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A QUANTIFICATION AND MEASUREMENT OF THREE QUALITATIVE CHANGES
IN THE RECALL OF COMPLEX VERBAL MATERIALS

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University

By
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The Ohio State University
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CHAPTER I

PROBLEM AND PURPOSE OF STUDY

The process of forgetting is ordinarily described quantitatively in such terms as the number of units of original material forgotten, the number of trials taken to relearn a performance, and the amount of time lost in the speed of performance. Describing forgetting in such terms, however, ordinarily does not give a complete picture of the forgetting changes. There can also be changes in the form or structure of the material. Changes in the quality or character of the retention are known as qualitative changes.

The qualitative changes first received major attention with F. Wulff's paper in 1922 (38). One of the qualitative changes observed was called normalizing, and was described as the process whereby the later reproduction of earlier seen visual figures begins to approximate more and more some well known figure. Other systematic changes noted were sharpening, which is an emphasis upon some part of the figure, and leveling, which is a de-emphasis upon some property of the figure. These three types of qualitative change were supposed to tend progressively in the direction of a good gestalt. The changes were thought to depend upon the structural nature of the initial figure presented and were thought to be autonomous changes.

1Numbers in parentheses refer to bibliographical citations.
In 1932, an extension of the concept of qualitative changes was made when F. C. Bartlett (4) described remembering as a process of construction and reorganization rather than a process of rote recall and decay. Precise rote recalls were shown to be the exception rather than the rule. The actual reconstructions or constructions were made possible, and partially determined, through the operation of schemas. A schema was defined as "an active organization of past reactions, or of past experiences, which must always be supposed to be operating in any well-adapted organic response" (4, p. 201). The resultant reproduction after learning was said to be not only a function of the stimuli impinging upon an individual, but also was a function of the active organization of schemas within an individual.

The dynamic character of the schemata was given emphasis. The schemata were "not merely something that works the organism, but something with which the organism can work" (4, p. 207). The organism was said to begin with a few schemata and then could acquire the capacity "to turn round upon its own 'schemata' and to construct them afresh" (4, p. 206). The development of these schemata was said to take place in a fluctuating overlapping hierarchy of organic and experiential forces. These active changing factors of schematic determination and organization forced the occurrence of qualitative changes such as condensation, elaboration, and rationalization. These qualitative changes, similar in nature to those described by Wulf, were noted both in the reproduction of visually presented figures and in the written reproduction of stories. For a more complete summary of Bartlett's theory of remembering, see R. C. Oldfield and O. L. Zangwill (29).
The verbal changes observed by Bartlett were intentionally not dealt with quantitatively. Rather, direct inspection of the stories was followed by descriptions of the types of changes that had taken place. Objective methods for describing the qualitative changes were lacking.

One major purpose of the present study was to quantify three qualitative changes in retention—leveling, sharpening, and rationalization. An attempt will be made to show what happens to the tendencies with the passage of time. A second purpose of the study is to determine whether there are individual differences in the degree to which subjects make qualitative changes in their reproductions. A third purpose of the study is to find out whether the tendencies to change, if any, are related to personality characteristics. Finally, an interpretation of the results will be made in terms of the theories of retention that the data best support.

Critical Review of Research

Despite a good beginning by Wulf, relatively little work has been done on the problem of qualitative changes in recall. This lack of work is clearly reflected in the number of pages devoted to discussions of the topic in some current books in which the major concern is learning. McGeoch and Irion (28), for example, take only seven pages to discuss the topic in a book which is 596 pages long. Deese (11) takes six pages in a text of 367 pages, and Hilgard (21) uses four pages in a book of 563 pages. The other pages of these three books are all devoted to studies of quantitative changes and theoretical issues in learning and recall.
The lack of work done is not due to a failure to notice the problem or to be aware of its existence. In 1897, for example, Binet (6) observed that when subjects were trying to recall details of a picture shown to them, they fell into two types—the describers and the observers. His describers gave detailed descriptions of the separate items in the picture but did not attempt to relate them to one another. His observers were interested mainly in the meaning of the whole; the specific details were either recalled or guessed at in line with their observations. Twenty-five years later, Stern (34, 1922) made a somewhat similar distinction between the preserver and the reorganizer. More recently, Gomulicki (17, 1956) claimed a dichotomy of recall types—the changers and the condensers. Observations and experimentation over the last sixty years have suggested that subjects can be differentiated in the qualitative manner of their recall.

Although recall types have been noted for many years, the majority of studies have been oriented around the works of Wulf (38) and Bartlett (4). Each of these two major works has started a line of research activity. Interestingly enough, these two lines of research have been largely independent of each other. The two lines differ both in the kind of problems studied and in the methods used.

The research efforts of the Wulf line of investigators have been directed toward showing that there are systematic memory changes, and toward finding that these memory changes tend progressively in the direction of a good gestalt. The main proving ground for these systematic errors has been in the later reproduction of visual figures
which had been seen earlier. Along with the emphasis on relatively simple memory materials has been an emphasis on methodology. There has been considerable refinement of methods, with each experiment demonstrating that some of the earlier experiments were not valid or else in extending the results of previous research. For example, the results of Hebb and Foord (20) and the extension of their results by George (14) are in doubt because the recognition test employed may have distorted the qualitative changes (9).

The efforts of the Bartlett line of investigators, on the other hand, have been directed toward finding the ways in which individuals differ in their retention modes, and toward finding the relationship of these retention tendencies to personality variables. Berkowitz (5), for example, related leveling tendencies to the Complexity-Simplicity dimensions of Barron (3). Following Bartlett's lead, this line of investigators has used complex verbal materials for the learning activity of the subjects. In contrast to the studies originating from Wulf's work, there is little continuity among these studies. They neither refute nor extend any previous research. The studies stand in relative isolation to each other, the only major bond between them being the direct connection with Bartlett's work.

Research Stimulated by Wulf's Study

After Wulf's paper (38, 1922), the first experiments tended to support his contentions (1, 1930; 32, 1932). Gibson's experiment and counterclaim (15, 1929) was reinterpreted by Koffka (25, 1935) who claimed that Gibson's results did not contradict Wulf's theory. With
the exception of Goldmeier's experiment in 1940 (16), experiments using visual figures as memory objects have given no positive confirmation of systematic memory changes since Hanawalt's study (18) gave negative evidence in 1937. The experimental results have been either negative or not interpretable.

Experiments since 1940 which did not demonstrate systematic memory changes include the works of F. W. Irwin and M. A. Seidenfeld (22), D. D. Hebb and F. N. Foord (20), N. G. Hanawalt (19), J. B. Carlson and C. P. Duncan (9), S. H. Lovibund (27), and J. Fisher (13). Some experiments have demonstrated autonomous change, although the changes were said not to be predictable from gestalt theory. Included in this group are the experiments of J. C. Crumbaugh (10), J. Brown (7), L. Karlin and G. Brennan (24), and H. James (23).

Methodological flaws seemingly invalidate the experiments using visual figures. All of the studies done from 1922 to 1937 had the defect of using the method of repeated reproduction. Earlier reproductions by a subject have been demonstrated to have an effect on the quality of the subsequent drawings (18). In effect, the subject remembers more from his own early reproductions than from the stimulus figure.

Another pitfall of some of the earlier studies is that multiple-choice recognition tests have been used to test memory changes (20, 14). A major difficulty with this method is that stimuli which are introduced during the forgetting period and which are similar to the original
stimulus tend to mask the forgetting changes. Lovibund (27, p. 412) evaluated the recognition test in this way:

It would appear that the method of recognition which requires S to make a selection from a temporal series of recognition figures, makes use, in effect, of a series of repeated recognition tests. As a result, it suffers from defects similar to those of the repeated reproduction method.

We could assume that the introduction of the correct diagrams by means of multiple choice tests would slow down the forgetting process. The introduction of incorrect diagrams would speed up the forgetting process for some subjects and reverse the direction of change for other subjects.

A further difficulty of the multiple choice test is the number of response biases that exist. That these response biases do arise from these tests perhaps explains why it has been so easy to interpret the forgetting changes as being the result of the kind of reproduction response habits outlined by Woodworth (37). Reproduction response habits, of course, are not necessarily the same kind of change as actual memory change. An example of such a response habit was Carlson and Duncan's (9) demonstration of a tendency to select ultimately a recognition card which erred in the direction of the error of the first card selected. The answer to this specific problem is not to have the error cards counterbalance each other because there is probably also a response bias toward selecting cards near the mean of the series (8). This bias apparently operates over and above mere statistical regression. The effect of this bias would be to mask actual forgetting.

Another variation of the recognition method is the "method of comparison" used by Hanawalt (19). In this method, the original stimulus figure is reintroduced with the implication given to the
subjects that the figure is different from the original one. The subject then makes a judgment on prepared multiple-choice verbal forms concerning the nature of the change. Like the recognition method, this suffers from the defect of having the original stimulus introduced during the forgetting period; a condition which would bring about masking of forgetting.

The method of comparison was also used by H. James (23). James hypothesized that changes in the memory trace were due to non-random response tendencies produced by guessing. The conclusion was reached that the memory changes that were found could not have been predicted from gestalt theory, nor could they have been predicted from his guessing hypothesis.

The inability of James's experimental design to confirm the actuality of gestalt-like memory changes could have been predicted in advance. The reintroduction of the stimulus figure, an incomplete circle, took place only 27 seconds after the removal of the introductory stimulus figure. With a time interval as short as this, and with a stimulus figure as simple as this, very little forgetting occurs. Coupled with the masking of forgetting which would result from the method of comparison, the short time interval and the simple figure would make the possibility of systematic memory changes unlikely.

A source of contamination for some experiments has been their choice of figures. Hanawalt's figures in his 1937 experiment (18) were criticized by Goldmeier (16) as being mere perceptual aggregates of little integration, and therefore not suitable for group experiments in
which the method of recognition was used. In particular, there were too many designs, and the designs themselves were too simple.

