introductory background material pertaining to a longer and more detailed selection in the same general subject-matter area that you will be studying shortly. You will have five minutes in which to study this introductory material.

When I give the signal, turn this page and read the entire selection at your customary reading speed. During the first reading, concentrate on grasping the general features of the material and becoming generally familiar with it. During the remainder of the available time, use whatever method you prefer to fix the substance and the details of the selection in your memory, but do not take any notes or make any marks on the reading material.

TEACHINGS OF BUDDHISM

The concept of a Deity is fundamental to Christian theology. Buddhism, while not denying the existence of God, would affirm that knowledge of such a Being is beyond man's comprehension. In addition, Buddhism places no value on things beyond this world. All that exists, exists within this world at this moment. The ultimate fact of existence is not a Divine Being, but the principle of cause and effect.

The central purpose of Christianity is to bridge the spiritual gap which separates any individual from the original experience of contact with the living Jesus. All devotional exercises, whether sacraments, Bible reading or prayer, are directed towards this goal. Man has separated himself from God by sin. He can only be reunited with God through Jesus. Salvation is thus gained through the intermediary of Christ. Buddhism, on the other hand, is a process of self-salvation which emphasizes the insistent present. There have been Buddhist prophets in the past, but their words and writings are merely guides to the individual. In Christianity the source of authority is the Bible, in Buddhism it is the individual.

In Buddhist doctrine, the individual can realize the brotherhood of man by his own efforts without recourse to a super-natural Being. If man has sinned, according to Buddhism, exoneration from sin is achieved through restitutive moral action and not, as Christians believe, through Divine forgiveness. Salvation is achieved for the Buddhist by reason (Zen-Buddhism emphasizes intuitive experience) whereas for the Christian it is by faith.

Christians have a strong and firm belief in the continuance of the individual's conscious experience (personal identity) beyond the grave. The "resurrection of the body" and "a spiritual body" are phrases which commit

the Christian to the everlasting continuance of recognizable personal identity (soul) in some form or other. A person is born, lives this life and, depending upon his state of "grace" (state of Divine forgiveness or otherwise) at death, endures for eternity, as the same individual, a "Heaven of bliss" or a "Hell of torment." To the Buddhist, the conscious experience of this world (personal identity) suffers death with the body of man. His principal goal in life is to obliterate his desire for individuality and become one with the Universe (i.e., with all other forms of life). If he is unable to renounce this desire in his lifetime, his personal identity disintegrates, but that aspect of his personality concerned with capacity for self-awareness is continued in another individual (human or animal). He is reborn into this world, as a different individual, to a station in life determined by the quality of his previous conduct.

Buddhism is above all a religion of individual effort, wherein no Being, man or God, is allowed to stand for good or evil between a cause and its effect. "Absolution" as understood by the average Christian, is to the Buddhist mind absurd in that it strives to separate evil-doing from the suffering which is its inevitable and thoroughly justifiable consequence, and to make the victim of the evil suffer the natural consequences of the deed.

Historical OrganizerDIRECTIONS

This is some introductory background material pertaining to a longer and more detailed selection in the same general subject-matter area that you will be studying shortly. You will have five minutes in which to study this introductory material.

When I give the signal, turn this page and read the entire selection at your customary reading speed. During the first reading, concentrate on grasping the general features of the material and becoming generally familiar with it. During the remainder of the available time, use whatever method you prefer to fix the substance and the details of the selection in your memory, but do not take any notes or make any marks on the reading material.

Siddhartha Gotama (Buddha) was the son of a nobleman whose ancestors, the Sakyas, had held kingly rank. Kapilarastic, where he was born in 560 B. C., was a city in north-east India, the site of which is now unknown. Probably it lay somewhere in the south-eastern corner of what is today the kingdom of Nepal. Many authorities believe that Gotama was of Mongolian stock. This has not been established, though it may well be that there was a Mongolian strain in his pedigree.

There are numerous stories of the birth and life of Buddha, many in esoteric tradition. Thus we are told of the seven steps to the North, East, South and West which the baby took to proclaim his incomparable wisdom; of his mother's death seven days after Gotama's birth; of the intervention of Mara, the tempter, at key points in his life, all of which have symbolic meaning.

