1974

Meaningful learning and retroactive interference in prose materials.

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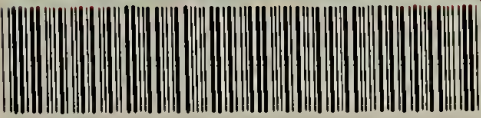
MEANINGFUL LEARNING AND RETROACTIVE

INTERFERENCE IN PROSE MATERIALS

A Thesis Presented

By

Douglas Bill Coulson

Submitted to the Graduate School of the

University of Massachusetts in

partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

February   1974
(Month)   (Year)

DEPARTMENT OF PSYCHOLOGY

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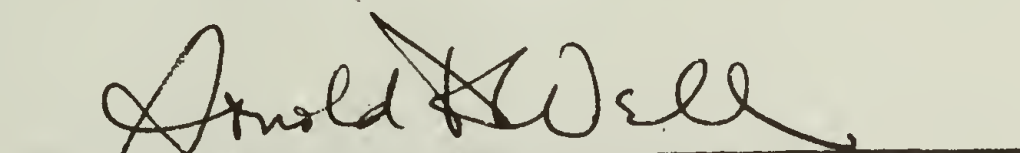
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(Head of Department)

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(Member of Committee)

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(Member of Committee)

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CHAPTER I

BACKGROUND AND LITERATURE REVIEW

Introduction

Although the study of learning from written material is one of the first areas of modern psychological investigation, it is an area of study that is not clearly understood, an area that is complex and controversial. It is the controversy between the "interference theorists" and the "meaningfulness theorists" that has been the impetus for this study. This study investigates whether interference occurs in a retroactive interference paradigm when the materials are connected discourse and meaningful learning has occurred. Before this question can be discussed, some review of the verbal learning researcher's materials and paradigms will be given.

Ebbinghaus, a verbal learning researcher at the turn of this century, set the style of future verbal learning research when he employed the nonsense syllable. He made lists with such nonsense syllables as VAX - NIF - JEX etc., and studied retention of these lists as a function of list length, order of presentation or other related variables. The use of the nonsense syllable allowed specification of

the locus of learning and avoided the influence of out-
side-the-laboratory learning and experience. His method
of research was the prototype for the serial list learn-
ing and paired-associate paradigms.

In the serial list learning paradigm, the S learns
an ordered list and then is asked to recall it either in
the presented order (serial recall) or in any order (free
recall). In the paired-associate paradigm, which is more
relevant to this study, the S learns a pair of letters,
syllables or words. The first word of the pair is con-
sidered the stimulus and the second word of this pair is
considered the response. In this task, the experimenter
often gives the S the stimulus word and he must recall
the response word (anticipation method). There are sev-
eral types of paired-associate transfer paradigms and
Osgood (1949) outlines them in detail. In this study,
a modified retroactive interference (RI) paradigm is
used, where the subject receives an introductory passage
called the advance organizer, then an original learning
passage (OL), then an interpolated learning passage (IL)
and finally a test on OL. This will be discussed in more
detail at a later point.

It should be noted that these paradigms may be
adapted either to the study of learning (acquisition) or
forgetting (retention). Underwood (1964) makes this dis-
tinction by saying that the interval in an acquisition

study between a learning trial and a relearning trial (or test) is a matter of a few seconds, whereas, the interval in a retention study between a learning trial and a relearning trial (or test) is a matter of hours or days. In the first case we may ask about the variables that influence the rate of learning. In the second case we may ask about those variables which effect the level of learning during the retention interval. The transfer paradigm, central to theories of forgetting, is designed to study the processes of retention. Basically, a transfer paradigm is where S learns something at time 1, learns something else at time 2 and then at time 3 is tested either on the material learned at time 1 or at time 2. In addition to Osgood (1949), Hall (1966, Chapter 14) has an excellent discussion of transfer paradigms.

Two Theories of Forgetting

At this point two theories of forgetting will be discussed. First, the interference theory of forgetting will be examined, a theory which has dominated the literature for many years. Second, a more recent position will be discussed. Cunningham (1971) calls it subsumption theory, taken from Ausubel's concept of forgetting. The two positions emphasize different aspects of verbal learning and forgetting, and because of their often opposite experimental predictions create an interesting controversy and an area for investigation.

Interference theory has been a direct result of years of studies using the serial list or paired-associate paradigms. Forgetting, before the advent of interference theory, was often explained by the law of disuse. It was believed that the time related variable, disuse, was the major factor in forgetting. A memory trace was thought to fade or decay when it was not used and that such disintegration of the trace would cause forgetting. However, in 1924 Jenkins and Dallenbach cast the first empirical blow to the disuse position. Their study looked at retention when the intervening variables between learning and recall were either normal waking activity or a comparable interval of sleep. The result that sleeping subjects remembered more, clearly argued against the disuse hypothesis. A few years later McGeoch (1952) wrote his classic attack on the law of disuse. McGeoch (1929); McGeoch and McDonald (1931); Johnson (1933); McGeoch, McKinney and Peters (1937); and McGeoch and McGeoch (1937) are other examples of early studies that deal with interfering factors that contribute to forgetting.

In the discussion of interference theory and for the study in general, several terms must be considered. The first term is "learning." Gagne (1965) identifies five major learning prototypes and points out that none ex-clusively can explain learning nor can all of these models

together exhaust the types of learning. One of the five prototypes is the familiar paired-associate study which includes the pairing of nonsense syllables. However, Ausubel would question the relevance of such a verbal learning prototype to "meaningful" learning. Ausubel (1966) argues that the paired-associate and list learning tasks are rote in that they consist of purely arbitrary and verbatim associations. Further, he conceptualizes meaningful learning as learning that: a) is nonarbitrary in that there is some basis for establishing a relationship between the new material and the individual's cognitive set, b) is substantive (nonverbatim) in that the meaningfulness of the material does not depend exclusively on the use of particular words. While traditional verbal-learning psychologists reduce the learning task to paired-associates so they may draw clearer inferences about the nature of the learning process, Ausubel would argue that it is the nature of the task that determines the learning process. If the task is rote, then it will contribute little to the understanding of learning from meaningful materials.

In addition to the consideration of the roteness or meaningfulness of the materials to be learned, one also must consider the type of recall data collected. One early study (McGeoch & McKinney, 1933a) scored for meaning but did not report the reliability of this scoring

procedure and focused on the verbatim scoring in the analysis. King (1960) broke down a 200-word passage into arbitrary idea units and validated this scoring procedure with a criterion scoring procedure, which rank ordered protocols according to their accuracy in relation to the original passage. The validity coefficients in King's study did not go below .88. Later Meyer (1971) obtained high interjudge reliabilities (>.90) for the idea units derived from her prose passages. Yet there is still reluctance to use more meaningful measures; typically verbatim or word-for-word recall measures are taken, even in prose studies (Hall, 1955; Slamecka, 1960 and 1962; Crouse 1970 and 1971). When such verbatim recall procedures are used regardless of the meaningfulness of the materials, it can be argued that rote learning is tapped rather than meaningful learning.

Other terms used in the verbal learning literature are "transfer," "inhibition," "facilitation," "retroaction," and "proaction." Transfer in most contexts simply refers to the effect of early learning on later learning. While transfer is usually considered in the normal temporal sequence from time 1 to time 2, it is possible to conceptualize "backwards" transfer from time 2 to time 1 as in the case of unlearning in the RI paradigm. Transfer may be inhibitory or it may be facilitatory. Further, one may specify the facilitation or

inhibition as retroactive or proactive. In the case of retroaction, the researcher studies the influence of subsequent learning (usually referred to as interpolated learning or IL) on the retention of earlier learning (original learning or OL), whereas in the case of proaction, the researcher studies the effect of OL on the retention of IL. The choice of these terms, retroaction and proaction, is apparent. It must be pointed out that, and as Kausler (1966, p. 359) has noted, transfer applies to a gross learning phenomenon. Interference theory and subsumption theory attempt to specify and detail this gross phenomenon into subcomponent processes. A second, more minor point concerns the distinction between acquisition, and transfer and retention. As was mentioned earlier, studies in learning are "acquisition" studies where the dependent variable will be directly concerned with the type and length of learning task. Typically recall follows the learning by a few seconds. In the latter case, of concern in this study, forgetting studied in the context of transfer and retention paradigms may be concerned with amount of time between learning and retention test or the nature of the intervening materials.

Interference Theory

As originally formulated by McGeoch (1936), interference theory explained forgetting with the concept of response competition. For example, in an RI A-B, A-C

paired associate paradigm learning the second list re-
sponse C to the same stimulus A would cause response
competition between B and C. If the learning of the A-C
list exceeded a certain level, the competition of C would
cause B to become unavailable and in this sense forgotten.
That is, it is the relative strength of the "competing"
responses (B vs C) that determines if B or C or an ex-
traneous D is elicited on the recall test. The relative
strength is a function of amount of training on OL, amount
of training on the competing responses (IL) and the degree
of similarity. Further, the main evidence for the compe-
tition hypothesis was the presence of intrusion errors
in Ss' protocol. As this was the only mechanism in the
explanation of forgetting, it was necessary to hypothesize
that RI would vary directly with the amount of intrusion
errors.