Goldmeier's criticism helps to pinpoint the kind of figure needed in the qualitative change experiments. There is a need for an irregular figure which creates the impression of asymmetry. A second need is that the figure should not be too simple; simplicity may be a mark of a good gestalt, a situation where changes would not be expected. No one apparently disputes the contention that memory changes will be eliminated if the subject has a good gestalt.

On the other hand, the figure should not be too complex. If the memorial contents are extremely complex and fragmentary, reorganization ordinarily will not be demonstrated. Autochthonous change in memory usually takes place only when the memorial contents have enough structure to invite improvement. While a structurally ambiguous figure will be subject to the laws of perceptual organization, such as closure and proximity, a figure which has little structural integration is little more than a perceptual aggregate, and the laws of wholes will not hold up for group experimentation (16).

Whether or not some forgetting is a necessary condition for the appearance of memory changes is a disputed point. Goldmeier, for example, holds that only when forgetting is slight can autonomous changes be shown. The viewpoint adhered to in this present experiment is that there has to be room for change before autonomous or systematic change is to be expected. If a subject is able to reproduce memory material photographically, and if he is under the set to reproduce the material, he probably will make an exact reproduction.
Another requirement of the kind of figure needed in memory form experiments is that there should not be too many figures presented for retention. As Osgood (30) points out, this may cause serial confusion. Hebb (20) indicated, however, that he could tell no difference in the results of those subjects who had been presented one figure as compared with those who had seen two figures to be remembered. How many figures can be shown without fear of contamination undoubtedly depends upon many variables. One of these many variables is the degree of similarity among the various figures. The figures should be dissimilar to each other, otherwise their homogeneity will interfere with memory (36). A probable result of excessive similarity among designs will be feature assimilation, a process whereby the features of different designs will be combined in one reproduction. The criticisms of excessive ambiguity of figures, excessive number of figures, and excessive homogeneity of figures can be applied to Postman's experiment (33). Postman trained his subjects on eight basic pairs of designs with four derivative pairs for each basic pair. Then a memory series of $2^k$ different figures was used.

Goldmeier's experiment (16) has not been immune from criticism either. Hebb and Foord (20) criticized Goldmeier for 1) making an incomplete report of the procedure used, 2) reporting his results in terms of frequency of error rather than in terms of degree of directed or systematic error, and 3) using methods which were contaminated with subjectivity.

Hanawalt's (19) and Lovibund's (27) works can both be criticized for the assumption that the memory changes for each figure would always
be in the same direction, and furthermore, always away from the chance level of selection. In Hanawalt's experiment, for example, the subjects were asked to estimate the area of a supposedly different figure and tell whether the area was "greater" or "lesser" than the same figure which was presented earlier. Measurements taken at three different time intervals over a seven-day period showed that the percentage of "greater" judgments in estimating the area of a circle went from 45 percent to 50 percent to 58 percent. The difference in percentages from chance was then calculated for each of the three intervals. The resulting critical ratios were not deemed to be significant, since the largest one was only twice its standard error. If the first measurement, though, is assumed to be the baseline from which to calculate the memory change, the resulting change is statistically significant.

The investigator has recalculated Hanawalt's data by using chi-square as a test of statistical significance. A comparison was made between the observed frequencies at the 7-day interval with the theoretical expected frequencies at the 7-day interval. The theoretical frequencies were derived on this basis: if no change had taken place from the 3-minute interval to the 7-day interval, or if the change was random, one would expect that after 7 days the proportion of "greater" judgments would remain the same as the 3-minute interval. The chi square was 148.23. For df = 21, it would only need to be 46.797 to be significant at the .001 level. The null hypothesis that there is no difference in the proportion of "greater" or "lesser" judgments from a 3-minute interval to a 7-day interval is rejected at less than the .001
risk level. Clearly here is a unidirectional trend which was not brought out by the statistic used by Hanawalt.

Lovibund's experiment (27) should be examined thoroughly since it has not been criticized in the literature. In the introductory phase of the experiment, a baseline was determined against which to judge further memory changes. The subject's task was to adjust a comparison \( A \)-figure so that this comparison figure matched the standard short-legged \( A \)-figure. There were thus two inverted V-like figures present, one of which was to be adjusted by each subject in making a match to the standard figure. Rather than to compute future changes from the adjustment that each subject made, Lovibund chose to compute the future changes from the average of the group's estimate of the standard figure. The average of the group's estimate of the standard figure was thus used as a baseline against which to judge further memory changes.

This average group figure was then used as the test figure during the later memory recalls. The subjects were instructed to tell the E which was to make an adjustment so that the "new" figure was just the same as they remembered it. Any adjustment that the subjects called for were classified as changes.

One difficulty with this experiment was that the recognition period was different from the inspection period. With one of the \( A \)'s missing, the stimulating conditions or field conditions were not the same. Even if the field conditions had been the same, the method used is only a slight variation of the "method of comparison." Previously noted criticisms of this method are still applicable here. A second difficulty was in the nature of the figure chosen. The accuracy of
choices in the recognition period indicated that very little forgetting took place; the \( \Lambda \)-figure used was perhaps too simple to be forgotten over the seven-day interval. Note too that of the 110 subjects in error from the standard after the different time intervals, 56 requested change to the direction of the original standard and 54 requested a change away from the standard. Rather than to conclude that this indicates a lack of autonomous change, as Lovibund did, one might conclude that each individual had a different gestalt—for some individuals sharpening was in order; for others, leveling. In four of the six groups, the standard deviation of the mean changes was greater than the mean changes themselves. This could mean that the memory changes were going in different directions.

**Summary of research stimulated by Wulf's work.** The basic question as to whether there are systematic memory changes has not been answered. Results are conflicting, mainly as a result of poor methodology or poor interpretations. The experiment's major value is in serving as guideposts for the design of future experiments. They are instructive in helping to design and interpret experiments which are concerned with the nature of changes in verbal remembering. It is known, for example, that there are certain conditions, such as excessive simplicity, under which systematic memory changes will not be demonstrated. Other conditions, such as using the method of repeated reproduction, are likely to magnify the changes.
Research Related to Bartlett's Work

The experimental demonstrations of the existence of qualitative changes in the retention of complex verbal materials have been few in number. Even fewer studies have been done to identify the personality characteristics of subjects who show different types of recall modes.

In discussing the literature relevant to the forgetting process, Underwood states:

Thus far I have not said anything about forgetting as a function of the characteristics of the subject, that is, the personality or intellectual characteristics. As far as I have been able to determine, there is not a single valid study which shows that such variables have any appreciable influence on forgetting. Many studies have shown differences in learning as a function of these variables, but not differences in rate of forgetting. Surely there must be some such variables (35, p. 58, 1957).

One year previous to the time of Underwood's review, Gomulicki (17, p. 400) had stated that individual differences in recall, both quantitative and qualitative, can be shown "... with a degree of statistical significance that makes it perilous to ignore them when designing experiments in recall." Gomulicki was apparently basing his statement on his interpretations of the results of his own study, while Underwood's statement came after a review of the literature. Since Underwood's review, there has been a slight improvement in the situation.

Fisher (13) hypothesized that memory changes, as measured by the method of repeated reproduction, would vary with the degree of a subject's ethnocentrism. The subjects in the experiment memorized two designs from Form L of the 1937 revision of the Stanford-Binet. Reproductions were made immediately, after two weeks, and after four
weeks. Fisher concluded that non-ethnocentric subjects, more than ethnocentric subjects, were likely to "break the gestalt," i.e., to alter the general course of the reproductions toward simplification and symmetry by reproduction reversals. Fisher's conclusion, however, does not necessarily follow from his data. On the basis of using chi-square to test the probability of an association between memory change and ethnocentrism, only 4 out of 15 comparisons were statistically significant at the .05 risk level of confidence.

In an experiment by Gomulicki (17), meaningful verbal materials of different lengths and difficulty levels were recalled. Gomulicki interpreted his results as supporting two different recall types—

changers and condensers. Six out of seven of his measures of change, however, did not support his contention of two different recall types. The distribution of scores of the six measures fell into a normal distribution rather than a bimodal distribution.

An important study by Berkowitz (5) related leveling tendencies to an attitude scale independently developed by Barron (3). This attitude scale was designed to measure a preference for perceiving and dealing with complexity or with simplicity. Subjects were asked to reproduce five designs immediately after learning and after 35 minutes. In addition, the forty-six subjects made an immediate recall of a story from Form I of the Wechsler Memory Scale and a recall of the story one month later. He found that a subject's amount of leveling of the story was related to his amount of leveling on the designs. As expected, the complexity scale scores were related to leveling tendencies. The
complexity scale scores were more related to leveling tendencies than to intelligence, as measured by the ACE language scale (L).

A partial replication of Bartlett's work was made by Paul (31) during the time that this study was conducted. His aim was the same as that of this study, although his methods were not the same. He attempted to apply quantitative analyses to qualitative changes. In addition, Paul planned to manipulate some relevant variables experimentally.

The first experiment reported in his monograph was an attempt to find out whether the gaps and ambiguities in "The War of the Ghosts" were responsible for the qualitative changes found by Bartlett. A comparison was made between recalls of the original story and the recalls of a modified version of "The War of the Ghosts." In this version, clarifying and explanatory words were built into the portions of the story which were ambiguous and not clear. Subjects were divided into groups of five. These groups then serially reproduced one of the versions of the story. The reproductions of the original story were interpreted by Paul as becoming skeletonized in content and structure at a faster rate.

In a qualitative analysis of the data, the interpretation was made that skeletonization of material and the importation of new materials not in the story both served the functions of smoothing gaps, solving ambiguities and contradictions, and enhancing the redundancy of the story. Redundancy, as used by Paul, specifically refers to the degree to which the story's parts are repeated or duplicated. Further
experiments by Paul, reported in the same monograph, indicated that the subjects' tendencies to import new material was a stable retention characteristic from one story to another.