The boy, we are told, led the normal life of ease of his birth and calling. At sixteen he won, in a contest of arms, his wife Yasodha, and by her had a son Rahula. But from earliest childhood he had been unusually self-possessed and never satisfied for long with sensuous delights. He left his wife and child when he was 29 to seek wisdom and truth, and attained enlightenment at the age of 35.

Buddhism, which developed from the teachings of Gotama, is in fact a family of religions and philosophies. The Buddha himself wrote nothing; and none of his teaching was written down for at least four hundred years after his death. We therefore do not know directly what the Buddha taught; and today at least four Schools, with sub-divisions in each, proclaim their own view as to what is Buddhism.

The oldest and probably nearest to the original teaching is the Theravada (the Doctrine of the Elders), known at first to the West as the Hinayana (little Vehicle). This today is the religion of Ceylon, Burma, Thailand and Cambodia. The Mahayana (large Vehicle) includes the rest of the Buddhist world. However the peculiarities of Tibetan Buddhism, which covers Tibet and its neighbors, Bhutan, Sikkim and Nepal, are so marked that though it is part of Mahayana, it may be considered a school on its own. The same applies to the Zen School of Japan, which is utterly different from any other School of Buddhism or from any other religion-philosophy.

The range of Buddhism is enormous. In time it covers 2,500 years; in space it covers the Theravada countries already described, the Mahayana countries of Tibet and its neighbors, and Mongolia, China, Korea and Japan. Buddhism is therefore to be found to the North, East and South of its parent country, India, while in the West, its influence, first felt in Roman times, is growing rapidly today.

Learning PassageDIRECTIONS

This is a test of how well you can learn the substance and details of typical ideational material at the college level.

When I give the signal, turn this page and read the entire selection at your customary reading speed. During the first reading, concentrate on grasping the general features of the material and becoming generally familiar with it. During the remainder of the available time, use whatever method you prefer to fix the substance and details of the selection in your memory, but do not take any notes or make any marks on the reading material.

You will be examined on this material by means of a multiple choice test. The ability to provide correct answers to these questions will presuppose adequate comprehension of the material as well as precise knowledge of the details. You will have an opportunity before the end of the semester to learn both your own score and the range, distribution and central tendency of scores for the entire class.

According to Buddhist beliefs "the Buddha was the Buddha because he was Buddha, Awakened, Enlightened, made Aware." Bodhi (wisdom), acquired by the power of Buddhi (intuition), has many names and many degrees of achievement. Samadhi, the last step on the Noble Eightfold Path, is a step on the way to it. Nirvana is its human goal. Yet beyond Nirvana lies some further goal, for Buddhism is a process of becoming and admits no conceivable end. There are many degrees in this development, from a "bright idea" when a faculty greater than reasoning breaks through into the cage of the concept-ridden mind, to Parinirvana (past Nirvana)--and Beyond. The Buddha, a human being, achieved supreme Enlightenment, yet his victory over the mind was not unique. There had been Buddhas before him and there are Buddhas to come. In the end each living thing will achieve Enlightenment.

Buddhism teaches that self-salvation is the immediate task for each man. If a man lay wounded by a poisoned arrow he would hardly delay extraction by demanding details of the man who shot it, or of the length or make of the arrow. Similarly Buddhists believe that there will be ample time for ever increasing one's understanding of the Buddha's teachings during the path to Enlightenment. Meanwhile, man should begin now by facing life as it is, learning by direct and personal experience.

The Law of Change

Buddhism teaches that the first fact of existence is the law of change or impermanence. All that lives, from a mite to an elephant, from a man to a society of men, passes through the same cycle of existence--i.e., birth, growth, decay and death. Only the principle of life is continuous, ever seeking

self-expression in new forms. However, the forms that life takes are impermanent, each suffering the same cycle of existence. Thus, life is a process of flow, and he who clings to any form, however splendid, will suffer as a result of resisting the flow.

The Nature of "Self"

The Buddha analyzed man's concept of self and found it to be at least twofold, a real Self and a self which is not-Self.