It was this hypothesis that led Melton and Irwin
(1940) to question the one-factor explanation of for-
getting. They believed that the response competition
hypothesis could not completely account for the forget-
ting and postulated a second factor called response un-
learning. In their 1940 paper IL was varied at 5, 10,
20 or 40 trials. The rationale was that if the intrusion
error is an indication of response competition as re-
searchers believed and if the number of intrusions varies
directly with the amount of RI as the one factor theory

must predict, then as IL varied, RI and intrusion errors must covary to the same extent. However, their study showed that intrusion errors leveled off at trial 10 of IL while RI did not level off until trial 20 of IL. This result indicated that the single factor of response competition was not an adequate account of forgetting. They argued that learning second list responses in an RI paradigm not only created competition between the B and C responses but also caused some of the first list responses to be unlearned or extinguished. Peterson and Peterson (1957) also showed that intrusion errors and recall did not covary when recall was tested immediately and 15 minutes later in the RI paradigm.

The consequence of these and other studies (see Underwood, 1948; Briggs, 1954) was the emergence of two-factor interference theory. The two-factor theory has been described in many books (see Cofer, 1961; Kausler, 1966) and attributes first list response forgetting in the RI paradigm to (1) the initial unlearning of B while learning AC (extinction) and (2) the response competition resulting from the spontaneous recovery of AB during the retention interval. Since the establishment of the two-factor theory of forgetting, additional revisions of the theory have been made. For example, McGovern (1964) argued that improper controls in the AB-AC, AB-rest paradigm masked effects due to learning new responses

per se (AB-CD) and learning specific associations in the AB-AC group. This generalized response competition hypothesis, first advanced by Newtons and Wickens (1956), says that Ss tend to make responses from the last list learned.

Current controversy _within_ two-factor interference theory is not the main concern here. Underwood and Ekstrand (1966) and Postman (1961) offer excellent summaries on the present status of interference theory. The main concern is the controversy _between_ interference theory and "subsumption" theory.

Subsumption Theory

To introduce this next section an illustration will be considered. An 8th grade teacher assigns Chapter 13 as this week's geography reading. Chapter 13 consists of a general introduction to Central American countries, followed by four specific sections that discuss attributes of four Central American countries. Some of these attributes are the same for all the countries and some vary from country to country. Generalizing their theory, the "interferists" would caution that Chapter 13 is a classical example of an interference paradigm (retroactive and proactive) and should not be assigned. They argue that learning specific section 2 will cause specific section 1 to be unlearned and learning 3 will unlearn 2 and 1 and then learning 4 will unlearn 3, 2 and 1.

Furthermore, when the test on Chapter 13 is given, the calamity of spontaneous recovery will befall these conscientious but unsuspecting students. (Brief style departure is to increase midpaper mathemagenic activities.)

Yet not everyone would forsee calamity for the poor students; Ausubel's subsumption theory of meaningful verbal learning views the "Chapter 13 problem" differently. After outlining the major tenets of Ausubel's position, important variables will be identified and several relevant, albeit contrasting connected discourse studies will be discussed.

Ausubel (1962, 1966) distinguishes two types of learning: discovery and reception. Discovery learning is similar to induction in that the learner is given specific experiences from which, it is hoped, he will discover the general concept. Although many argue that such learning is more permanent, satisfying, and "meaningful," many educators realize it is a very inefficient way of transmitting knowledge. More appropriate to education is reception learning in which textbook or classroom teacher imparts general concepts and facts to students. The student receives the knowledge rather than discovers it.

A second distinction is between meaningful and rote learning and these terms may be used to modify the first distinction. That is, learning may be rote reception

learning, rote discovery learning, meaningful reception learning or meaningful discovery learning. An example of rote discovery learning might be a student who memorizes the specific steps for a general class of geometric proofs and when given a new theorem to prove, goes through the steps in a rote manner. However, only rote and meaningful reception learning will be of concern here.

It will be helpful to explain the subsumption process concurrently with the term "meaningful." The subsumption process, central to Ausubel's theoretical position, is a process in which new material is incorporated by _relating_ it to existing and more inclusive knowledge. Material that can in fact be related is considered "nonarbitrary." Furthermore, if the material does not depend on the exact words for its meaning (that is, it can be paraphrased), it is substantive (nonverbatim). When the material is "substantive" and "nonarbitrary," it is considered to be meaningful and not rote. If the material is nonarbitrary and substantive, then meaningful reception learning can occur. The subsumption process works in this way: an individual reads a meaningful passage B and relates it to his existing knowledge, A, by incorporating B into an appropriate and inclusive part of A. Ausubel (1962) says that in the absence of an appropriate A, the learner will use the most relevant and proximate A available. Ausubel considers

this knowledge as a cognitive structure that is organized in a hierarchical fashion. This major hierarchical organization principle works by progressive differentiation of concepts (lesser to greater inclusiveness) for a given sphere of knowledge, each linked to the next higher step in the hierarchy by a process of subsumption. It should be mentioned that Ausubel (1962) argues that the ability of new materials to be subsumed accounts for its meaningfulness, a point which can be related to the two aspects of meaningful learning ("substantive" and "nonarbitrary") mentioned earlier.

There are three important conditions that affect learning and forgetting under Ausubel's model. First, there should exist appropriate subsuming concepts for the new material. If appropriate concepts are not available, it would be desirable to introduce appropriate subsumers prior to the introduction of the new material. Second, existing concepts should be stable and clear. Third, the new material should be discriminable from the subsuming concepts. Another way of saying this is that if the new material were not discriminable from existing knowledge, then for memory purposes, only the existing knowledge need be maintained. This third point leads directly to Ausubel's notion of forgetting for meaningful material, called "obliterative subsumption."

Assume that the three variables described above are

operating to effect meaningful learning of new material. At first the memory for the new material will be enhanced by its anchorage to relevant conceptual knowledge. Incidentally, the memory for two sets of new and similar material that have the same degree of specificity will also be enhanced. In fact, Ausubel, Stager and Gaite (1966, p. 253) say that exposure to a second specific passage (C) "makes possible the delineation of a common set of differences between the learning passages (B and C) and A and may thereby make B more discriminable from A than if later exposure to C had not taken place." This incidental point is important for deriving the RI predictions in this study. As a large number of specific materials are added, it becomes more economical to remember the single inclusive concept. Gradually the specific material becomes less dissociable as entities in their own right and are eventually forgotten when they are finally incorporated into the generalized meaning of the latter subsuming conceptual framework. This process of "obliterative subsumption" is contrasted with the process of forgetting rote learned material.

Ausubel (1962) argues that any material not relatable and subsumable to existing cognitive organization must be learned by rote. Thus, rote material is viewed as discrete, isolated units and separate from cognitive organization. Because such materials cannot

be anchored to existing frameworks, they are much more vulnerable to forgetting than materials that can be anchored. Furthermore, memory for these discrete items is very much influenced by immediately adjacent learning (before or after) of similarly rote items. In this manner, Ausubel would understand and explain the classical RI and PI effects observed in the traditional interference theory paradigms.

Prose Literature Review

The question is, do the principles of interference theory, specifically those that govern RI, apply to meaningful verbal learning? As Cunningham (1971) points out, the critical extension of interference theory is that the retention of meaning from prose materials follows the same laws as the retention of verbatim items in rote materials.

McGeoch and McKinney (1933a, 1933b) performed two studies on RI with poetry and prose materials. They measured verbatim and substantive recall and though the verbatim recall showed RI trends, there were no significant differences between the OL-IL and OL-rest groups. One important difficulty with these studies is that OL was first tested before IL. Anderson and Myrow (1971) and others have shown that this procedure will inflate OL retention scores. Also McGovern (1964) has criticized the AB-rest control.

More recent studies with prose materials have shown
RI. Slamecka (1960, 1962) in a series of studies showed
that prose learning appears to follow the laws of inter-
ference theory. Specifically, his data supported the
hypothesis that 1) rote retention of prose is subject to
significant RI, and 2) recall varies directly with
amount of OL and inversely with amount of IL. In his
studies he presented pairs of sentences (OL and IL) on a
memory drum, exposing one word at a time. Recall was a
serial verbatim anticipation procedure where Ss are given
the first word of the sentence and told to respond with
the second word. Then they are given the second word and
told to give the third word, etc. Several major crit-
icisms were levied against these studies, even by sup-
porters of interference theory. Anderson and Myrow (1971)
said that Slamecka's materials were obscure and his pro-
cedure further obscured relationships within the senten-
ces. Exposing prose materials on a memory drum would
disrupt the natural connectedness and perhaps even the
grammar of the sentences.