In view of the fact that one purpose of Paul's study was closely related to the purposes of the present study, a critical evaluation of his work will be made. The evaluation will cover only the material which is relevant to the present study. First, the assumption is made that the method of serial reproduction is a valid method for studying individual recall. This assumption is still a matter for experimental verification. The fact that the serial reproduction method capitalizes on the rapid forgetting that occurs immediately after learning, and does this for each subject in the serial chain, argues that the method does not mirror individual recall.

Second, his assessment of importing leaves much to be desired in the way of objectivity. Paul states that he simply counted the number of importations and made a subjective judgment as to whether it was a "major" or "minor" importation. As to the difficulty of the task, the statement is made that, "I found that importations were quite easy to identify and to assess" (31, p. 69). The experiment to be reported in this study indicates that determining what is or is not an importation is a problem of considerable magnitude. Attaining high reliability in rating importations is a difficult task.

Third, Paul devised a technique to heighten importing tendencies. Subjects learned seven tersely written verbal themes, and then composed a story based on these themes. The themes were then reproduced and measured for the number of importations that came from the subject's
story. No evidence is presented to show that this measure of the subjects' importing tendencies was related to the importing tendencies of subjects who are reproducing under usual instruction.

Summary of research stimulated by Bartlett's work. With the possible exception of Berkowitz's experiment (5), the research stimulated by Bartlett's work is subject to multiple criticisms. As a result of the kind of research which has been done, leveling is the only recall type which has had adequate experimental verification.
CHAPTER II

PROCEDURE AND DESIGN

One portion of this experiment was a replication of one of Bartlett's experiments on remembering. The method of repeated reproduction was used to measure remembering changes.

Materials Used

The subjects learned or partially learned a folk-tale called "The War of the Ghosts." This story, as perceived by college students, is somewhat strange and lacks familiarity. There is frequently no obvious connection between the events in the story; hence it appears somewhat disjointed and gappy. In addition to having some vivid dramatic events, the story has some supernatural elements in it. A copy of the story is included in Appendix A.

Instructions

The story was mimeographed and presented to each subject. The following instructions were informally presented:

I would like to attempt to duplicate an experiment that was done some thirty years ago in England. A comparison of results should prove interesting. I will not be able to give you an explanation of the purpose of the experiment until the end of the semester. We can then discuss the experiment in detail. What I would like you to do is to read the story to yourself twice at your normal reading rate. At some future time, you will be tested on the accuracy of your recall. Your grade in the course, however, will not be affected by your performance.
The subjects were not given advanced knowledge as to what days the reproductions were scheduled, nor were they told that there would be additional reproductions. At the time of the subsequent reproductions, the following instructions were informally presented:

Do you remember the story that you read sometime ago here in class? What I would like to do today is to test the accuracy of your recall. Write the story as accurately as you possibly can. Recall the exact words and ideas if you can.

Subjects

A total of 372 reproductions were quantitatively scored from 224 subjects. All of the subjects were enrolled at College of the Pacific. With the exception of 65 subjects enrolled in upper division undergraduate courses, all subjects were enrolled in Introductory Psychology.

Subjects who were absent on any of the days scheduled for reproductions were omitted from the experiment. The number of subjects who were dropped from a sample thus varied according to the number of reproductions that were scheduled for that group. The rate of attrition for a group which was scheduled to make four reproductions was 36 out of 48. Another group, which made two reproductions, had an attrition of 7 out of 33.

Reproduction Intervals

Bartlett collected reproductions from his subjects as the opportunities offered. Except for the fifteen-minute reproduction interval, Bartlett intentionally did not attempt to secure uniformity in the length of the interval.
Three groups in this experiment reproduced the story more than once. This, of course, is the method of repeated reproduction. One group of 27 (Group 1) reproduced the story after 15 minutes and after 63 days. A second group of 12 (Group 2) reproduced the story after 15 minutes, 7 days, 21 days, and 63 days. The third group of 93 (Group 3) reproduced the story at 15 minutes and 42 days.

Another three groups reproduced the story only once. This, of course, is the method of single reproduction. The fourth group of 29 (Group 4) did not reproduce the story after 15 minutes, but did reproduce the story after 7 days. The only reproduction of the 36 subjects in Group 5 was at 21 days. The last group of 27 subjects (Group 6) reproduced only once following an interval of 63 days.

The schedule of reproductions of these six groups is shown in the following summary:

Group 1 15 min. repro. ........................................................ 63 day repro.
Group 2 15 min. repro., 7 day repro., 21 day repro. ... 63 day repro.
Group 3 15 min. repro................................................ I|2 day repro. ................
Group 4 ............................................................ 7 day repro.
Group 5 ............................................................ 21 day repro.
Group 6 ............................................................ 63 day repro.

**Personality and Attitude Tests Administered**

Groups 3, 4, and 5 took an attitude test used by Berkowitz (5). This scale is purported to measure a person's preference for either simplicity or complexity. Hereafter, the scale will be called the
Complexity-Simplicity Scale. All three groups took this scale within a week after reading the "War of the Ghosts." No title was placed on the scale nor was any explanation for taking the scale given to the subjects other than saying their instructor "wanted to find out some information about them." A copy of the scale is included in Appendix B.

Groups 4 and 5 took the Revised Edition (1951) of the Allport-Vernon Study of Values. "The Study of Values aims to measure the relative prominence of six basic interests or motives in personality: the theoretical, economic, aesthetic, social, political, and religious" (2, p. 1). No explanation was given to the subjects about why they were taking the scale.

Group 3 took the Edwards Personal Preference Schedule (12). This scale attempts to measure 15 of the manifest needs presented by H. A. Murray and others. The subjects in Group 3 took the entire test, but only 8 of these personality variables are included in this experiment. The respective names of the needs considered are (1) achievement, (2) deference, (3) order, (4) exhibition, (5) autonomy, (6) intraception, (7) change, and (8) endurance. The scale was taken in the subject's discussion groups and not in the lecture room. The discussion instructors were cautioned not to reveal that there was any connection between this test and the reproduction of the stories.
Assessment of Qualitative Changes

Preliminary Attempts to Quantify Reproductions by Objective Tests

An attempt was made first to quantify the qualitative changes of leveling, sharpening, and rationalization by means of objective tests. Multiple-choice questions, true-false items, and recall questions were written. A copy of the test devised is included in Appendix C.

As a guide to what questions should be included, the assumption was made that the perceptual and learning distortions found in the initial reproductions would be a reliable guide to future remembering changes. The questions were then written after direct inspection of the initial reproductions of Groups 1 and 2. All groups except Group 3 were administered the test. The test was not given until after the final reproductions were made. The instructions given were to answer each question in order; some of the answers to the earlier questions could be found in the later questions. The subjects were instructed to guess if they did not know the answer.

The true-false questions and the recall questions were dropped from the combination test because a sufficient number of questions could not be written by the experimenter without giving away the answers to the later questions. A decision was made to concentrate on the multiple-choice test.

Eventually, however, it was decided to shift from the multiple-choice test to a rating scale form. There were several reasons for this. One reason was the difficulty involved in putting some of the
qualitative changes in the form of multiple-choice questions. There appeared to be too much individuality and not enough communality.

A second reason for dropping the multiple-choice test was that many of the response alternatives could not be fitted into one of the three categories that were chosen for study. Many of the alternatives could fit any, or none, of the three categories. For example, suppose a subject writes that the Indians coming up the river had on warpaint and bonnets. This is rationalization in the sense that if the subject knows the Indians were in a war party, it is plausible to assume that they were dressed this way. At the same time the subject is sharpening by dramatizing and emphasizing.

A third reason was that the multiple-choice scale was not measuring the same thing as the reproductions were. A subject might write that the battle took place in daylight; yet would answer the multiple-choice question by saying that it took place at night. These kinds of reversals appeared to be frequent. Part of the discrepancy is probably due to the fact that the two methods are measuring different kinds of remembering, but the suspicion is raised that the major reason is that the multiple-choice test is unduly influenced by response biases such as those outlined by Campbell (8).

Procedures Involved in Constructing the Rating Scale

Model for Scale

An attempt was then made to construct rating scales for specific changes in the story. A partial model for the form of the rating scale
was furnished by the vocabulary subtests of the 1937 Revised Stanford-Binet Intelligence Test and the Wechsler Intelligence Scale for Children. There would be, for example, general rules to be followed by the raters as to what were the distinguishing characteristics of a particular qualitative change. In addition the specific portions of the story would have illustrative examples of the scoring standards.

Content Sampling Procedures

To ensure that the content of the scale was a representative sample of the qualitative changes, the procedure included the following steps. First, an inspection of 81 reproductions of the story was made. The experimenter noted as many instances of sharpening, leveling, and rationalization as he could. Although at least 50 different examples of each of these qualitative dimensions were observed, the haphazardness of the selection process was clearly evident.

Attempts were then made to break the story down into a universe of idea units so that a sampling selection could be made. The story was broken down into the parts of speech. This analysis did not solve the problem because no distinction was made within a single part of speech such as nouns. Some nouns, for example, are extremely important for the development and meaning of the story; others are not. Breaking the story down into sentences, or into independent and dependent clauses, did not work for the same reason. The grammatical analysis was not a good psychological analysis.

A lead as to the importance of the method used in dividing verbal material into meaning units is afforded by Lewitt (26). He
experimentally determined that different experimenters will use varying kinds of unit groupings when they are preparing connected verbal material for quantitative scoring. A conclusion was reached that differences in the mean number of words per idea group, or in the variability of the number of words per idea group, could affect experimental findings by obscuring the measurement. The relative positions or ranking of subjects in a group, however, were not affected by either type of difference.