On the nature of the Self the Buddha concluded that the real Self, far from being that which distinguishes man from man, is actually the "common denominator" of all forms of life, and is hence the philosophic basis of the brotherhood of man. It exists in every living thing but is possessed by none of them. It is eternal but in no sense mortal or immortal.

The not-Self, which is the human manifestation of the real Self, can be equated to our concept of personality or character. It is composed of both mortal and immortal groups of qualities or attributes, called skandhas. The "mortal" skandhas are those attributes of personality which disintegrate when the human form "dies." The "immortal" skandhas consist of those attributes of personality which are passed on through succeeding cycles of life.

The "mortal" group of skandhas comprise those elements of personality which are involved in or acquired through the unique conscious experience of each individual. It consists of Rupa, form, shape or body; in this sense the physical body, also including the organs of sense. The second is Verdana, which includes the feelings or sensations, whether pleasant,

unpleasant or neutral. The third is Sanna, comprising all perception or recognition, whether sensuous or mental. It is reaction to sense stimuli, described as "awareness with recognition." The fourth bundle, the Sankharas, includes all behavioral tendencies or predispositions, all moral and immoral volitional activity, and the mental processes of discrimination and comparison between ideas.

The fifth of the skandhas, Vinnana, constitutes the immortal aspect of the not-self. It is that part of personality which enables the individual to appreciate that he is different from his neighbor, i.e., that he is himself and not another. This tendency to be aware of one's own identity, whatever it may be at the moment, is the only component of personality that can survive death. The rest of personality (the mortal skandhas), i.e., that which is a product of the individual's unique personal experience and unique bodily and mental equipment, that which defines his personal identity, disintegrates at death. Thus personality in the sense of personal identity is mortal, but the particular component of personality which is responsible for self-awareness may, under certain circumstances, continue after death in another individual (human or animal).

Capacity for self-awareness, and actual awareness of self as a separate entity, are obviously necessary before the desire for separate existence can arise. Once this desire for separate existence is formed, however, it energizes and perpetuates the tendency toward self-awareness. But if the individual is able to renounce his desire for separateness, the capacity for self-awareness is no longer energized, ceases to be exercised, and its immortality is extinguished. At this point, the entire not-self (both the

mortal personal identity and the immortal self-awareness components of personality) ceases to exist, and the true self emerges--no longer a separate entity aware of its separateness, but an anonymous part of the eternal principle of life.

If, on the other hand, desire for separateness is not overcome before death, it perpetuates the continued existence of the self-awareness component of personality, which is then reborn in another individual. The new individual, in turn, develops a new personal identity which, together with the reincarnated self-awareness tendencies, constitutes the new not-self or personality. Through his capacity for self-awareness he becomes conscious of his new individuality, comes to regard it as the principal value in life, and develops an urge to preserve it indefinitely; and this desire both reciprocally enhances the self-awareness aspect of personality during the lifetime of the individual, and (if not renounced before his death) effects its rebirth in another individual.

Doctrine of Karma

The Buddhist doctrine of karma is the law of cause-effect. Each man molds his future hour by hour; and his actions in this life determine his condition in the succeeding cycle of life. Thus the individual's lot in this life is dependent upon his actions of "deeds" in an earlier life, and his activities in this life influence his lot when he is reborn. The Buddha taught that karma resulted from man's desire for individual existence, and that this craving was ultimately responsible for rebirth. But even as the actions of one man react upon that man, so do his actions relative to a group, be it family, society

or nation, also react upon that group as such, and upon all whose karma place them within the scope of these actions. Each man, therefore, has many "karmas", including racial, national, family, and personal. Extinction of the desire for individual existence, however, will result in the achievement of Nirvana (enlightenment). When the desire for individual existence is destroyed (desire being the cause of karma), the elements of individual personality disperse and the real "Self" of man is merged with the universe. If desire is not destroyed before death, on rebirth karma produces another personality, and so the endless "wheel of becoming" continues. Thus, ignorance causes desire and desire causes attachment; attachment perpetuates the existence of personality; then death, rebirth, ignorance, craving, old age, death and so on. Man only has control over one link in the chain, namely desire. By its elimination he can break the chain of rebirths and suffering, whereupon he enters Nirvana (the merging of the "Self" with the universe).

