Retroactive interference (inhibition) is defined as a decrement in retention attributable to interpolated learning (McGeoch & Irion, 1952), and the operations that define it require a comparison of the retention of some original learning between two groups that differ in some aspect of interpolated learning activity (Underwood, 1969). Better retention by members of the control group over members of the experimental group defines retroactive interference.

A review of the experimental literature concerning retroactive interference revealed that the majority of studies utilized the learning and verbatim recall of such items as nonsense syllables and paired-associates. Even when connected prose (meaningful material) was used, verbatim recall was required on the test for retention. Such studies reported a degree of retroactive interference.

The few studies which used meaningful verbal material, mainly those conducted by Ausubel and his associates, and which did not require verbatim recall failed to find retroactive interference.

A study by Anderson & Myrow (1971) found, for the first time to this investigator's knowledge, a significant degree of retroactive interference while using meaningful verbal material. Their findings prompted the current study which attempted to conduct a similar experiment using the same learning material and tests.

The current study was conducted from a cognitive viewpoint and was based on Ausubel's (1963) subsumption theory of meaningful verbal learning and retention. Subsumption theory states that the existing cognitive structure of the learner is crucial in learning. This structure is hierarchically organized with the more inclusive concepts at its apex and with lesser inclusive concepts and information at the lower levels, all of which are linked to the next higher step by a process of subsumption. Meaningful verbal learning takes place when potentially meaningful material is perceived, interacts with, and is appropriately subsumed under a relevant and more inclusive conceptual system of the learner's cognitive structure. The discriminability of the new material from the established cognitive structure that subsumes it is the second important factor in meaningful verbal learning.

Subsumption theory predicts that when new learning is non-arbitrarily and substantively related to existing ideas in cognitive structure, the newly learned material is protected by such anchorage from the automatic interfering effects of retroactively introduced material. Whether or not interference occurs depends on the net interfering effect of such material on the stability, clarity and discriminability of the learning task.

Based on subsumption theory, it was hypothesized that there would be no retroactive interference regardless of whether the interpolated learning task was (a) similar and conflicting, or (b) substantively dissimilar to the original learning task. Further, it was hypothesized that (c) a recognition mode of measuring retention would result in higher retention scores than a recall mode. That is, Anderson's measure on the posttest would result in an increment in retention scores, (d) Neutral items would result in neither an increment nor a decrement in retention and (f) Interfering items would not result in a statistically significant degree of retroactive interference.

The Ss for this study were 16 paid volunteer Japanese freshman students of ICG who were randomly assigned to a control group and two experimental groups. On Monday all Ss read the original learning passage which was an anthropological discussion of a fictitious tribe in Africa, the HIMOOTS. A test was administered to all Ss immediately after the learning session and will be referred to as the pretest (pre-interpolated learning). On Wednesday the control group was not presented (no interpolated learning) while the experimental group learned the interpolated learning material. One group learned a substantively similar, parallel anthropological passage of another fictitious tribe in Africa, the GUAANDA. The second experimental group learned an unrelated, substantively dissimilar passage concerning the causes and types of drug addiction. On Friday all Ss were retested (posttest) on the original HIMOOTS learning passage.

The pretest and posttest consisted of both multiple-choice (recognition) and completion (recall) type questions. The difference in the two tests was the fact that multiple-choice questions on the pretest appeared as completion questions on the posttest and vice versa. Thus, all Ss answered each question both as a recognition and as a recall type question. All of the learning material and the tests were translated into Japanese from Anderson & Myrow's original English material.
There were three types of items on the tests. Anderson & Myrow had categorized the items according to interference theory. Facilitation items were items that appeared in both the HIMOOT and GRUANDA passages and the responses were identical in both passages; they were expected to facilitate retention. Neutral items were items which were discussed only in the HIMOOT (original learning) passage and as such were expected to have no effect on retention. Interfering items were items which were discussed in both the HIMOOT and the GRUANDA passages, but the GRUANDA (related learning) passage gave a competing, incorrect response; a decrement in retention was expected from these items.

An analysis of variance and an analysis of covariance revealed that there was no significant difference among the three groups; there was no retroactive interference (F = 2.14; df = 2/90), thus confirming hypotheses (a) and (b).

The data indicated that recognition type items on the posttest yielded higher retention scores than recall items (F = 7.93; df = 1/90; p < .01) thus confirming hypothesis (c).

The analysis of variance failed to confirm or deny the hypotheses dealing with test item types. An analysis of the differences between paired observations was then performed using pretest and posttest scores. The results indicated that facilitation items did not result in an increment in retention; thus hypothesis (d) was not confirmed. Every one of the 9 analyses which were required to make the comparisons resulted in F values which did not exceed the tabled values of F at the 5 percent level. Consequently, hypotheses (e) and (f) were confirmed. Neutral items resulted in neither increment nor decrement in retention and Interference items failed to result in retroactive interference.

The results of this study led to the following conclusions:

1. When potentially meaningful verbal material is the subject of learning (as is the majority of the material presented in the classroom), the introduction of (a) either substantively similar, or (b) substantively dissimilar learning material between original learning and the test for retention does not result in retroactive interference.

2. A recall measure to test retention yields lower scores than a recognition measure. The threshold of availability level is higher for recall than for recognition.

3. Neutral and interference items on the test for retention had no significant effect on retention.

4. The results of this study support Ausubel's subsumption theory of meaningful verbal learning and retention and denies the applicability of interference theory to meaningful verbal learning.

Due to the small size of the sample the results enumerated above cannot be generalized, but must be restricted to the freshman class of ICU to which Ss belonged. However, sufficient studies have been made in which retroactive interference was lacking when meaningful verbal material was used to indicate that further studies in this area should be undertaken if we are to settle the neobehavioristic-cognitive argument in this regard.

In meaningful verbal learning, the centrality of the existing cognitive structure of the learner cannot be overemphasized. Ausubel (1968) put it very well when he wrote, "If I had to reduce all of educational psychology to just one principle, I would say this: The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly."

REFERENCES