In the absence of empirical rules for dividing connected verbal materials into idea units for qualitative analysis, the story was broken down into the idea units used in Paul's study (31, pp. 11-12). Paul's idea units were constructed by following the general rule that each unit should furnish a separate piece of information which is not superfluous or repetitive in its context. The changes in the idea units from the 15-minute reproductions to the 63-day reproductions were then separately tabulated for all 26 subjects of Group 1. The fairly obvious changes which exhibited some communality among the different subjects were built into the rating scale.

Construction of General Rating Instructions

General rating instructions were written for the use of the raters. In these instructions, the raters were told the procedure to be used in making their ratings.

General scoring standards for each of the three rating scales were also written for the use of the raters. The general scoring standards gave descriptions of the changes that were to be rated.
Rating scales I, II, and III correspond respectively to leveling, sharpening, and rationalization. Copies of the three general scoring standards and the general rating instructions are included in Appendix D.

Construction of Preliminary Rating Scales

First rating form. Three separate rating scales of 30 items each were built to measure the three change dimensions. The location of the item in the story to be scored is listed according to the line number in the original copy of "War of the Ghosts." A score of 1 was to be given if the story showed the change called for in the rating scale item. A score of 0 was used for reproductions like the original, or for changes that are not like those called for in the item. Copies of these three rating scales are included in Appendix E.

It was found that these three preliminary scales, consisting of 90 items, could not be used in rating a reproduction in less than 40 minutes. A shorter scale was therefore devised.

Second rating form. The three separate rating scales were combined into a single form consisting of 49 items. Old items from the three separate scales that did not seem to be discriminating were eliminated from this form. Time was also saved by placing the items to be scored in their chronological sequence in the original story. The scoring scheme was also changed so that a 1 score represented leveling, 2 for sharpening, 3 for rationalization, and 0 for reproductions and for other types of change. A copy of this rating form, labeled simply as "Rating Scale," is also included in Appendix F.
Final Rating Scale

The final rating form is known as the "Revised Rating Scale" and was the scale which was used in this study. All reportings of measures of leveling, sharpening or rationalization in the results to follow were derived from this scale. A copy of the scale is included in Appendix G.

This scale was derived from the earlier form, known as the "Rating Scale," in the following manner. The "Rating Scale" was given to a group of 70 students enrolled in an advanced undergraduate psychology course. This group was told the entire plan of the experiment and asked to look for errors of commission and omission in the scale. They were specifically instructed to look for examples which did not fit the general scoring standards for any of the particular scales, and to look for items that might be keyed wrong. The items were then revised on the basis of this knowledge. The purpose of the procedures just described was to achieve some degree of consensual validity.

A special answer sheet was devised for easier scoring by the raters. A copy of this form is included in Appendix F. Items in which it is possible to sharpen are followed by the symbol * . The highest possible sharpening score is 25. Items in which there is a blank space to the right of the line indicate the items in which it is possible to rationalize. The highest possible rationalizing score is 25. The five items which are followed by the symbol # indicate those items in which it is not possible for leveling to occur. Item numbers which are followed by the symbol \( \) are items which duplicate other leveling items in the scale. These seven items were not included in the final leveling scale; they were included in the sharpening and rationalization scales. The total number of possible points on the leveling scale was 38.
CHAPTER III

RESULTS

Rating Reliabilities of Scales

In an attempt to assess the reliabilities of the scales, a trained independent rater made ratings of 142 reproductions from Group 1. Twenty-one reproductions were rated from both the 15-minute reproduction interval and the 63-day reproduction interval. These ratings were then correlated with the experimenter's ratings of the same reproductions. The product moment correlation coefficients are shown in Table 1.

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATER RELIABILITY COEFFICIENTS ON QUALITATIVE SCALES</td>
</tr>
<tr>
<td>(N = 21 pairs of reproductions)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rating Scale</th>
<th>15 Min. Repro. Papers</th>
<th>63 Day Repro. Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leveling</td>
<td>.869</td>
<td>.941</td>
</tr>
<tr>
<td>Sharpening</td>
<td>.926</td>
<td>.903</td>
</tr>
<tr>
<td>Rationalization</td>
<td>.635</td>
<td>.767</td>
</tr>
</tbody>
</table>

The results reported in Table 1 demonstrate that two different raters show substantial agreement on the ratings of various reproductions. There is marked agreement on ratings of leveling and sharpening; there is moderately high agreement on ratings of rationalization. In
summary, raters can be trained to agree with each other in their ratings of three modes of qualitative change in forgetting.

Qualitative Change Tendencies over a Sixty-Three-Day Interval

The quantitative degree of qualitative change that took place was a function of the method used to measure the qualitative change, the amount of time after the original learning, and the kind of qualitative change that was being measured. The quantitative changes that took place in leveling, sharpening, and rationalization will be described separately in the following sections.

Leveling

The degree of leveling that took place over the 63-day interval is shown in Table 2.

As might be expected, the longer the time interval is between the original learning and the time of reproduction, the greater is the amount of leveling. The $t$-ratios of the mean leveling increases of Groups 1 and 3 were 10.52 and 10.38. Both ratios were statistically significant beyond the .001 risk level of confidence. Group 2, a group which reproduced the story four times, did not show a statistically significant mean increase from the first to the last reproduction.

Another fact which offers no contradiction to previous experimental evidence is that leveling is proportionately greater if there is no recall period shortly after learning. The more recall periods there are after learning, the less leveling there is. The extra recalls apparently partially function as relearning sessions.
### TABLE 2

LEVELING AT DIFFERENT TIME INTERVALS AS A FUNCTION OF THE METHOD OF MEASUREMENT

<table>
<thead>
<tr>
<th></th>
<th>15-min. repro.</th>
<th>7-day repro.</th>
<th>21-day repro.</th>
<th>42-day repro.</th>
<th>63-day repro.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N = 27)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \bar{M} )</td>
<td>9.704</td>
<td>18.889</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma )</td>
<td>3.660</td>
<td>6.360</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma_M )</td>
<td>.718</td>
<td>1.247</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N = 12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \bar{M} )</td>
<td>11.916</td>
<td>12.916</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma )</td>
<td>6.238</td>
<td>6.512</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma_M )</td>
<td>1.881</td>
<td>1.964</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N = 93)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \bar{M} )</td>
<td>8.022</td>
<td>12.860</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma )</td>
<td>3.779</td>
<td>4.987</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \sigma_M )</td>
<td>.394</td>
<td>.520</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Groups Measured by Method of Single Reproduction**

|                     |                |              |               |               |               |
| **Group 4**         |                |              |               |               |               |
| (N = 29)            |                |              |               |               |               |
| \( \bar{M} \)       | 17.142         | 20.941       |               |               |               |
| \( \sigma \)        | 4.646          | 6.193        |               |               |               |
| \( \sigma_M \)      | .856           | 1.078        |               |               |               |
| **Group 5**         |                |              |               |               |               |
| (N = 36)            |                |              |               |               |               |
| \( \bar{M} \)       |                |              |               |               |               |
| \( \sigma \)        |                |              |               |               |               |
| \( \sigma_M \)      |                |              |               |               |               |
| **Group 6**         |                |              |               |               |               |
| (N = 27)            |                |              |               |               |               |
| \( \bar{M} \)       | 26.666         | 26.666       |               |               |               |
| \( \sigma \)        | 8.088          | 8.088        |               |               |               |
| \( \sigma_M \)      | 1.586          | 1.586        |               |               |               |

*Reproductions were made but not rated.*
Sharpening

The degree of sharpening that took place over the 63-day interval is shown in Table 3.

The amount of sharpening varied as a function of the method used in measurement. Sharpening, as measured by the method of single reproduction, showed an increase within the first 7-day interval after learning, and then showed a steady decline over the remainder of the 63-day interval. A t-test of the mean decline in sharpening for the 7-day recall and the 63-day recall showed a t-ratio of 3.25. For 26 degrees of freedom, the difference was statistically significant at the .01 risk level of confidence.

Sharpening, as measured by the method of repeated reproduction, increased from the 15-minute reproduction interval to the later reproduction interval. The t-ratios for Groups 1, 2, and 3 were, respectively, 3.28, 5.00, and 4.16. All increases were statistically significant at the .01 risk level of confidence. Notice that these increases in sharpening took place in spite of the fact that there were more omissions and leveling on the scale items.

Rationalization

The degree of rationalization that took place over the 63-day interval is shown in Table 4.