Nirvana

Nirvana is the cessation of becoming, a stopping of the "Wheel of Rebirth" because the motive power of its revolutions, desire for individual life, has stopped. It is the end of separateness. It is the extinction of the not-Self in the completion of the Self. It is, therefore, to the limited extent that we can understand it, a concept of psychology, a state of consciousness. The first and last word on Nirvana was said by the Buddhist teacher Nagasena in one phrase: "Nirvana is!" for no discussion with the finite mind will enable one to cognize the Infinite. Thus Nirvana cannot be conceived; it can only be experienced.

The Middle Way

Life as we know it, including the intellect which surveys it, seems to be composed of an endless series of opposing principles. According to the Buddha's teachings, these seemingly opposing principles (i.e., life and death, spirit and matter, good and evil, truth and error) are complementary aspects of a whole. In terms of Buddhist philosophy the "Path to Enlightenment is the Middle Way" between these extremes.

Buddhists believe that the finest qualities in man, i.e., strength of purpose, patience and unselfishness, have gradually developed from the interplay between two such opposites, namely the extremes of good and evil. "Suffering and evil form the gymnasium in which to strengthen virtue." Man's will is a natural force, to be used for good or evil at its user's choice. If a man uses power for good, his gain will be proportionate; if for evil, the transgressor is pitting himself against the whole force of the universe. For a while he may seem to flourish in his selfishness, but ultimately, by the process of inexorable law, the Karmic pendulum will bring him the dukkla (suffering), which his acts have caused.

Freewill and "Fate"

The Buddhist fails to see any conflict between the hypotheses of freewill and predestination, considering karma and freewill as two facets of the same spiritual truth. Buddhism is fatalistic in the sense that the present is always determined by the past; but the future always remains free. Logically, if the past determines the present, then the present determines the future. The present, however, is always under control of current will, in the same way that the past was under the control of past will. Every action we make depends

on what we have come to be at that time; but what we are coming to be at any time depends on the direction of the will. The karmic law merely asserts that this direction cannot be altered suddenly but must be gradually changed by our own efforts. Hence, every man is free within the limitations of his self-created karma i.e., the resultant of past actions of body, speech, and thought. No man can rise above his individual failings without lifting, to some degree, the whole body of which he is an integral part. In the same way no man can sin and suffer the effects of sin alone.

Right Motive in Morality

The sanction of Buddhist morality is threefold. At the lowest level it is enlightened selfishness. An understanding of the law of Karma makes one realize that it "pays" to be good. At this stage of evolution there is "no other sanction of goodness beyond the driving forces of pain waiting on immoral living, and the pleasures rewarding moral living, now or in the long run." This is the sanction of all man-made laws. The Buddhist believes that the moral laws of nature carry with them both the punishment of disobedience and the virtuous man's reward. In Buddhism, a man is punished by his sins, not for them.

Later comes the rational basis of morality. If life be one, each unit of that life reacts in all it does, for good or evil, on each other unit of the whole. Hence to do evil is to harm one's fellow men, while the strict morality of one such unit raises the level of all humanity.

Finally comes the stage of "motiveless morality", a realization that the highest virtue is its own reward. In Buddhist terms:

Virtue rewards itself by strengthening the will, by subduing unworthy desire, by generating knowledge of reality, by giving inward peace. Sin punishes itself by weakening the will, by inflaming unworthy desire, by generating delusions, by breeding fever and unrest. For sin to be "forgiven" is as impossible as for virtue to forego its reward.

Unity of Life

Life is one and indivisible, though its ever changing forms are innumerable and perishable. There is, in truth, no death, though every form must disintegrate. From an understanding of life's unity arises compassion, a sense of identity with the life in other forms. Compassion is described as the "Law of laws--eternal harmony;" and he who breaks this harmony of life will suffer accordingly' and delay his own Enlightenment.

Life being One, the interests of the part should be those of the whole. In his ignorance man thinks he can successfully strive for his own interests, and this wrongly directed energy of selfishness produces suffering. He learns from his suffering to reduce and finally eliminate its cause. The Buddha taught four Noble Truths: (i) the omnipresence of suffering; (ii) its cause, namely, wrongly directed desire; (iii) its cure, i.e., the removal of the cause; and (iv) the Noble Eightfold Path of self-development which leads to the termination of suffering.