A second study by Entwisle and Huggins (1964) found
significant RI with prose passages about electrical en-
gineering. The experimental group read a passage about
voltage principles and then a passage on current prin-
ciples whereas the control group read the same first
passage and then an irrelevant passage on computer

programs. Ss were tested with fill-in the blank questions. However, Ausubel, Stager and Gaite (1968) have noted that these materials were probably learned in a rote fashion since they were mathematical and could not be substantively and nonarbitrarily related to cognitive organization.

Anderson and Myrow (1971) attributed the lack of significant RI in studies to be subsequently discussed, to the failure to consider passage similarity beyond the level of topics. They noted that interference theory predicts facilitation when stimulus and response for OL and IL are identical and interference when stimulus is same and response is different. In a procedure that considers the test item stems the stimulus and the answers to the test items (as short answer or fill in the blank) the responses, Anderson and Myrow were able to partition test questions into three types: 1) facilitating, 2) neutral, 3) interfering. A facilitating item might be derived from, "the OL and IL tribes drink beer." An interfering item might be derived from, "the OL tribe grows corn," whereas, "the IL tribe grows wheat." Such partitioning allows better specification of similarities and differences between the two passages and permits differential predictions of RI for each set of partitioned test items. Measuring recall with a partitioned 30 item short answer test, and a partitioned 30 item multiple choice

test, Anderson and Myrow demonstrated a significantly higher recall for the experimental group that had unrelated (as opposed to similar) IL. Further, $\underline{Ss}$ in the similar IL group on the delayed recall test did poorer on interfering test items than facilitating test items, whereas, this was not the case with $\underline{Ss}$ in the unrelated IL group. This interaction was statistically significant and conforms roughly to interference theory expectancies. They argue that one reason Ausubel and his associates have not found RI is a result of not partitioning their test questions; in their studies RI was "averaged out."

Another important result of the Anderson and Myrow (1971) study is the confirmation that immediately testing OL before IL is learned, will significantly facilitate later OL retention levels. This result has also been found by Michael and Maccoby (1961), Rothkopf (1966), and Roderick and Anderson (1968).

There are two problems with the Anderson and Myrow (1971) study. First, their results ($\underline{i.e.}$, their Figures 2 & 3) do not support the interference position as strongly as they would lead us to believe. This statement is based on their initial argument that RI is largely a consequence of response unavailability and therefore would most likely be found by measures sensitive to response unavailability ($\underline{i.e.}$, short answer test items). However, their results indicate that RI is accounted for

by the multiple choice test, which is a recognition meas-
ure sensitive to response competition. RI is not regis-
tered by the short answer test as one would expect. Fur-
ther, this fact is somewhat obscured in the results sec-
tion by lumping together the multiple choice items and
short answer items <u>within</u> the facilitating, neutral and
interfering partitions in Figures 2 and 3 of experiment 1.
In the discussion section their results are only reconciled
with Postman and Stark (1969) while several other studies
initially cited appear to be ignored. Also a subsumption
theorist would argue that multiple choice items are ver-
batim recognition, therefore are tapping verbatim learn-
ing; and consequently, on that basis RI in this study
would be expected.

The second problem with Anderson and Myrow (1971) is
that the two 2,200 word passages about fictitious tribes
used in experiment 1 appear to be mostly composed of
arbitrary facts. This suspicion is grounded in the way
such passages might be created. For example, choosing
the crops of the two fictitious tribes can be arbitrary;
one grows corn (or wheat or rice) while the other grows
rice (or corn or wheat). The consequence of learning
arbitrary facts is a greater susceptibility to inter-
ference from other similar arbitrary facts (as discussed
earlier in the section on subsumption theory). In fact,
if Anderson and Myrow's passages were largely arbitrary

facts, one would predict the operation of response competition on the basis of rote learning studies in which the arbitrariness is unequivocal. This is precisely the result in Anderson and Myrow (1971).

One important point regarding the issue of "nonarbitrariness" needs to be considered. It can be argued that if nonarbitrary materials (e.g., passage B) can be inherently related to a cognitive hierarchy (i.e., advance organizer), then it may be possible to logically deduce specific items (e.g., from passage B) without actually being exposed to them. This potential logical deduction is an example of specific transfer. In more general terms, specific transfer is an effect resulting from some specific item in the earlier passage that facilitates or inhibits the learning of a specific item in the second passage. A pilot study using a cloze-type procedure, has been designed to provide data on the specific transfer problem.

The case for retroactive facilitation in a prose RI paradigm is less convincing than the case for retroactive interference, primarily due to the lack of careful methodological procedures in these studies. Hall (1955) using 30 sentences to describe each of two fictitious African tribes failed to find RI in a standard RI paradigm. He argued that the lack of RI indicated that interference laws were not operating. However, Anderson and Myrow

(1971) argue that deflated RI effects would be expected on the basis of the general finding that immediately testing learning greatly enhances retention. Cunningham (1971) points out that Hall's completion of the sentence task (similar to cloze procedure, Taylor, 1953) might have been too easy in that the sentence fragment often determined the correct response. Indeed there was perfect recall 45 minutes after IL for all groups. Cunningham suggested a control group that would not see the original passage and only fill out the test.

Ausubel, Robbins and Blake (1957) had subjects study a 1,700 word passage on Buddhism for 35 minutes. Immediately afterwards they took a 37 item multiple choice test. On the second day Ss were divided into four groups and group 1 read a comparative essay on Buddhism and Christianity, group 2 read the Buddhism passage again, group 3 read a passage on Christianity, and group 4 had no passage. Ss were tested eight days later on the first Buddhism passage. Ausubel, Robbins and Blake argue that group 3 received the most competing passage and therefore their retention should not only be affected by previous learning (PI) but also by RI if interference theory is correct. On the other hand, group 4 would be expected to have PI only because they had no subsequent learning. Further, the data show that groups 3 and 4 were very close on the 8th day retention test (82.3% vs 84%) and

they therefore argue that RI is not an important variable in meaningful prose learning. Furthermore, they argue that group 1's superiority over group 4 (107.7% with correction factor vs 84%) is due to retroactive facilitation of the discriminating effect of the second reading passage in group 1. However, two criticisms are made: 1) the second passage in group 1 repeated much of the content from the first passage, 3) similarity of passages and test specifications were not adequately detailed.

Ausubel and Fitzgerald (1962) studied the effects of an advance organizer on learning with several levels of verbal ability as measured by the School and College Ability Test (SCAT). They found, using a 36-item multiple choice test, that the advance organizer helped Ss with low verbal ability but made no difference in the retention of IL for high verbal ability Ss. The reason for this is that high ability Ss can spontaneously provide inclusive concepts even when they are lacking, whereas low verbal ability Ss cannot efficiently generate such inclusive concepts. Peeck (1970) criticizes Ausubel and Fitzgerald on the grounds that Ss might have done as well if the time spent studying the advance organizer had been spent on the actual material. However, this criticism may not be appropriate to a study that is trying to contrive a conceptual framework (by using very unfamiliar

materials) to test a theory about the role of such a conceptual framework on learning and retention.

In a 1968 study similar to the 1957 one discussed earlier, Ausubel, Stager and Gaite studied RI using a 2,200 word passage on Zen Buddhism as OL and a 2,100 word passage on Buddhism as IL. The unrelated IL was on drug addiction. In this study overlearning of OL and the effect of related IL were studied in a 2 x 2 factorial design. A 31-item multiple choice test was used and the overall effect for related IL was significant in the facilitating direction and the overall effect for over-learning of OL was significant also. Furthermore the interaction between overlearning and related IL was non-significant and interpreted to imply that the two main effects operated independently. Again this study did not specify passage similarity in terms of the test nor was the multiple choice test adequately described. For ex-ample, were distractors from the IL passage used? Anderson and Myrow (1971), experiment II, used the same materials and got a very low learning level, i.e., 17% on OL and 8.4% on interfering subset items for control group (unrelated IL). In Ausubel, et. al. (1968) reten-tion uncorrected for guessing with 4 difficult items deleted ranged from 28% to 45%. Anderson and Myrow (1971) attribute the lack of RI in their study and in Ausubel, et. al. (1968) one to the low learning levels.

The study described in the next two chapters will incorporate many of the aspects of the preceding discussions. Specifically, the materials will simulate a subsuming concept with an advance organizer that distinguishes between two types of concepts (myths and legends) that are not ordinarily distinguished. Dependent measures will be free substantive recall graded by two independent judges for number of experimenter idea units present and a short answer test that specifies facilitating, neutral and interfering items. Measures of verbal learning ability will be taken. The basic paradigm is an RI one extended to include a preceding advance organizer.