Rationalization, as measured by the method of single reproduction, showed a decline following the 21-day reproduction interval. The t-ratio for the decrease between the 21-day recall group and the 63-day
TABLE 3

SHARPENING AT DIFFERENT TIME INTERVALS AS A FUNCTION OF THE METHOD OF MEASUREMENT

<table>
<thead>
<tr>
<th></th>
<th>15-min. repro.</th>
<th>7-day repro.</th>
<th>21-day repro.</th>
<th>42-day repro.</th>
<th>63-day repro.</th>
</tr>
</thead>
</table>

Groups Measured by Method of Repeated Reproduction

<table>
<thead>
<tr>
<th>Group 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(N = 27)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>4.370</td>
<td></td>
<td></td>
<td></td>
<td>6.222</td>
</tr>
<tr>
<td>σ</td>
<td>1.984</td>
<td></td>
<td></td>
<td></td>
<td>3.337</td>
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<td>σ&lt;sub&gt;M&lt;/sub&gt;</td>
<td>.389</td>
<td></td>
<td></td>
<td></td>
<td>.654</td>
</tr>
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</table>

<table>
<thead>
<tr>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(N = 12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>4.083</td>
<td></td>
<td></td>
<td></td>
<td>7.417</td>
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<tr>
<td>σ</td>
<td>2.813</td>
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<td></td>
<td></td>
<td>2.985</td>
</tr>
<tr>
<td>σ&lt;sub&gt;M&lt;/sub&gt;</td>
<td>.868</td>
<td></td>
<td></td>
<td></td>
<td>.900</td>
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<table>
<thead>
<tr>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(N = 93)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>4.258</td>
<td></td>
<td></td>
<td></td>
<td>6.742</td>
</tr>
<tr>
<td>σ</td>
<td>2.064</td>
<td></td>
<td></td>
<td></td>
<td>2.866</td>
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<tr>
<td>σ&lt;sub&gt;M&lt;/sub&gt;</td>
<td>.790</td>
<td></td>
<td></td>
<td></td>
<td>.297</td>
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Groups Measured by Method of Single Reproduction

<table>
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<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>(N = 29)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td></td>
<td></td>
<td>5.964</td>
<td></td>
<td>.400</td>
</tr>
<tr>
<td>σ</td>
<td></td>
<td></td>
<td>2.079</td>
<td></td>
<td></td>
</tr>
<tr>
<td>σ&lt;sub&gt;M&lt;/sub&gt;</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Group 5</th>
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</thead>
<tbody>
<tr>
<td>(N = 36)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td></td>
<td></td>
<td>5.559</td>
<td></td>
<td>.487</td>
</tr>
<tr>
<td>σ</td>
<td></td>
<td></td>
<td>2.799</td>
<td></td>
<td></td>
</tr>
<tr>
<td>σ&lt;sub&gt;M&lt;/sub&gt;</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 6</th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(N = 27)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td></td>
<td></td>
<td>3.777</td>
<td></td>
<td></td>
</tr>
<tr>
<td>σ</td>
<td></td>
<td></td>
<td>2.753</td>
<td></td>
<td></td>
</tr>
<tr>
<td>σ&lt;sub&gt;M&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Reproductions were made but not rated.*
### TABLE 4

**RATIONALIZATION AT DIFFERENT TIME INTERVALS AS A FUNCTION OF THE METHOD OF MEASUREMENT**

<table>
<thead>
<tr>
<th></th>
<th>15 min.</th>
<th>7-day</th>
<th>21-day</th>
<th>42-day</th>
<th>63-day</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Groups Measured by Method of Repeated Reproduction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N = 27)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M</strong></td>
<td>4.815</td>
<td></td>
<td></td>
<td></td>
<td>5.741</td>
</tr>
<tr>
<td><strong>σ</strong></td>
<td>2.150</td>
<td></td>
<td></td>
<td></td>
<td>2.689</td>
</tr>
<tr>
<td><strong>σ_M</strong></td>
<td>.481</td>
<td></td>
<td></td>
<td></td>
<td>.527</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td></td>
<td>3.250</td>
<td>2.241</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>(N = 12)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M</strong></td>
<td>3.250</td>
<td>2.241</td>
<td>a</td>
<td>a</td>
<td>5.750</td>
</tr>
<tr>
<td><strong>σ</strong></td>
<td>2.241</td>
<td>a</td>
<td>a</td>
<td>2.586</td>
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</tr>
<tr>
<td><strong>σ_M</strong></td>
<td>.646</td>
<td>a</td>
<td>a</td>
<td>.780</td>
<td></td>
</tr>
<tr>
<td><strong>Group 3</strong></td>
<td></td>
<td>5.269</td>
<td>1.879</td>
<td>6.366</td>
<td></td>
</tr>
<tr>
<td>(N = 93)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M</strong></td>
<td>5.269</td>
<td>1.879</td>
<td>6.366</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>σ</strong></td>
<td>1.879</td>
<td>2.483</td>
<td>.259</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Groups Measured by Method of Single Reproduction** |         |       |        |        |        |
| **Group 4**   |         |       |        |        |        |
| (N = 29)      |         |       |        |        |        |
| **M**         | 4.821   |       |        |        |        |
| **σ**         | 1.465   |       |        |        |        |
| **σ_M**       | .282    |       |        |        |        |
| **Group 5**   |         |       |        |        |        |
| (N = 36)      |         |       |        |        |        |
| **M**         | 4.912   |       |        |        |        |
| **σ**         | 2.822   |       |        |        |        |
| **σ_M**       | .491    |       |        |        |        |
| **Group 6**   |         |       |        |        |        |
| (N = 27)      |         |       |        |        |        |
| **M**         | 2.593   |       |        |        |        |
| **σ**         | 2.265   |       |        |        |        |
| **σ_M**       | .494    |       |        |        |        |

*aReproductions were made but not rated.*
recall group was 3.80 and was statistically significant at the .01 risk level of confidence.

Rationalization, as measured by the method of repeated reproduction, showed an increase from the 15-minute reproduction interval to the 42-day and 63-day reproduction intervals. The t-ratios for Groups 2 and 3 were 4.37 and 4.12, respectively, and were statistically significant at the .01 risk level of confidence. The increase of Group 1 was not statistically significant. For some unexplained reason, the correlation coefficient between Group 1's two measurements of rationalization was -.02. As a result, the standard error of the mean difference was quite high and helped account for the lack of statistical significance.

A t-test was made of the difference in rationalization between the 63-day reproduction of Group 1 and the 63-day reproduction of Group 6. Group 6, as will be recalled, had no previous reproductions. The t-ratio was 4.58 and was statistically significant at the .01 risk level of confidence. Thus, after 63 days, there were statistically significant differences in rationalization between the groups tested by the two different methods. In summary, rationalization decreased when measured by the method of single reproduction, and increased when measured by the method of repeated reproduction.
Test-Retest Reliabilities of Qualitative Modes of Reproduction

A question of considerable importance in this study is whether subjects are consistent in the degree to which they utilize change tendencies. Consistency would indicate that subjects could be identified with respect to the use of a particular retention mode. Data on this question are shown in Table 5.

**TABLE 5**

**TEST-RETEST RELIABILITY COEFFICIENTS OF THREE RETENTION SCALES FOR THREE GROUPS**

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (N = 27)</th>
<th>Group 2 (N = 12)</th>
<th>Group 3 (N = 93)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leveling</td>
<td>.73</td>
<td>.93</td>
<td>.51</td>
</tr>
<tr>
<td>Sharpening</td>
<td>.64</td>
<td>.71</td>
<td>.76</td>
</tr>
<tr>
<td>Rationalization</td>
<td>-.02</td>
<td>.70</td>
<td>.34</td>
</tr>
</tbody>
</table>

The data indicate, in general, that there was some stability in the degree to which subjects utilize different change tendencies. There is apparently more consistency in the use of leveling and sharpening than in the use of rationalization. With the exception of the -.02 test-retest correlation of rationalizations for Group 1, all of the nine correlation coefficients are statistically significant at the .01 risk level of confidence.

No additional information was available to tell whether the correlation fluctuations from one group to another were due to sampling fluctuations, or whether they were a reflection of differences in
methodology. The groups differed from each other both in the time of retest measurement and in the number of reproductions that were made.

The reliability coefficients are relatively high. When these coefficients are compared with the inter-rater reliability coefficients, it will be seen that these coefficients are not much lower than the rater reliability coefficients.

Intercorrelations of Qualitative Change Scales

The question arises as to whether the scales are measuring different aspects of qualitative retention change, or whether the scales are intercorrelated. From the manner in which the scales were constructed, the measures of leveling would be expected to be inversely related to sharpening and rationalization. The subject who did excessive leveling, for example, would not have an opportunity to sharpen or rationalize. The correlations of the leveling scale with the sharpening scale and the rationalization scale therefore would not be very meaningful and were not computed.

In correlating the sharpening scale with the rationalization scale, it would be possible that excessive leveling on the items in either of the scales would produce misleading correlation coefficients. It is therefore of importance that the individual subjects level to the same extent on each scale.

Using the subjects of Group 3 as a test group, it was found that the correlation of the leveling on the sharpening scale to the leveling on the rationalization scale was .72 at the 15-minute reproduction interval. For the 42-day reproductions, the correlation was .77. The
correlation of levelings at the 63-day reproductions for Group 6 was .85. These relatively high correlations indicate that differential amounts of leveling on the two scales is not a serious problem.

The intercorrelations of the sharpening and rationalization scales are shown in Table 6.

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>15 minutes</th>
<th>7 days</th>
<th>21 days</th>
<th>42 days</th>
<th>63 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>( r )</td>
<td>.16</td>
<td>.29</td>
<td>.60</td>
<td>.46</td>
<td>.57</td>
</tr>
<tr>
<td>( N )</td>
<td>93</td>
<td>28</td>
<td>34</td>
<td>93</td>
<td>27</td>
</tr>
</tbody>
</table>

Overlooking the correlation fluctuation which appears to be due to sampling fluctuation, there is an increasing correlation between the two scales over the period of time. The correlation of the scales at the 15-minute reproduction interval \( (r = .16) \) is not statistically significant from zero at the .05 risk level of confidence. The same group, tested at 42 days, demonstrated a statistically significant correlation \( (r = .46) \) between the two variables at the .01 risk level of confidence. Furthermore, a \( t \)-test computed between the significance of the difference of the two correlation coefficients showed a \( t \)-ratio of 2.73. The standard error of the correlation difference formula was reduced by the substitution of the correlation of the sharpening-rationalization scale at 15 minutes with the sharpening-rationalization
scale at 63 days, \( r = .28 \). This t-ratio was statistically significant at the .01 risk level of confidence.

There was then a difference in the degree to which the two scales were correlated, depending upon the time at which the measurement was taken. The longer the time interval after the original presentation, the more closely the scales were related.

**Intercorrelations of Qualitative Change Measures and Personality Test Scores**

Three different personality scales were administered to randomly selected groups in the study. The rationale used in selecting the particular personality scales used in this study is discussed in the following chapter. Group 5, which reproduced only at the 21-day reproduction interval, took the Revised Edition (1951) of the Allport-Vernon Study of Values. Correlations of the qualitative retention modes with the "Theoretical," Aesthetic," and "Religious" subtests are shown in Table 7.