The Eightfold Path consists in Right (or perfect) Views or preliminary understanding, Right Aims or motive, Right Speech, Right Acts, Right Livelihood, Right Effort, Right Concentration or mind-development, and finally Right Samadhi (state of superconscious), leading to full Enlightenment. Since Buddhism is a way of living, not merely a theory of life, the treading of

this path is essentially a self-deliverance. "Cease to do evil, learn to do good, cleanse your own heart: this is the teaching of the Buddhas."

Enlightenment

Reality is indescribable (unknowable to man), and a God with supernatural attributes is not the final Reality. But the Buddha, a human being, became the All-Enlightened One, and the purpose of life is to transcend the intellect and attain Enlightenment (Nirvana). This state of consciousness, Nirvana, the extinction of the limitations of selfhood and desire, is attainable on earth. All men and all other forms of life contain the potentiality of Enlightenment, and the process therefore consists in becoming what you are. As a Buddhist master said, "Look within: thou art Buddha."

From potential to actual Enlightenment there lies the Middle Way, the Eightfold Path "from desire to peace," a process of self-development between the "opposites" avoiding all extremes. This is the path the Buddha trod. The only faith required in Buddhism is the reasonable belief that where a guide has trodden it is worth our while to tread. The Way must be trodden by the whole man, not merely by the best of him, and heart and mind must be developed equally. The Buddha was the All-Compassionate as well as the All-Enlightened One.

Meditation and Authority

Buddhism lays great stress on the need of inward concentration and meditation. This, it is believed, leads in time to the development of the inner spiritual faculties. The subjective life is as important as the daily round, and periods of quietude for inner activity are essential for a balanced life.

The Buddhist should at all times be "mindful and self-possessed", refraining from mental and emotional attachment to "the passing show." This increasingly watchful attitude to circumstances, which he knows to be his own creation, helps him to keep his reaction to it always under control.

The Buddha said: "Work out your salvation with diligence." Buddhism knows no authority for truth save the intuition of the individual, and that is authority for the individual alone. Each man suffers the consequences of his own acts, and learns thereby. Similarly the authority for moral judgment is the individual. Thus the ethical theory of Buddhism separates moral rules from prescriptions of merely ritual significance. Motive is made the criterion of moral action. Buddhists believe that there is no ultimate authority to which the individual can appeal for salvation. Buddhist monks are merely teachers and exemplars, and in no sense mediators between Reality and the individual.

Test

DIRECTIONS

The questions on the following pages test your knowledge of the material that you studied recently.

These questions are all of the multiple-choice type. For each question choose the lettered alternative that is most appropriate. If two or more answers seem appropriate, choose the one that seems most correct to you. Only one answer should be chosen for each question.

When you have decided which of the five lettered answers is correct for each question, make an x on the corresponding letter on your answer sheet. Make sure that the number of each question you answer on the answer sheet corresponds to the same numbered question on the question sheet.

Although some questions might appear to be similar to questions previously answered, no two questions are identical.

Having once turned over a page, you are not permitted to turn back to that page either to reread questions or to change your answers.

Please make no marks on the question booklet.

Revised Buddhism Test (Form B)