Predictions

Predictions will follow the expectancies of Ausubel's subsumption theory. Group 1 is expected to do better than group 3 because passage A provides a conceptual framework in which B and C may be compared and contrasted. An interaction is predicted between groups (1, 2) vs (3, 4). Possible outcomes are illustrated on the next page.
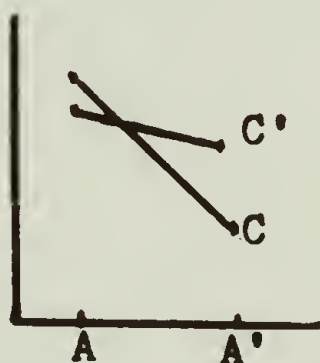
Prediction Page: Free Recall

Group 1: A-B-C
Group 2: A-B-C'
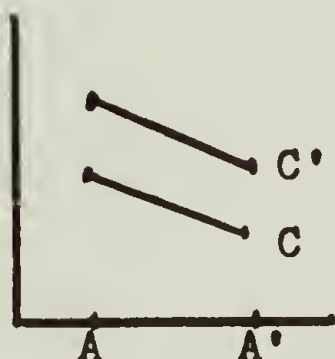
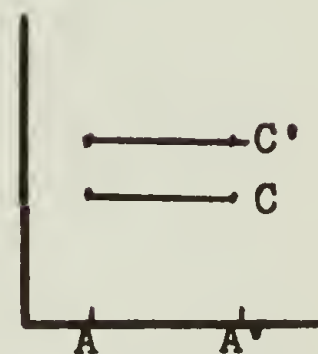Group 3: A'-B-C
Group 4: A'-B-C'

SUBSUMPTION THEORY

INTERFERENCE THEORY

NO RESULTS
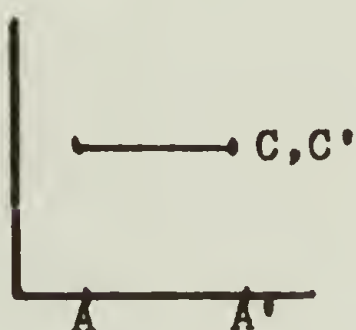
Prediction Page: Short Answer

SUBSUMPTION THEORY
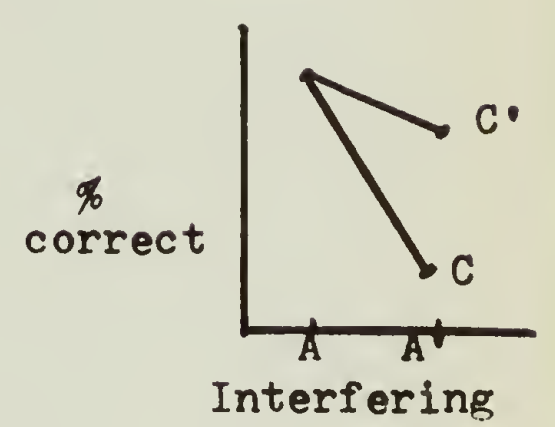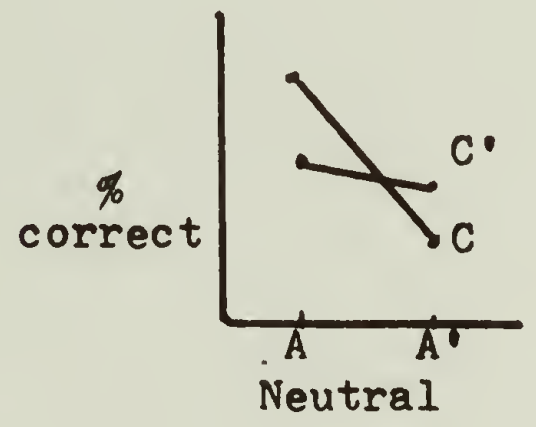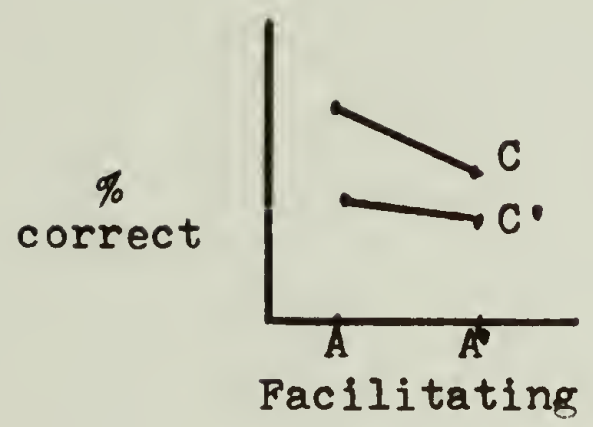
INTERFERENCE THEORY
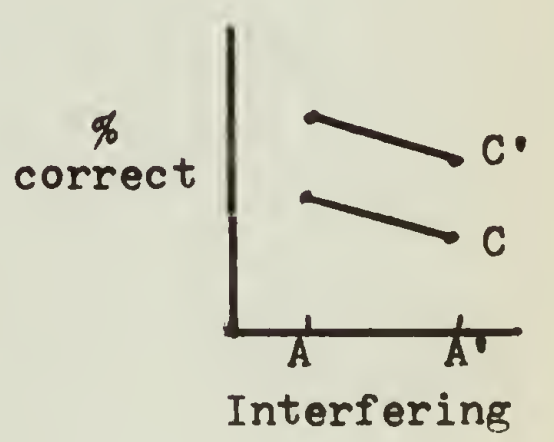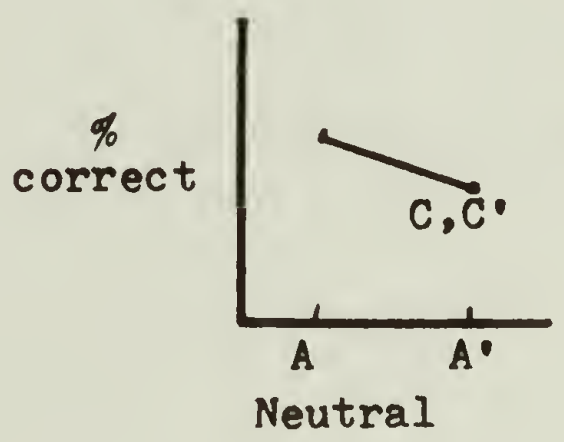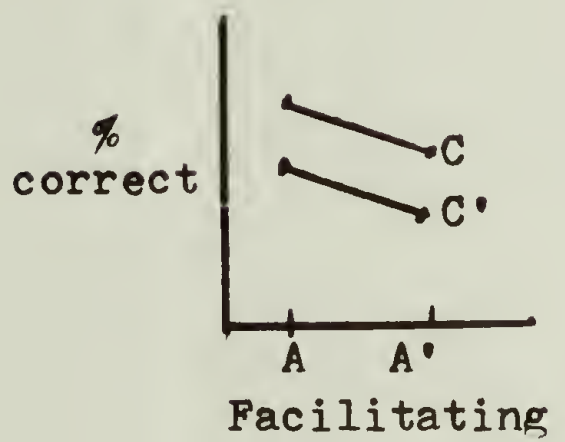
CHAPTER II

PRELIMINARY EXPERIMENT

The Preliminary Experiment provided information on
the amount of specific transfer from passage A (advance
organizer) to passage B (specific legend). One group
read the relevant advance organizer and a second group
read an irrelevant advance organizer. Then both groups
received a mutilated version of passage B and were in-
structed to fill in the missing words. Proportions of
Ss correctly filling in each blank in each group were
calculated and compared. Such comparisons provide infor-
mation on items that are subject to specific transfer.

Method

Subjects. Thirty students from an introductory
psychology course at the University of Massachusetts vol-
unteered as Ss. They were run in groups ranging in size
from two to seven subjects.

Materials. A general passage describing myths and
legends and a general passage describing political and
philosophical cartoons were used as passages A or A', re-
spectively. Passage B is a specific legend with every

3rd adjective or noun deleted according to the cloze procedure (Taylor, 1953). All passages were written specifically for use in this study.

Design and Procedure. Half of the 30 Ss were randomly assigned to read each passage, A or A'; then all Ss filled in a mutilated version of passage B. Ss were instructed to read and study the first passage for approximately $3\frac{1}{2}$ minutes. Ss read this first passage twice. After trial 2, Ss were asked to free recall the passage in sentence form. Following the recall period all Ss were instructed to write in their best guess for the deleted words in the passage B booklet. Responses were scored as correct if they were the exact words from passage B or close synonyms.

Results

Blank completion recall. The deletion of every 3rd noun or adjective in passage B resulted in 49 blanks. The proportion correct for each blank in the experimental and control groups were compared using the Z test for the difference between two proportions (Walker and Lev, 1953). None of the 49 Z tests exceeded the .05 significance level. This is particularly impressive if we realize that the probability of at least one Type I error is very high when so many tests are performed.

Discussion

In this preliminary experiment a significant Z test on a particular blank would constitute evidence for the presence of specific transfer. One group read passage A and the other group read passage A'. If one group filled in a particular blank correctly more often than the other group, then the significant difference would be attributed to transfer of information from that first passage, A or A'. The results of this preliminary experiment clearly indicate that specific transfer is not a factor with these materials.

CHAPTER III

EXPERIMENT I

Experiment I was designed to test the subsumption-
ists' prediction of facilitation of retention of a pas-
sage (B) when there is a relevant subsuming passage (A)
and a third passage (C) that is very similar to B in con-
tent and specificity. By including groups that received
an irrelevant general passage (A') and groups that re-
ceived an unrelated third passage (C') contrasting pre-
dictions from an interference theory could be tested. In
Experiment I there were four groups: ABC, ABC', A'BC and
A'BC'. A more detailed description of the rationale of
this design and the theoretical predictions may be found
in Chapter I.