The only statistically significant correlation from the Allport-Vernon Scale was between the rationalization scale and the religious scale. The negative correlation was statistically significant at the .01 risk level of confidence.

Group 3, which reproduced at 15 minutes and 42 days, took the Berkowitz Complexity-Simplicity Scale and the Edwards Personal Preference Schedule. The Edwards subscale scores were related to the three qualitative retention modes at the 42-day reproduction time period. The relationships between these personality subtests and the 42-day
reproductions are shown in Table 8. A high score on the Complexity-Simplicity Scale indicates a preference for complexity; a low score indicates a preference for simplicity.

TABLE 7

<table>
<thead>
<tr>
<th>Theoretical</th>
<th>Aesthetic</th>
<th>Religious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leveling</td>
<td>-.105</td>
<td>.088</td>
</tr>
<tr>
<td>Sharpening</td>
<td>-.051</td>
<td>.064</td>
</tr>
<tr>
<td>Rationalization</td>
<td>.189</td>
<td>.301</td>
</tr>
</tbody>
</table>

\(^a\)Statistically significant at .01 risk level of confidence.

Three correlations were statistically significant. The Complexity-Simplicity Scale was positively associated with 142-day rationalization at the .01 risk level of confidence. Those subjects who preferred complexity showed a tendency to rationalize. The achievement variable was associated with 142-day sharpening and 142-day leveling at the .01 and .05 risk level of confidence, respectively. Achievement and sharpening were positively correlated, while the correlation between achievement and leveling was negative. The negative relation between intraception and 142-day leveling was very close to statistical significance. None of the other relationships achieved statistical significance.

The Edwards subscale scores were correlated with derived retention scores. The derived retention scores were representative of
TABLE 8
CORRELATIONS OF COMPLEXITY—SIMPLICITY SCALE AND SELECTED EDWARDS
PERSONAL PREFERENCE INVENTORY SUBTESTS WITH QUALITATIVE
SCALES AT 142 DAYS
(N = 93)

<table>
<thead>
<tr>
<th></th>
<th>142-day Leveling</th>
<th>142-day Sharpening</th>
<th>142-day Rationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-S Scale</td>
<td>-.06</td>
<td>-.02</td>
<td>.66a</td>
</tr>
<tr>
<td>Achievement</td>
<td>-.21b</td>
<td>.56a</td>
<td>.18</td>
</tr>
<tr>
<td>Deference</td>
<td>.09</td>
<td>-.06</td>
<td>.05</td>
</tr>
<tr>
<td>Order</td>
<td>.04</td>
<td>-.04</td>
<td>.01</td>
</tr>
<tr>
<td>Exhibition</td>
<td>.10</td>
<td>.01</td>
<td>.05</td>
</tr>
<tr>
<td>Autonomy</td>
<td>-.10</td>
<td>-.01</td>
<td>-.03</td>
</tr>
<tr>
<td>Intraception</td>
<td>-.20</td>
<td>.00</td>
<td>.07</td>
</tr>
<tr>
<td>Change</td>
<td>.02</td>
<td>.00</td>
<td>-.01</td>
</tr>
<tr>
<td>Endurance</td>
<td>-.15</td>
<td>-.15</td>
<td>.15</td>
</tr>
</tbody>
</table>

aStatistically significant at .01 risk level of confidence.
bStatistically significant at .05 risk level of confidence.

the relative degree to which the subjects made increasing use of a particular retention mode. These derived retention scores indicated the relative amount of leveling, sharpening, or rationalization
increase that took place for a given individual over the 42-day retention interval.

The derived retention scores were computed in the following manner. For purposes of illustration, only the derivation of the leveling change scores will be described. The computation of the sharpening change scores and the rationalization change scores was done in a similar manner. First, the difference in raw scores was computed between the subject's initial amount of leveling and his final amount of leveling. If the subject had less leveling on the second reproduction, the appropriate negative sign was maintained. The second step was to add a constant to each difference raw score. In the case of leveling, the constant was 7. The constant added to the individuals' sharpening and to the rationalization differences was 5.

The derived retention scores therefore do not represent the respective qualitative retention increases, nor the respective qualitative retention changes, but represent a relative ranking of the degree to which the subjects increased in utilizing a particular retention mode. A high score represents an increase, a low score represents a decrease, and a medium low score represents no change.

A second type of derived score was computed. This score, labeled as "All Change," is an index of the total amount of qualitative change that occurred in all three retention modes. The score is an index of the subjects' tendencies to change their reproductions from one reproduction to another. The score was computed by summati
the amount of positive or negative change that took place in leveling, sharpening, and rationalization. Algebraic signs were disregarded in the summation. A high score on "All Change" indicates a high amount of change; a low score indicates little change. The data for the two types of derived scores are presented in Table 9.

TABLE 9

CORRELATIONS OF THE COMPLEXITY-SIMPLICITY SCALE AND SELECTED EDWARDS PERSONAL PREFERENCE INVENTORY SUBTESTS WITH TWO TYPES OF DERIVED QUALITATIVE MODE CHANGE SCORES

(N = 93)

<table>
<thead>
<tr>
<th>Relative Leveling Increase</th>
<th>Relative Sharpening Increase</th>
<th>Relative Rationalization Increase</th>
<th>All Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-S Scale</td>
<td>-.09</td>
<td>-.02</td>
<td>-.06</td>
</tr>
<tr>
<td>Achievement</td>
<td>-.04</td>
<td>.19</td>
<td>.04</td>
</tr>
<tr>
<td>Deference</td>
<td>.02</td>
<td>.45*</td>
<td>.03</td>
</tr>
<tr>
<td>Order</td>
<td>-.03</td>
<td>-.10</td>
<td>-.03</td>
</tr>
<tr>
<td>Exhibition</td>
<td>.09</td>
<td>.02</td>
<td>-.03</td>
</tr>
<tr>
<td>Autonomy</td>
<td>-.08</td>
<td>.01</td>
<td>-.14</td>
</tr>
<tr>
<td>Intraception</td>
<td>.07</td>
<td>.01</td>
<td>.00</td>
</tr>
<tr>
<td>Change</td>
<td>.11</td>
<td>-.19</td>
<td>.03</td>
</tr>
<tr>
<td>Endurance</td>
<td>-.10</td>
<td>.10</td>
<td>.03</td>
</tr>
</tbody>
</table>

*Statistically significant at .01 risk level of confidence.
Only one correlation coefficient in Table 9 was statistically significant. A positive correlation between the amount of relative sharpening increase and deference was statistically significant at the .01 risk level of confidence.
CHAPTER IV

INTERPRETATION AND DISCUSSION OF RESULTS

Ratings

Trained raters can agree with each other in their ratings of the amount of leveling, sharpening, and rationalization that takes place in complex verbal materials. Substantial agreement was reached on ratings of rationalization. The reliability coefficients compare very favorably to those reported by Berkowitz. His rater reliability-ratings of leveling for three figural designs were .79, .86, and .87.

Making the ratings, however, was not a simple routine job. An average time of twenty minutes was needed to rate each reproduction. Because of the uniqueness of each reproduction, the rating scale judgments had to be made very carefully. The high inter-rater reliabilities demonstrated in this study could not be reached until after approximately fifteen hours of rater training time.

That less agreement was reached on the ratings of rationalization than the other two scales could perhaps be attributed to the incompleteness of the rater training period. More than in the case of the other two scales, the rating of rationalizations calls for an understanding of the determining criteria for the rating and an understanding of the assumptions involved in constructing a rationalization scale item. As an example of the need for understanding, consider the rationalization item in number 6 on the "Revised Rating Scale." The story says that
the two young men went down to the "river to hunt seals." The scale instructs the rater to judge the reproduction as a rationalization if "a more plausible activity than seal-hunting is substituted; e.g., hunting, camping, or walking." The rating was also to be made if the subject changed "river" to "ocean," "shore," or "sea." Before an adequate judgment could be made, the rater would need to see the rationales behind the item. He would need to understand that seal hunting is not a common experience in the lives of college students. He would need to understand that hunting, camping, and walking were familiar experiences to the majority of college students. Again, he would need to understand that seal hunting is more likely to take place in the ocean, shore, or sea rather than in a river. Ratings, of course, could be made without an understanding of the rationales, but the rater would probably make more errors.

Qualitative Scale Construction

The rating scales constructed were adequate for the purposes of this study. Rater reliability was attained and subject consistency in the use of the qualitative changes was demonstrated. Other important relationships were documented.

For practical purposes, however, the rating scales are not adequate. Too much time is needed to train raters and to make ratings. The need for a quick, reliable, objective measurement of the qualitative changes is evident.

The attempt in this study to construct an objective scale of the multiple-choice type ended in failure. It is felt that the failure
resulted from the experimenter's lack of knowledge of the reproduction changes that the subjects would make. In comparing the reproductions of the subjects, it was observed that the amount of similarity in their reproductions was quite high for some portions of the story. The communality of the reproductions suggests that an objective qualitative scale could be constructed which would account for a major proportion of the total qualitative changes.

**Qualitative Change Trends**

The results of this study agree with Hanawalt's contention (16) that some qualitative changes in forgetting are relatively greater when measured by the method of repeated reproduction than when measured by the method of single reproduction. Subjects who reproduced the "War of the Ghosts" two or more times showed more sharpening and rationalization than subjects who reproduced the story once.

To go one step further, however, as Hanawalt and Woodworth (18, p. 15) have, and to conclude that the method of repeated reproduction is essentially a "false" method for measuring progressive qualitative memory change, is going beyond the data. That there are more qualitative changes when there are repeated reproductions does not necessarily mean that the changes are an artifact of the method. The method may very well be measuring the actual state of the remembering at that particular time.