1. The idea that "goodness" will be rewarded: (a) is one of several bases of Buddhist ethics; (b) is foreign to Buddhism; (c) is the foundation for Buddhist ethics; (d) is a concept in morality at a higher level than the criterion of reason; (e) none of the above.
2. Buddhism teaches that immoral deeds are punishment in themselves because they: (a) instigate craving; (b) subvert the will; (c) inspire false beliefs; (d) cause discontent; (e) all of the above.
3. Buddha taught that man is subjected to a personal karma. To which of the following karmas is he also subjected? (a) the karma of his caste; (b) the karma of his occupation; (c) the karma of his kinship group; (d) all of the above; (e) none of the above.
4. The central ideal of the Buddhist religion is: (a) to help man acquire compassion by understanding the unity of all life; (b) to teach the word of Buddha; (c) to help man attain enlightenment; (d) a and c; (e) b and c.
5. In judging the moral quality of a truly enlightened Buddhist's conduct, the question of intent: (a) is irrelevant; (b) should be considered in relation to Buddhist scripture; (c) should be considered in relation to the outcome of the conduct; (d) should be considered in relation to the ethical standards of the culture in which he lives; (e) should be considered in relation to his station in life.
6. Enlightenment can be achieved by: (a) all living creatures; (b) members of the Buddhist faith alone; (c) all objects; (d) humans only; (e) all living creatures at the moment of death.
7. According to Buddha, man should be concerned with: (a) the past, and the reason for his present karma; (b) life at this moment; (c) fulfilling his desire for Enlightenment; (d) all of the above; (e) none of the above.
8. The prime concern of Buddha was: (a) to help man understand the unchanging laws of the universe; (b) to help man achieve Enlightenment; (c) to help man conquer craving; (d) b and c; (e) a and b.
9. When man achieves Enlightenment, he: (a) loses all interest in social living; (b) accepts the personality of the Buddha as his own; (c) repudiates all emotional experience; (d) a and b; (e) none of the above.
10. Nirvana is best described as: (a) a condition of the mind when it has attained complete disinvolvement from the here and now; (b) the final goal of life; (c) a condition which is beyond description; (d) a state of absolute happiness; (e) complete involvement in material things.
11. The final reality, according to the Buddhist scriptures, is: (a) a disembodied intelligence; (b) nothingness; (c) unknowable; (d) enlightenment; (e) a and b.

12. Buddha taught that it is possible: (a) for moral actions to be rewarded; (b) for man's transgressions to be forgiven; (c) to suffer alone the consequences of immoral deeds; (d) b and c; (e) a and c.
13. The Buddhist believes that after death: (a) there is immortality of an unchanging soul; (b) a new personality is born if enlightenment has not been achieved; (c) the sameness of individuality persists indefinitely; (d) all of the above; (e) a and b.
14. In Buddhism, sins may be eradicated by: (a) conquest of desire; (b) acceptance of the absolute power of Buddha; (c) moral living; (d) all of the above; (e) none of the above.
15. Nirvana is attained when a man obliterates his: (a) immoral tendencies; (b) emotions, in the development of his intellect; (c) craving; (d) b and c; (e) all of the above.
16. Buddha proclaimed the validity of the ancient law of karma which is essentially that: (a) the past determines the future irrespective of man's actions; (b) man has complete freedom to determine the future; (c) the present is determined by the past but man can determine his future within the limits of that past; (d) the present is the result of the past but man can alter his future at will; (e) none of the above.
17. The cycle of Samsara is determined by many factors, only one of which is under man's control. That factor is: (a) life; (b) concern for earthly things; (c) knowledge; (d) birth; (e) none of the above.
18. According to Buddhism, the criterion of moral actions is: (a) the degree of conformity of the acts to the ethical code proclaimed by Buddha; (b) the morality of the intent behind the actions; (c) the outcome of the actions; (d) a and b; (e) a and c.
19. A central concept of karma is that: (a) man's Samsara is beyond his control; (b) man will receive retribution for his misdoing; (c) man is being punished now for his deeds in previous lives; (d) man is being punished in this life for the sins of his ancestors; (e) a and d.
20. Buddha was: (a) a man who attained absolute enlightenment; (b) an inspired teacher; (c) a divine person; (d) a unique individual who transcended earthly life; (e) none of the above.
21. According to Buddha, man's character: (a) is merely a figment of the mind; (b) suffers death with the body of man; (c) is compounded of both mortal and immortal elements; (d) is immortal; (e) none of the above.
22. For the Buddhist, redemption from sin will result from: (a) repentance; (b) seeking enlightenment; (c) expiation; (d) b and c; (e) none of the above.
23. Which of the following skandhas does not necessarily suffer death with the human form? (a) Vinnana; (b) Verdana; (c) Sankharas; (d) Sanna; (e) Rupa.