Method

Subjects. Sixty students from introductory psychol-
ogy courses at the University of Massachusetts volunteered
as Ss. They were run in groups ranging in size from 7 to
25 subjects.

Materials. The materials used in this study were
designed to test aspects of Ausubel's subsumption theory
and to include some of the methodological refinements of

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Anderson and Myrow (1971), and Crouse (1970, 1971). The advance organizer adapted from Fontenrose (1966) discusses the similarities and differences between myths and legends. The discussion is general and provides a larger inclusive framework in which a myth may be better distinguished from a legend. These passages were chosen because of the potential confusability of events or facts between the myths and legends, and because it was believed that most people are not familiar with the myth-legend distinction.

Though the writer had reviewed several books that contained examples of American Indian legends and myths, and African legends and myths, the myth and legend passages are original and written especially for this study. The materials were designed so that responses to short answer questions could be facilitating, neutral or interfering. Further, it is believed that these materials are less arbitrary (in relation to the advance organizer) than the prose materials used in past experiments. That is, specific facts or events in the myth or legend relate directly (though not specifically) to the concept of what a myth or a legend is. For example, the myth of Sa deals with Sa, the earth spirit. An earth spirit is a supernatural being and could not be the actor in a legend; legends deal with human beings as warriors or kings. Or in the legend of Nya, Nya dies in a flood, which is a

natural act; whereas, Sa dies by engulfment in a vast ocean, a consequence of a supernatural act. To someone who is unfamiliar with the distinction between myths and legends, the occurrence of an action or an actor might seem arbitrary while to someone familiar with the distinction, the events are not interchangeable between the myth and the legend.

The irrelevant passage (A') described the similarities and differences between two types of cartoons: political and philosophical. The unrelated passage (C') was a description of the business transactions of the plastics industry in 1971.

Design. Four groups of 15 randomly assigned Ss were run through a RI design modified by a preceding general passage, A or A'. The groups were: 1) ABC, 2) ABC', 3) A'BC, 4) A'BC'.

Procedure. The general passage (A or A') was overlearned and in all cases B (OL) was tested. OL was tested 15 minutes after IL and 24 hours after IL. Verbal ability measures were taken to provide a covariate for a second analysis.

Ss were asked to participate in a two-day reading experiment for two experimental credits. On Day 1, Ss were told that they would read three passages and be given two vocabulary tests during the experimental session. Ss were told that they would be asked to freely

recall passage one after reading it. Then at the end of the session they would be asked to recall either passage two or three. It was explained that they would not know which it would be during the reading and that the choice to recall passage two or three would be a random one. However, in all cases the test was free recall of the second passage. Reading for meaning was emphasized; Ss were asked to study the material as if they were preparing for an essay exam. Further, Ss were told that the procedure on Day 2 would be similar and that credit would be given only upon completion of both days.

The first passage was read three times. Following trial 1, Ss were asked to free recall the passage. The second reading trial was a study trial in which Ss were instructed to correct their free recall protocols from trial 1. Following the third reading Ss were again asked to free recall the material in sentence form. On each trial Ss were given approximately three minutes to read the passage and seven minutes to recall it.

After this reading was completed, instructions followed explaining how passages B and C (or C') were to be read. These passages were read only once with 2½ minutes allowed for each passage. Between the readings of passages B and C (or C'), a 5-minute advanced vocabulary measure (Part I) was given. Following the reading of C (or C'), Part II of the advanced vocabulary test was given.

After this all Ss were asked to recall passage B in sentence form.

On Day 2, Ss did not read three additional passages. Rather, they were asked to free recall passage B again. After that they took a short answer test on passage B, which contained facilitating, neutral and interfering item stems. Then Ss were asked to fill out a brief questionnaire on recall strategies and pre-experimental familiarity with the materials.

Results

Free recall. Passages A and A' were divided by the experimenter into 10 and 13 main idea units respectively. As shown in Table 1, second trial recall for group ABC is .81, for group ABC' is .84, for A'BC .85, and for A'BC' .86.

Passage B was divided by the experimenter into 143 specific idea units. Retention of passage B was measured immediately after reading passage C (or C') and approximately 24 hours later. Proportion of idea units recalled for the four groups on days one and two is presented in Figure 1. As can be seen in Figure 1, recall decreased over days for all groups. Also the recall decreased faster for groups A'BC' and A'BC than for groups ABC' and ABC. Despite these trends, analysis of variance showed no significant differences between the

TABLE 1

Proportion Idea Units Recalled
on Trial 2 for Passage 1 (A or A')

	Groups			
	ABC	ABC'	A'BC	A'BC'
Percent Recall	.81	.84	.85	.86

FIGURE 1

Proportion Idea Units for Passage 2 (B)
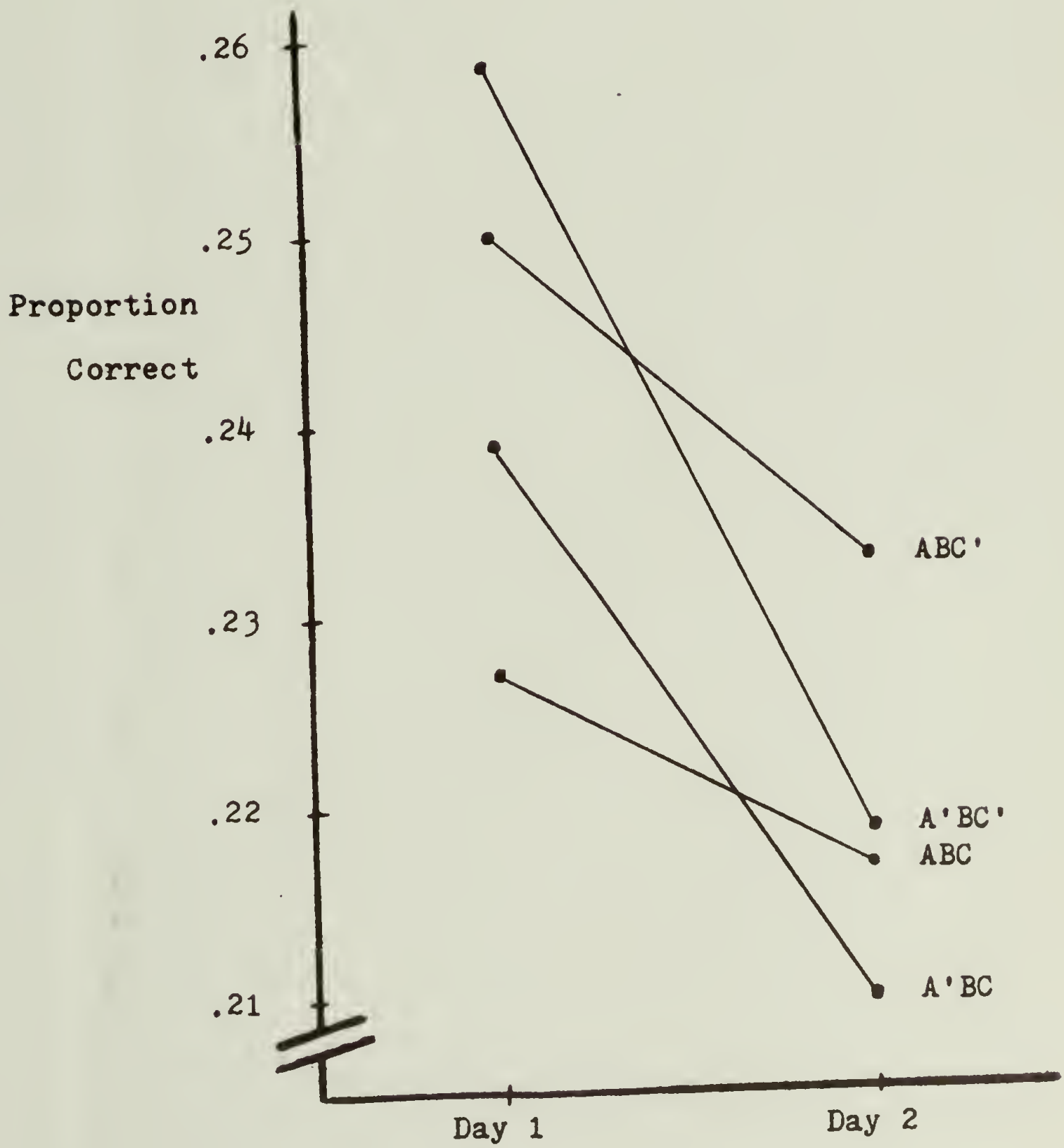
groups, between days one and two, or between the inter-
action of groups-by-days.

Response protocols for passage B were rated for
free-recalled idea units present by the experimenter and
one independent rater. The correlation between experi-
menter and independent rater on number of idea units
present was .94.