It would be equally plausible to theorize that recall periods during reproduction are periods of reorganization. In these periods, and perhaps afterwards, one could speculate that processes of
consolidation and expansion are occurring. One of the products, or by-products, of this reorganization period could be the qualitative changes. Another step further in the conjectural chain would be that effective retention of complex verbal materials is dependent upon qualitative changes.

One fact which is central to this reorganization viewpoint is that retention is better when there is relatively more sharpening and rationalization. To substantiate this idea, an index of retention is needed. This need is fulfilled by the leveling scale. The great majority of leveling items in this study were constructed and rated on the basis of whether there were omissions of information units. The number of omissions of information units is a measurement unit which, traditionally, has been used in studies of retention. The leveling data indicate that subjects who have more than one reproduction interval retain more of the story than those who reproduce the story only once. Not only does the multiple reproduction group retain more, but they also sharpen more and rationalize more.

The data which has been presented so far could be interpreted equally well by the proponents of the idea that qualitative change is an artifact of the method. A fact, though, which could not be handled equally well by this group is why qualitative changes exist, and exist at all time periods, for the groups which reproduce the story only once.

One explanation which has been given is that the memory changes are due to forgetting of the original experience. The subject's response habits at the time of reproduction then become a major
determiner of the reproduction. Woodworth, a representative of this viewpoint, states—

If his memory of a figure is vague, he scarcely knows how to represent that vagueness and feels obliged to draw a definite figure which he knows must differ from the original. He would feel it rather absurd to put in irregularities of which he cannot be sure. So his attempted reproduction will tend toward regularity. If it is more regular than the original, we cannot tell whether the trace has become more regular or merely less definite (37, p. 775).

It should be made clear that reproductions will not necessarily tend toward regularity. The sharpening of an irregularity is an example of this. Gibson (15), for one, found many reproductions which did not tend toward regularity in spite of the fact that the conditions in his experiment were favorable for the dominance of response habits. A second criticism of this regularity-viewpoint is that it would not explain the decrease of sharpening and rationalization when several groups are measured by the method of single reproduction at different time intervals. The reproduction response-habit viewpoint would predict that the amount of qualitative change would increase because of the increasing fuzziness of the memory. This response-habit viewpoint could, from the same data, empirically predict that the amount of qualitative change would decrease due to forgetting of the particular characteristics of the experience. As Hanawalt describes it, "The undisturbed trace shows increasing vagueness and variability of reproduction, but very little that can be classed as progressive sharpening or leveling or gravitation toward a 'good figure.' Some of the reproductions show so much change after a period of time that there is no longer any question of sharpening or leveling—the trace has
practically disappeared" (18, pp. 77-78). The prediction that qualitative changes would decrease with time could also be made by the response-habit viewpoint because of their thesis that qualitative changes are largely a reflection of the reproduction process and not a reflection of the state of memory.

The preceding section has shown that the reproduction response-habit viewpoint is presently incapable of explanations of qualitative change without the addition of ad hoc explanations. The same criticism has been made by Hanawalt (18) of gestalt theory. A major gestalt tenet of memory is the law of Praegnanz—every memory tends to become as "good" as possible. The vagueness of the definition of "good" makes it difficult to directly test this principle.

The data from this experiment controvert neither theory. The multiple interpretations that can be made by both theories make it impossible to design a crucial experiment. An indirect test of the two theories perhaps could be made, however, by determining the function, if any, served by the qualitative changes. Evidence concerning the functional nature of the changes may be sufficient to rule out one or both of the theories.

Subject Consistency in Use of Qualitative Modes of Reproduction

There are individual differences in the degree to which qualitative changes are used in reproductions. There is also consistency in the extent to which subjects use particular types of qualitative changes in their subsequent reproductions. Some of the consistency from
one reproduction to another is probably due to consistency in retaining changes made during the original learning rather than to an occurrence of new qualitative changes of the same type.

Studies using materials of different lengths and difficulty levels have demonstrated that there is subject consistency in the extent to which leveling occurs on various materials (5; 17). Still to be answered is the question of whether this consistency will hold for the sharpening and rationalization of different types of verbal materials.

The consistency of the qualitative changes would suggest, at first glance, that subjects be identified with respect to their particular retention mode. With this identification, one could train the subjects to eliminate their own qualitative distortions from the original learning material. The subjects' accuracy could then be improved. This line of reasoning, however, does not seem to be the best conclusion to draw from the present data unless a high degree of reproduction accuracy is desired.

Extreme accuracy is perhaps purchased at the price of poor retention. The close relation between retention and the qualitative changes suggests that there might be a causal relationship between the two variables. It would be instructive to compare the retention of two groups of subjects who have the same number of reproduction intervals, but who differ in the amount of qualitative change.
Intercorrelations of Qualitative Change Scales

The degree to which the sharpening scale and rationalization scale was correlated depended upon the time at which the measurement was taken. The longer the time interval, the more closely the scales were related.

The increase in the correlation between the two scales may be partially due to the increase in the variability of the sharpening and rationalization scales. The degree of a correlation coefficient is related to the amount of variability that exists in the correlated variables. Other things being equal, the greater the variability, the higher the correlation will be. In the present study, the lesser amount of variability on the sharpening and rationalization scales at the early reproduction interval could depress the correlation coefficient. The depression of the correlation could come from either or both variables.

Since the formulas for "correcting" for double curtailment are none too satisfactory, an alternative partial solution is to estimate the amount of restriction that comes from each of the two variables by itself. An unrestricted estimate of the actual correlation for Group 3 between sharpening and rationalization at the 15-minute reproduction interval, with the suppression of the lesser variability of sharpening being accounted for in the formula, would raise the coefficient from the existent .16 to .23. The same kind of correction for rationalization would raise the coefficient from .16 to .22. Although there is uncertainty as to how these two corrections should be combined into a single correction, the slightness of the corrections makes it quite
likely that the major portion of the correlation increase is not due to the restricted variabilities.

Why there was an increasing correlation between the two scales is not clear. It may be that the specific content of the original story is not as important a determiner of later reproductions as it is of the earlier reproductions. When the original content of the story becomes obscure, either of the changes represented by the two scales could serve the same function in the story. The correlation between sharpening and rationalization would then be low soon after the presentation of the story and higher sometime afterwards.

Whatever is the function of the respective qualitative changes, it is a reasonable guess that the function of each change can be served by the other change. Sharpening, for example, can come about by means of rationalization. Conversely, rationalization can occur by means of sharpening.

**Intercorrelation of Qualitative Change Measures and Personality Test Scores**

Five out of 63 correlations between qualitative change measures and personality test scores were statistically significant beyond the .05 risk level, four of them being significant at the .01 risk level. The number of correlations that were statistically significant indicates some relationships between personality and qualitative change. Some of the relationships, however, are rather obscure in meaning. Other relationships, which might be expected a priori, were not statistically significant.
Allport-Vernon Study of Values

The theoretical man (i.e., one who scores high on the theoretical subtest) might be expected to make his story more rational than the original. He perhaps would not be expected to level. The data of this study agree with these expectations although the relationships do not reach statistical significance.

"The aesthetic man sees his highest value in form and harmony. Each single experience is judged from the standpoint of grace, symmetry, or fitness" (2, p. 13). From this description, any or all of the three qualitative change scales might be expected to be associated with aestheticism. The correlation between rationalization and aesthetic value in this study came very close to statistical significance at the .05 risk level. None of the other relationships, however, approached statistical significance.

"The highest value of the religious man may be called unity. He is mystical, and seeks to comprehend the cosmos as a whole, to relate himself to its embracing totality" (2, p. 14). The negative correlation between religious value and rationalization was statistically significant at the .01 risk level. The meaning of this correlation is not clear. One could very well theorize that rationalization would be one means of achieving unity, and the relationship between the two scales would be positive, that is, the opposite of what was found. Perhaps stated in a somewhat facetious manner, the mystical unity achieved by the religious man may be on a different level than the unity achieved by individuals on the mundane rationalization scale.
Complexity-Simplicity Scale

Berkowitz (5, p. 743) describes the complexity-simplicity dimension as "a bipolar factor which opposes a preference for perceiving and dealing with complexity to a preference for perceiving and dealing with simplicity." In his study, a negative relationship was found between the degree of preference for complexity to the degree of leveling.

No statistically significant relationships were found in this study between leveling or sharpening and the complexity-simplicity dimension. The author of this study can see no logical explanation for the discrepancy between the two studies. Both studies used similar complex verbal memory materials, similar reproduction intervals, similar leveling measurements, and comparable instructions.

The complexity-simplicity scale was positively associated with 42-day rationalization at the .01 risk level of confidence. The person who preferred complexity showed a tendency to rationalize. That a relationship such as this is so difficult to interpret may be a reflection of the lack of knowledge that exists concerning the nature of rationalization. An alternative explanation would be that either or both of the scales that are related to each other are not valid measures.
The manifest need for achievement was positively associated with 42-day sharpening and negatively associated with leveling. The positive correlation between achievement and rationalization came close ($r = .18$) to being statistically significant. The correlations of achievement with these qualitative retention modes would be in agreement with a priori expectations.

The only other correlation from the Edwards schedule that was statistically significant was the positive relation between deference and the relative sharpening increase. Why the need to defer to and to follow others should be associated with this retention score is not clear.

Likewise, the lack of statistically significant correlations between the retention scores and the Edwards schedule is an enigma. The experimenter felt that there would be a good chance that all of the selected Edwards subtest scores would be related to at least one of the retention scores. It was expected, for example, that the need for autonomy would be associated with sharpening, and that the need for change would be related to the total amount of change in the reproductions.

It may be that the expected relationships do not exist. On the other hand, neither the Edwards schedule nor the qualitative scales have had their external validity sufficiently demonstrated.
CHAPTER V

SUMMARY

Problem

Qualitative changes occur in retention. Not only are there usually quantitative losses of memory materials, but there are also qualitative changes in the form or structure of the memory material. Three such qualitative changes are leveling, sharpening, and rationalization.