24. Nirvana is achieved by: (a) confounding the mind; (b) suppressing the intellect; (c) transcending the mind; (d) intellectual development; (e) a and b.
25. If man achieves Enlightenment, his personality: (a) is preserved in the Buddhist "heaven"; (b) disintegrates; (c) is recast into a purer form; (d) is united with the personality of Buddha; (e) none of the above.
26. The Buddhist scriptures reduce the "self" of man into a Self and a not-Self. The real Self is: (a) the essence of individuality; (b) the essence of life common to all men; (c) the life form of the individual; (d) the intellectual ideal of personality; (e) none of the above.
27. According to Buddhism, unhappiness results from man's: (a) failure to control his desire; (b) disregard of the spiritual essence of life; (c) failure to control his emotions; (d) failure to predict the consequences of his behavior; (e) none of the above.
28. The "Middle Way" to Enlightenment stresses: (a) the development of the intellect; (b) emotional control; (c) mortification of the body; (d) a and b; (e) a and c.
29. According to Buddha, the quality (skandha) of man called consciousness is: (a) the constantly changing element of personality; (b) that element of personality resulting from past deeds; (c) a cause of Samsara; (d) self-awareness; (e) all of the above.
30. The state of Nirvana may be achieved: (a) only on the death of the human body; (b) during this life; (c) to a limited degree in this life with full enlightenment being reached only at death; (d) only in the next life; (e) only by Buddhists.
31. The criterion of truth, for the Buddhist, is the: (a) scriptures; (b) the judgment of the Enlightened; (c) society in which the truth is to be established; (d) individual person; (e) none of the above.
32. According to Buddha, karma results from: (a) immoral conduct; (b) desire for material things; (c) heresy; (d) desire for individual existence; (e) none of the above.
33. The Buddha said that moral deeds are their own reward because they: (a) neutralize previous misdeeds; (b) generate reciprocal good deeds; (c) lead the individual to an understanding of "life"; (d) a and b; (e) induce self-understanding.
34. The role performed by Buddhist monks is that of: (a) mediator between Buddha and the individual; (b) teacher of the Buddhist way of life; (c) mediator between reality and the individual; (d) enlightened sources of moral authority; (e) none of the above.
35. The Buddha believed that the inner subjective life is important because: (a) it balances the "daily round" of social living; (b) it provides a channel of communication to Buddha; (c) it leads to intellectual development; (d) a and c; (e) all of the above.

36. The Buddha taught that: (a) the real Self of living things is continuous; (b) the forms that life takes pass through a cycle of birth, decay and death; (c) there is no general principle of life which transcends particular forms of existence; (d) a and c; (e) a and b.
37. Those skandhas which disintegrate when the unenlightened person dies include: (a) sense perception; (b) the not-Self; (c) the human form; (d) a and c; (e) b and c.
38. What is transferred from one individual to another if reincarnation takes place? (a) desire for self-awareness; (b) the capacity to differentiate oneself from the rest of the world; (c) the total personal attributes of a particular man; (d) knowledge of one's prior personal identity; (e) the evil accumulated in previous lives.
39. From the Buddha's teaching, which one of the following is least likely to accelerate the attainment of Nirvana? (a) correct speech; (b) correct mind development; (c) correct actions; (d) correct understanding; (e) correct faith.

Which of the following replies to the question stated is most consistent with Buddhism?

Note. In some sets of replies two or more (or perhaps none) of the replies will be in accord with Buddhism. You are asked to indicate that reply which is most consistent with the principles of Buddhism. In each case mark one reply.

40. Is socialism or capitalism more consistent with Buddhism?

- (a) The Buddha said that the individual man is the true expression of life. Therefore a capitalistic society which stresses individuality is more consistent with Buddhism.
- (b) A good society should encourage both individual and community initiative and hence, to a limited extent, both are consistent with Buddhism.
- (c) Society is dependent upon the individual man. To advance individual ambition in a capitalistic society would advance the "well being" of both the individual and society in accord with the Buddha's teaching.
- (d) A political system based on social initiative (i.e. socialism), due to the interdependent nature of karmas, would best enhance individual development towards Nirvana.
- (e) Buddhism is concerned only with the spiritual development of man. The question of consistency or inconsistency between Buddhism and a political theory is therefore meaningless.