Short answer recall. On day two Ss also completed
an 18-item short answer test on passage B. The 18 items
were divided into 6 facilitating items, 6 neutral items
and 6 interfering items; items were administered in a
random order. As shown in Figure 2, all groups did
poorest on the subset of facilitating items. Analysis
of variance showed a significant item type main effect,
$F(2,168)=8.08$, $p<.01$. There were no differences between
groups, however.

Average item difficulty was computed by taking the
proportion of Ss over groups that answered the item cor-
rectly for the three subgroups of items (facilitating,
neutral and interfering) and is displayed in Table 2.

Vocabulary test. Parts I and II of the Educational
Testing Service advanced vocabulary test, form V-4, (1962)
were administered to all Ss. Test scores for the four
groups are summarized in Table 3. These scores were em-
ployed as a covariate in a multivariate analysis of var-
iance of free recall and short answer scores. This

FIGURE 2

Proportion Correct on
Facilitating, Neutral and Interfering Items
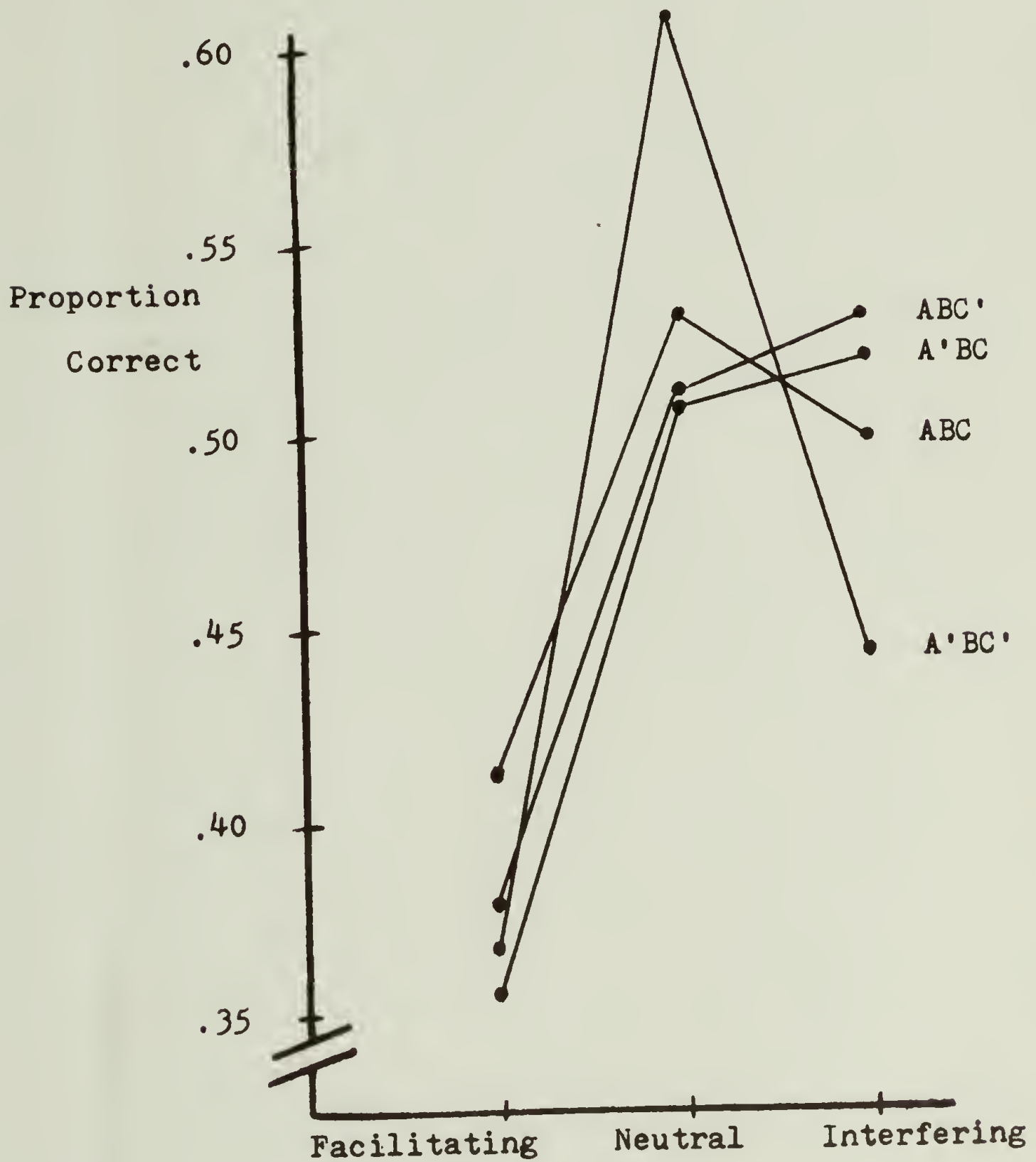
TABLE 2

Average Item Difficulty over Groups for
Facilitating, Neutral and Interfering Items

| | Item Type | |
Facilitating	Neutral	Interfering
.38	.54	.47

TABLE 3

Scores on 36 Item ETS Advanced Vocabulary Test

Groups			
ABC	ABC'	A'BC	A'BC'
17.1	15.5	18.1 ·	14.7

second analysis did not yield any significant effects.

Questionnaire data. Thirty seven percent of Ss reported that they read the second passage more carefully than the third, 50% read them equally carefully and 13% read the third passage more carefully. Three other questions were given and rated on a 1 to 5 Likert scale. Responses to these questions are summarized in Table 4.

Discussion

Two prerequisites for a discussion of the results of the main experiment are to consider the potential problem of specific transfer, and to examine how well the first passage (A or A') was established in memory.

Evidence for specific transfer in the Preliminary Experiment was examined. The absence of any significant Z comparisons is a strong indication that specific transfer is not a factor with these materials.

Second, and of primary importance to Ausubel's theoretical position, is that there exists appropriate subsuming concepts for the new material and that such subsumers be stable and clear. The purpose of passage A (or A') was to provide Ss with relevant (or irrelevant) subsuming concepts. Moreover, passages A and A' were studied and recalled twice to insure that their contents would be well learned and thus "stable" and "clear" in

TABLE 4

Summary of Questionnaire Data

		Groups			
		ABC	ABC'	A'BC	A'BC'
	#1	1.9	4.7	2.2	4.8
Questions*	#2	1.9	2.7	3.2	2.9
	#3	2.9	2.5	2.1	2.4

*Questions

    #1 - How similar did passages <u>two</u> and <u>three</u> seem to you?

       1   2   3   4   5
  very similar   very different

    #2 - Do you think that passage <u>one</u> helped you remember passages <u>two</u> and/or <u>three</u>?

       1   2   3   4   5
  very much   made no   it hindered
             difference

    #3 - Do you think that studying passage <u>three</u> made it difficult (or more confusing) to remember passage <u>two</u>?

       1   2   3   4   5
  definitely   made no   passage three
            difference   helped a lot

memory. Evidence that in fact the first passage was
well learned is seen in Table 1. In all groups recall
exceeded 80%, and further, recall levels were similar
among the groups (range, 81% to 86%).

These arguments, while satisfactory, are unfortun-
ately only preliminary to the main test of Ausubel's
position: the analyses of retention of passage B. In
view of the absence of statistically significant effects,
theoretical interpretations of trends in these data are
cautiously offered and will not be elaborate. However,
close examination of this aspect of the design will be
helpful for future studies.

Two interesting trends are apparent upon examination
of Figure 1. In all groups recall decreases from day
one to day two. Such a result is commonplace and is ex-
pected here. However, the interesting fact is that groups
A'BC and A'BC' show a greater, but not significant, de-
crease in recall from day one to day two than groups ABC
and ABC'. Specifically the decrease for groups A'BC and
A'BC' is 2.9% and 4% respectively, and only 1% and 1.7%
respectively for groups ABC and ABC'. This trend, in
terms of the subsumption position advanced by Ausubel,
supports the prediction that memory for new material
(i.e., passage B) is enhanced by its anchorage to rele-
vant conceptual knowledge (i.e., passage A). Furthermore
the memory is more likely to be better maintained over

time if it is so anchored, than if it has no such anchorage. But Ausubel's position also says that, if there are two sets of new material of similar specificity, (i.e., passages B and C) memory is also enhanced because of the comparing and contrasting that would occur (Ausubel, Stager and Gaite, 1966). Referring to Figure 1 it is seen that ABC' and A'BC' show higher retention on each day than ABC. This clearly contradicts the above argument and the interpretation is at best equivocal. The short answer results presented in Figure 2 are even more ambiguous and their interpretation will not be attempted.

However, the questionnaire data in Table 4 deserve some comment. In terms of subject perceived differences between the second and third passages, passages B and C were perceived to be fairly similar (1.9 and 2.2 on a 5 point scale) whereas passages B and C' were perceived as very different (4.7 and 4.8).

Secondly, the ABC group reported that the presence of passage A in recalling the B passage was relatively helpful (1.9); the other three groups reported that the first passage made no difference (2.7, 3.2, 2.9). However, group ABC also reported that the presence of passage C made no difference upon recall of passage B (2.9), whereas, group A'BC showed signs of minor interference from passage three (2.1). While the first result supports the subsumptionist's argument that A provided the

conceptual framework in which passages B and C could be compared and contrasted, the latter result supports the interference position that B and C compete. Again, contradictory evidence at best has provided an ambiguous interpretation.

Turning to the design, the important components in this type of study are, first, the type of materials used and, second, the recall procedure and the methods by which recall is assessed.

As discussed in the introduction, the materials were designed specifically to test the differential predictions of interference and subsumptive theoretical positions. To that end a conceptual framework (man's verbal arts) which had two distinctive yet generally unfamiliar components (myths and legends) was found and the materials were developed accordingly. While the materials seem to fit the requirements of this study, it now appears that two aspects, relating to ease of comprehension of these materials, should be changed. These two aspects of comprehension are passage length and "concreteness" of the passages.

First, passages B and C may be too easily comprehended because they are too short. These approximately 400-word passages could be read and comprehended easily in two or three minutes. Also, informal discussions with Ss after the experiment indicated that the short

legends and myths were very enjoyable, if somewhat simplistic. Therefore, the passages could be doubled or tripled in length without seriously affecting Ss' attention to the materials.

Second, passages B and C may be easily comprehended because they are too concrete; experimental manipulations to influence recall may be consequently washed out. Recent experimentation has indicated that facilitated retention occurs only when the passage to be recalled is difficult to comprehend (usually abstract) and it is preceded by an appropriate concrete passage. Bransford and Johnson (1971), and Dooley and Lachman (1971) have demonstrated that a concrete and subsuming concept can greatly facilitate retention of a difficult-to-comprehend passage. Royer and Cable (personal communication) have extended this finding. They did not use a concrete and subsuming concept, but rather, they used a prose passage that was concrete and related to a second passage in terms of degree of specificity and content area (e.g., both about scientific concepts). They found that non-specific facilitated retention of the second passage occurred when the first passage was very concrete and the second passage was abstract and difficult to comprehend. These two research results suggest that retention of easy-to-comprehend passages will not be greatly influenced by experimental

manipulations. Apparently, non-specific facilitation occurs when materials are sufficiently abstract so as to benefit from an adjacent concrete passage.

Though this study and the research cited above are considering different theoretical questions, it is possible to incorporate into this study some of their notions in order to improve our design without altering the theoretical basis of the design. However, for clarification purposes, the differences between this study and the Royer and Cable study will be briefly discussed. In order that the Ausubelian notion of learning from prose materials could be contrasted with the interference position on prose learning the important elements in this study were: 1) the presence of a relevant (or irrelevant) subsuming passage, 2) that B and C are similar or very dissimilar. On the other hand, the major consideration in Royer and Cable was the pre-conditions for nonspecific facilitated learning. Consequently, they considered the relative concreteness and appropriateness of a first passage to a second passage that was very abstract (or concrete). These considerations resulted in a different design.

Despite these differences their research has some design implications for this study. First, passages B and C should be increased to approximately three times their present length. In addition, passages B and C

should be made more abstract. For example, an abstract version of passage C might begin:

> About the time before the beginning of things a myth is told. A particular spirit was considered to be omnipresent in this pre-time state. Occasional checks of the state were, according to the myth, made by those who had created the spirit-in-charge. They would check the condition of the domain and if the state of affairs were shocking, then severe reproachment would be necessary. Apparently the conditions were in fact shocking and the necessary reproachment of the responsible spirit ensued.

With passages B and C longer and abstract rather than concrete, passage A would better function as a conceptual anchor and facilitator for B and C. The design would be essentially intact; therefore, the theoretical test would still be present. These improvements basically provide additional conditions under which the subsumption (or interference) predictions could be exhibited. Simply put, the revised design would be more powerful.

The second and last major component that needs to be refined is the free recall procedure and the short answer test. Earlier, it was argued that passage B is easily comprehended. However, this is not reflected in free recall of idea units where the highest percentage recalled is only 25%. Furthermore, subjective inspection of free recall protocols indicates that most Ss recalled the "gist" of passage B in its entirety. This discrepancy can be accounted for by two facts. First, the "gist" of

passage B is composed of only 4 major subtopics: the
siege, a call for help, a 3-part plan and a tragic
flood; however, there were 143 idea units. Second, Ss
were essentially told to capture the meaning or gist of
the passage when they wrote their protocols. Therefore
to make the idea units a more valid measure of recall,
it would have been better to instruct Ss to retell the
legend rather than merely describe its main elements or
capture its "gist."

Lastly, the main drawback with the short answer
test used in this study is that item difficulty varied
greatly from one subgroup of items to the next (see
Table 2). As a consequence of this, there was an item
main effect in an uninterpretable direction. To correct
this, several preliminary test construction procedures
are appropriate. A pool of items for each of the three
subgroups should be written and then these items should
be pretested. Comments should be solicited from Ss on
item clarity and then two quantitative indices should be
checked for each item. First, an item difficulty index
should be calculated for each item (proportion of Ss cor-
rectly answering that item) and second, an item discrim-
ination index would be calculated (the extent to which
the response pattern to an item correlates with overall
test performance). On the basis of these two indices
and comments, items would be revised or discarded so that

each subgroup of items would have similar item difficulty indices and similar item discrimination indices. Such refinements to the short answer test should result in a more sensitive instrument.

In summary, a preliminary experiment provided evidence that the materials used in Experiment I are not subject to specific transfer. Experiment I, a modified RI design, failed to produce any significant results to support either an interference or subsumptive position. Several methodological improvements were suggested; these suggestions included making the passages more complex and improving the recall measures.

APPENDIX A

Passage A

Myths and Legends

Anthropologists have identified three different types of prose narratives. These types of prose narratives are known as myths, legends and folktales. However, this passage will only be concerned with the first two: myths and legends. Myths and legends are factual (in the sense of belief) prose narratives that form part of man's verbal art.

Myths are prose narratives which, in the society in which they are told, are considered to be truthful accounts of what happened in the remote past. For example, myths may account for the origin of the world, of mankind, of death or may explain some phenomenon in nature such as geographical features. The characters in myths are gods or other types of supernatural beings that act with supernatural forces in the remote past or in another world. The society in which the myth is told always has a sacred or believing attitude toward the myth. Furthermore, myths are accepted on faith as authoritative explanations of an event or as authoritative answers to ignorance or doubt.

Legends are prose narratives which, like myths, are regarded as true in the society in which they are told, but they are set in a period considered less remote, when the world was much as it is today. For example, legends may tell of migrations, wars and victories. The characters in legends are human beings such as heroes, soldiers or kings that have acted in the recent and familiar past. The society regards the legend as a secular or worldly story in which some type of human action or behavior is described. Unlike a myth which explains occurrences, a legend only functions to describe an event. Legends may be considered a counterpart to written history.

On the next page is a chart which summarizes the differences and similarities between legends and myths. Please study this chart; you may refer back to this passage.

APPENDIX B

Myth-Legend Chart

Verbal Arts

Prose Narratives

Belief (fact)   Fiction

MYTHS   LEGENDS   Folktales
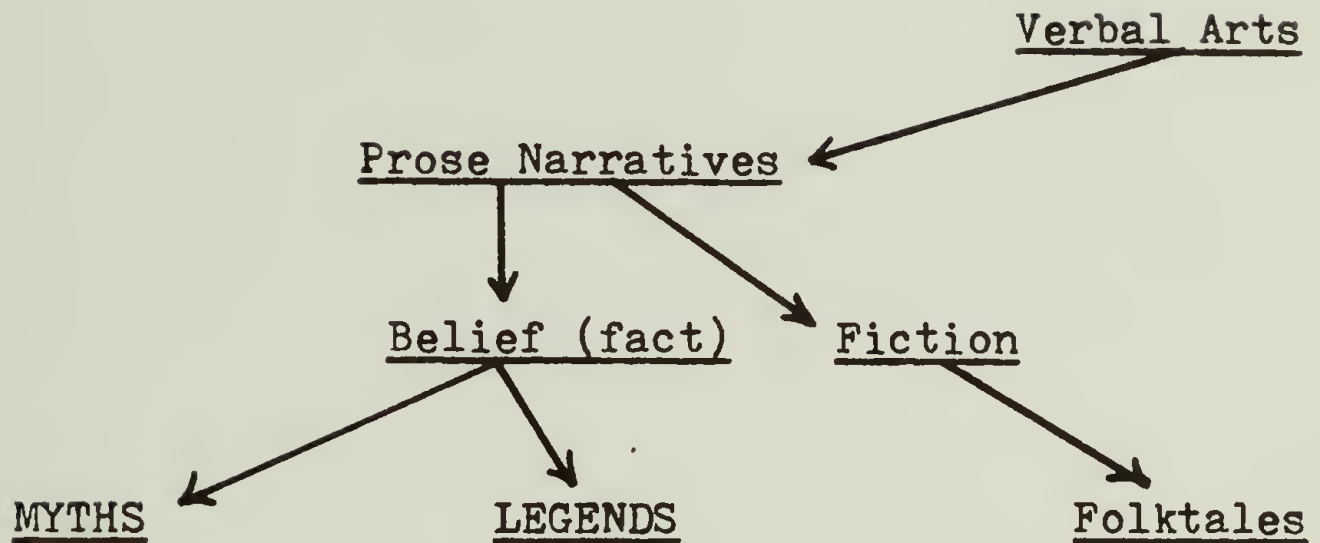
Function: Function:
 to explain,   to describe.
 to account for.