41. Could empirical research become an integral part of the Buddhist way of life?
- (a) Since Buddhism stresses the immediate present, empirical research as an end in itself is completely consistent with Buddhism.
 - (b) The attainment of Nirvana demands an emphasis on mind development and hence speculation. Although science is not at variance with Buddhism, it could never be considered an integral part of the Buddhist way of life.
 - (c) The final truths have been stated by the Buddha. Hence, empirical research has no place in Buddhism.
 - (d) Empirical research could constitute a substratum of inquiry in a Buddhist society, but interpretation of the data would be largely speculative.
 - (e) The only type of research compatible with Buddhism would be inquiry into the consistency of nature with the Buddha's teachings.
42. Is it wrong to take human life?
- (a) Killing could be moral or immoral, depending upon the morality of the reason underlying the deed.
 - (b) The taking of human life may be judged only in terms of the consequences of the deed.
 - (c) The individual man is the measure of morality. To have acted then, no matter what the deed, is to have acted in accord with morality.
 - (d) The taking of any form of life is always immoral.
 - (e) According to the Buddha, resistance to the flow of life will cause suffering. Since killing is the extreme form of resistance to life (albeit another's life), and hence not in accord with the Buddha's teaching, it must always be immoral.
43. Does "faith" (in contrast to "reason") play a role in Buddhism?
- (a) The concept of faith is completely at variance with Buddhist thought.
 - (b) A certain kind of faith is required in Buddhism, i.e., faith that the Buddha's way is the only way to Nirvana.
 - (c) Faith is required that the Buddha's teachings will provide a rough guide to Nirvana, but once man realizes its general direction he must be his own guide.
 - (d) The Buddhist needs faith that the way to Nirvana prescribed by Buddha is, for each man, the shortest path.
 - (e) Faith in the power of the Buddha to help man achieve Nirvana is a necessary aspect of Buddhist life.

44. Does Buddhism exclude the "non-believer" from the attainment of Nirvana?

(a) The "non-believer" is potentially capable of achieving Nirvana, but this could only occur after he adopted Buddhist ways.

(b) Any man, of any religious faith, can attain Nirvana.

(c) Buddhism excludes any believer in a personal God from ever attaining Nirvana.

(d) Any man can achieve Nirvana if he follows the path prescribed by Buddha.

(e) Any man of any faith can reach Nirvana if he can lose his personal identity in the flux of life or in his God.

45. What role do social rules play in a Buddhist society?

(a) Social rules form a general basis for moral judgment but they should be reinterpreted by each man in the light of his own experience.

(b) Since the individual man is the measure of all things, social rules can never be criteria of morality.

(c) Social rules are intended for the good of the individual as well as society, therefore they should constitute the only criteria of morality.

(d) Social rules are deductive elaborations of the Buddha's teachings. As such they are the absolute criteria of moral deeds.

(e) Moral rules in a society are usually expedient platitudes of a ruling class. As such, they could play no part in a Buddhist society where each man is equally capable of moral judgment.

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44. a b c d e
45. a b c d e

APPENDIX B

Raw Data

APPENDIX B

RAW DATA

Meaningful				Rote			
Long		Short		Long		Short	
Immed.	Delay.	Immed.	Delay.	Immed.	Delay	Immed.	Delay
29	27	25	18	25	22	21	17
25	17	21	17	25	21	18	16
22	16	20	16	23	19	18	15
21	15	20	16	22	18	18	15
20	13	19	15	20	18	18	14
18	12	19	14	19	17	17	14
17	11	17	14	19	17	15	14
17	11	16	13	18	15	14	13
17	11	16	13	18	11	13	12
16	9	16	12	16	10	13	11
16	8	16	12	16	10	11	11
15		14	11	15	9	10	10
13		14	10	15	7	10	9
11		14		11		10	
		13				8	
		12				5	
		10					
		10					
		8					
		8					
Group MLI	Group MLD	Group MSI	Group MSD	Group RLI	Group RLD	Group RSI	Group RSD

APPENDIX C

Test Scores for Test-Only Ss

APPENDIX C

Test Scores for Test-Only Ss

19

16

12

12

11

10

9

9

9

6

3

2

 $n = 12$ $\bar{x} = 9.8$

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