Time: Time:
 remote   recent past,
 past.   familiar past.

Place: Place:
 different world,   world of today.
 other or earlier
 world.

Attitude: Attitude:
 believing and   believing and
 sacred (faith).   secular (worldly).

Principal   Principal
Characters: Characters:
 non-human,   human (heroes,
 such as gods,   kings ...)
 deities ...

APPENDIX C

Passage B

<u>The Legend of Nya</u> (as told in Ancient Europe)

Hundreds of years ago our land was under siege. The countryside was plundered including the kingdom of Nya. One day the people came to Nya, the famous warrior whose kingdom was still besieged. These people came to Nya to plead that he put an end to the siege of their land saying that they had been without security, without crops and without shelter for many months.

What the people had said made Nya very angry. Nya realized that he would need the help of the General and the Prince, and he called them to obtain their forces to help end the siege of their kingdom. Then together they talked, determined to remedy the situation.

First, Nya would send out the General into the kingdom to cast out the enemy. But the enemy was strong and this could not be accomplished in one day. The General took ten days to travel around every corner of Nya's kingdom. And everywhere he went he used his powerful army to defeat the enemy. Soon the kingdom was once again secure and when Nya saw this he highly praised the General for making his kingdom secure. Now the people around the kingdom were happy instead of frightened and the town was content but still needed food.

Before Nya carried out the second step in his plan he went to visit an old man who once in a battle a long time ago saved Nya's life. This old man lived in a hut and the hut was near Nya's castle. Nya brought food for him and together they ate and talked about the battle of long ago. Afterwards Nya returned to his castle.

Again Nya sent out the General. The General first ordered his army to plow the soil. Next the army planted seeds and watered them so that they might grow.

Lastly Nya would have shelters built for the inhabitants of his kingdom. These shelters would provide warm places where the people could live and eat. Nya realized that his plan was successful and this made him feel very happy.

But before Nya could send the Prince into the forest
to cut down trees for shelters, a terrible misfortune
struck Nya and his kingdom. Sudden rains and storms came
and flooded the land. Nya ran with his people to the
highest hill but the floods were too great. And Nya and
his people perished in the floods.

We tell this sad legend to remember the brave
warrior Nya and his grateful people.

APPENDIX D

Passage C

The Myth of Sa (as told in Ancient Europe)

Before the beginning of things there was nothing but mud. The world was uninhabited except by the earth spirit, Sa. One day the gods descended from heaven to visit Sa. But the gods were shocked by this state of affairs and reproached Sa fiercely saying that he had created a place without light, without plants and without living beings.

What the gods had said made Sa very angry. Sa remembered that he had been given the powers of creation and light, and realized that he must use them to rid the earth of darkness and mud. Then he set out determined to remedy the situation.

First, Sa would use his power of light to cast the world out of darkness. But the world was large and this could not be accomplished in one day. Sa took ten days to travel to every corner of the barren world. And everywhere he went he used his power of light to send away the darkness. Soon the earth was filled with light and when Sa saw this he felt very important with his power to make light. Now the sky around the earth was white instead of black and the air was very clear but still very empty.

Again Sa used his power of light. He used the light to dry the mud so that agriculture could begin. Next Sa created seeds and as they were placed in the soil he shed light on them so that they might grow.

Lastly Sa would create living beings to inhabit the earth. Sa would create living beings that could eat the plants and the plants in turn would grow in the light he had provided. Sa realized that his plan was successful and this made him feel indispensible.

But before Sa could create living beings to inhabit the earth, a terrible fate struck Sa, the earth spirit. The gods became jealous of Sa's success and took away his powers. Then they sent death in the form of a vast ocean that engulfed Sa and the entire earth.

This myth of Sa tells why the earth became covered with ocean at the beginning of things.

APPENDIX E

Passage A'

Political and Philosophical Cartoons

Cartoon historians have identified two predominant types of cartoons. After a national and international survey of cartoons found in magazines and newspapers as far back as 1890, they concluded that political and philosophical cartoons were the two most permanent and historically important categories. Clearly, there are many other types of cartoons, but they do not seem to be of lasting historical interest and will therefore not be discussed.

A political cartoon is a popular means of communication only in those countries where the newspaper media is not politically controlled. The characters in these cartoons either discuss particular people in the government or represent a particular person. Often such representations are caricatures in which a feature or several features (e.g., ears) of the person are greatly exaggerated. Also the content of the political cartoon is issue specific and current. This issue specific aspect is the reason why political cartoons have a large readership. That is, people are able to understand the content in terms of their specific experiences in the social system. However, there is a second level to the surface content and it deals with some broad political principle. While realizing the generalizations enhances one's appreciation, it is not necessary to understand this second level to enjoy the cartoon.

Philosophical cartoons are more widespread than political cartoons insofar as they do appear in newspaper medias that are politically controlled. Unlike political cartoon characters, the characters in these cartoons are non-specific; they do not represent any particular person. Also the content of the philosophical cartoon deals with the larger, more general problems of human existence and does not deal with any specific issue. The philosophical cartoon is harder to understand than the political cartoon because it does not relate to any specific daily experience of the reader. To understand the cartoon the reader must generalize his experience. It is for this reason historians believe that a philosophical cartoon of some country is not as widely read as the political cartoon.

Please study the chart on the next page. You may refer back to this passage.

APPENDIX F

Cartoon Chart

Cartoons

POLITICAL		PHILOSOPHICAL	
Characters: specific, often particular people.	Readership: widespread except where press is politically controlled.	Characters: general, non-specific.	Readership: many countries but not as popular within a country.
Issues: temporary, specific.		Issues: general issues in life, generalizations.	

APPENDIX G

Passage C'

Plastics

Plastics resin production set new records in 1972, exceeding the 20 billion pound mark for the first time. The actual growth figure was 19.65 percent, the production figure was 23.6 billion pounds; both the highest ever recorded.

All major groups of plastics showed phenomenal growth during 1972, spurred in good measure by the upswing in the automative, construction, furniture, appliance and leisure markets. Packaging can be singled out as registering the most outstanding increase of all market areas normally associated with plastics consumption and this was despite the environmental concern.

The industry is currently facing some very serious challenges in the areas of flammability and solid waste. More and more people in this industry are recognizing the need for more information more widely disseminated to increase understanding of how plastics perform. SPI (Society of the Plastics Industry) is involved in research and education aimed at substantive solutions to the problems now associated with plastics. Until now, the challenges faced by the industry have largely been technical and managerial. Today it is absolutely necessary to develop new social and political capabilities to assure future growth.

University and citizen action groups have played an active role in educating the public to the importance of social and environmental considerations for industrial decisions. The actions of such groups will influence any industry's future plans, including plastics.

Despite the optimism registered throughout the industry on 1972 growth, the picture for 1973 will probably be substantially different. One of the effects of the 1970-1971 economic down-turn was the reluctance of management to make the capital investments necessary to expand plastics raw materials capacity. The effects of those decisions are certain to be visible when the 1973 production figures are in a year from now.

It will be impossible for the industry to duplicate its 1972 growth in view of social and environmental restraints.

STOP, PLEASE REVIEW UNTIL TIME IS CALLED.

APPENDIX H

Short Answer Test Items

I. Facilitating

11 - 1. What was Nya's emotional reaction to the initial pleas of the people?

14 - 2. What parts of the kingdom did the General travel to?

8 - 3. Where was the legend of Nya originally told?

3 - 4. How long did it take the General to cast out the enemy?

7 - 5. What word describes the attitude of Nya and his two helpers toward remedying the initial situation?

13 - 6. What did Nya realize about the plan he had made; that is, how would Nya have finally described his plan?

II. Neutral

9 - 1. When Nya sent out the General a second time, what was the first order that the General gave to his army?

1 - 2. Where did Nya and his people go when misfortune struck?

4 - 3. Before Nya carried out the second step in his plan who did he visit?

12 - 4. In what kind of a place did the old man that Nya visited live?

15 - 5. What did Nya bring with him when he visited the old man?

18 - 6. What did Nya and the old man talk about?

III. <u>Interfering</u>

16 - 1. When was the land under siege, according to the legend?

6 - 2. What three things were the people without?

5 - 3. Why is this legend told?

2 - 4. What caused the death of Nya?

10 - 5. What was the last thing that Nya planned to do?

17 - 6. How did Nya feel upon realizing his plan was successful?

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