Leveling is a de-emphasis upon some property of the memory material, while sharpening is an emphasis upon some characteristic of the memory material. Rationalization changes are those which make the memory material more reasonable or plausible; changes that bring the memory materials into a closer "fit" with the type of experiences that the subjects have had.

One major purpose of the present study was to quantify three qualitative changes in retention. An attempt was made to relate these changes to the method used to measure them. A second purpose of the study was to determine whether there were individual differences in the degree to which subjects make qualitative changes in their retention of memory materials. Last of all, an attempt was made to determine whether the tendencies to make qualitative changes were related to personality characteristics.
Procedure

The 224 subjects, all students at College of the Pacific, learned or partially learned a folk-tale called "The War of the Ghosts." After varying intervals of time, written reproductions were made. Some subjects reproduced the story only once. Their reproductions were written after intervals of 15 minutes, 7 days, 21 days, and 63 days. Other subjects reproduced the story more than once. Their first reproduction was made after 15 minutes. Various groups of these subjects made their second reproduction after 7 days, 42 days, and 63 days. Personality and attitude tests administered to some of the subjects included Berkowitz's Complexity-Simplicity Scale, the Allport-Vernon Study of Values, and the Edwards Personal Preference Schedule.

Three qualitative change rating scales were constructed. A major step in the construction of the scales was to make a content analysis of the qualitative changes that took place in the actual reproductions of one group of subjects. The changes which exhibited some communality among the different subjects were then built into the rating scales. Some consensual validity for the scoring standards was achieved by having students in advanced undergraduate psychology classes agree or disagree with the scoring scheme.

Conclusions

Raters can be trained to agree in their ratings of three kinds of qualitative change in the forgetting of complex verbal materials. Marked agreement occurred on ratings of leveling and sharpening; moderately high agreement occurred on ratings of rationalization.
Leveling is greater when single reproductions are made rather than when multiple reproductions take place. The converse of this relation is true for sharpening and rationalization; more sharpening and rationalization take place when multiple reproductions are made than when there is only a single reproduction. The longer the time interval after learning, the more closely were the sharpening and rationalization scales associated with each other. The data were interpreted as being consistent with gestalt theory and also the view that qualitative changes are an artifact of the method.

Individual differences occur in the extent to which particular types of qualitative changes are made in the written reproductions of stories. Subjects show consistency in the degree to which they use particular types of qualitative changes in their subsequent reproductions.

Some of the individual differences in qualitative change were shown to be related to scores on standardized personality tests. Rationalization at the 21-day reproduction interval was negatively correlated with the Allport-Vernon religious value. A preference for complexity, as measured by the Complexity-Simplicity Scale, was positively associated with 42-day rationalization. The need for achievement, as measured by the Edwards Personal Preference Schedule, was positively associated with 42-day sharpening and negatively associated with leveling. The need for deference was positively associated with the amount of relative sharpening increase from the 15-minute to 42-day reproduction interval.
The War of the Ghosts

One night two young men from Egulac went down to the river to hunt seals, and while they were there it became foggy and calm. Then they heard war-cries, and they thought: "Maybe this is a war-party." They escaped to the shore, and hid behind a log. Now canoes came up, and they heard the noise of paddles, and saw one canoe coming up to them. There were five men in the canoe, and they said:

"What do you think? We wish to take you along. We are going up the river to make war on the people."

One of the young men said, "I have no arrows."

"Arrows are in the canoe," they said.

"I will not go along. I might be killed. My relatives do not know where I have gone. But you," he said, turning to the other, "may go with them."

So one of the young men went, but the other returned home.

And the warriors went on up the river to a town on the other side of Kalama. The people came down to the water, and they began to fight, and many were killed. But presently the young man heard one of the warriors say: "Quick, let us go home; that Indian has been hit." Now he thought: "Oh, they are ghosts." He did not feel sick, but they said he had been shot.

So the canoes went back to Egulac, and the young man went ashore to his house, and made a fire. And he told everybody and said: "Behold
I accompanied the ghosts, and we went to fight. Many of our fellows were killed, and many of those who attacked us were killed. They said I was hit, and I did not feel sick."

He told it all, and then he became quiet. When the sun rose he fell down. Something black came out of his mouth. His face became contorted. The people jumped up and cried.

He was dead.
APPENDIX B

1. Things seem simpler as you learn more about them.

2. I could cut my moorings . . . quit my home, my parents, and my friends . . . without suffering great regrets.

3. I enjoy discarding the old and accepting the new.

4. The unfinished and the imperfect often have greater appeal for me than the completed and the polished.

5. Some of my friends think that my ideas are impractical, if not a bit wild.

6. I prefer symmetry to asymmetry.

7. I don't like modern art.

8. Many of my friends would probably be considered unconventional by other people.

9. I think I take primarily an aesthetic view of experience.

10. Politically I am probably something of a radical.

11. In art, I generally prefer traditional themes to themes that are radically experimental.

12. In art, I generally prefer things that are simple or regularly predictable to things that are complex, irregular, and whimsical.

13. Perfect balance is the essence of all good composition.

14. In art, I generally prefer themes involving home, family, or traditional events to themes that are esoteric, primitive or experimental.

15. As far as art goes, I prefer many Saturday Evening Post covers to many of the abstract paintings I have seen.

16. Straightforward reasoning appeals to me more than metaphors and the search for analogies.

17. I would enjoy the experience of living and working in a foreign country.
18. Kindness and generosity are the most important qualities for a wife to have.

19. Barring emergencies, I have a pretty good idea what I'll be doing for the next ten years.

20. I prefer team games to games in which one individual competes against another.
APPENDIX C

1) The battle between the war party and the town took place:
   1) at night  2) during the day  3) was not specified in the story

2) The number of men who were greeted by the warriors was:
   1) one  2) two  3) five  4) six  5) was not specified in the story

3) The two males who became involved with the warriors were:
   1) boys  2) young men  3) old men  4) the age of the males was not specified

4) The men who were greeted by the warriors were from:
   1) Egulac  2) Kalama  3) both of these  4) neither of these

5) The two young men in the story were:
   1) Eskimos  2) Cheyennes  3) Pawnees  4) Apaches  5) not specified

6) The two males went down to the:
   1) shore of the ocean  2) river  3) creek  4) stream

7) Why did the men go down by the river?
   1) to go camping  2) to go fishing  3) to hunt seals  4) to trap
   5) to shoot buffalo  6) none of the above

8) The weather at the time the men met the warriors was:
   1) foggy and calm  2) foggy and chilly  3) foggy and rainy
   4) still and calm  5) cloudy and cool  6) hot and muggy
   7) not specified

9) The two men heard:
   1) war-cries  2) the noise of paddles  3) both of the above
   4) neither of the above

10) The two young men escaped to the shore and hid behind a:
    1) log  2) bush  3) tree  4) clump of grass

11) The men coming up the river were in:
    1) boat  2) canoe  3) rowboat  4) raft

12) How many boats or canoes were in the war party?
    1) one  2) seven  3) the number was not specified

13) The number of warriors in the canoe which greeted the men was:
    1) three  2) four  3) five  4) six

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14) The warriors coming up the stream had on:
1) warpaint  2) war bonnets  3) both of these  4) neither of the above

15) The first thing that the warriors in the canoe said to the men on shore was:
1) "Hello over there!"  2) "We are going up the river to make war on the people."  3) "What do you think?"  4) "We wish to take you along."

16) The war-party:
1) asked the young men to go along  2) forced the young men to go along  3) told the young man not to be cowards

17) Which way did the war-party go on the river when they went to make war?
1) up the river  2) down the river  3) the direction was not specified

18) The people in the war party said they were going to:
1) "make war on a town on the other side of Kalama."  2) "ambush the white settlers."  3) "make war on the people"  4) "make war on the white settlers."

19) One of the following is a reason used by one of the young men for not wanting to accompany the war-party?
1) "I am sick of fighting."  2) "I have no arrows."  3) "I am not feeling well."  4) "I have been sick."

20) Another reason used for not wanting to accompany the war-party was:
1) his family would not know where he had gone  2) his wife and children would not know where he had gone  3) his friends would not know where he had gone  4) his relatives would not know where he had gone

21) When one of the young men said he had no arrows, the members of the war party said,
1) "you will not need arrows."  2) "we have some extras."  3) "That's all right, come along anyway."  4) "arrows are in the canoe."

22) After the one young man had excused himself from going on the warparty he turned to his companion and said,
1) "You may go with them."  2) "You shall go with them."  3) "Will you go with them?"  4) "You should go with them."

23) The war-party made war on:
1) the people of Egulac  2) a town on the other side of Egulac  3) the people of Kalama  4) a town on the other side of Kalama
24) The scene of the fighting was:
   1) in some fields  2) at the river's edge  3) in the woods
   4) in the town itself

25) Which of the following best describes the outcome of the fight?
   1) Many were killed on both sides.  2) More people from the town
   were killed than from the war-party.  3) More people from the
   war-party were killed than from the town.  4) None of the above
   answers is correct.

26) Why did the war-party leave the fight?
   1) They had too many casualties.  2) They were taking a beating.
   3) The Indian had been hit.  4) They were cowards

27) What gave the young man the idea he had been fighting with ghosts?
   1) None of the attacking Indians were injured.  2) Even though he
   was shot, he felt no pain.  3) "Ghosts" was the name of the Indian
   tribe.  4) The Indian tribe disappeared after he had been wounded.
   5) The attacking Indians called him "that Indian."

28) After the fight, the young man returned to:
   1) his village  2) his house  3) his camp  4) his teepee  5) his
   igloo

29) Before telling his story, the young man
   1) wrapped a blanket around himself  2) smoked a pipe  3) made a
   fire  4) went into a trance

30) After the young man had told his story:
   1) he became violently ill.  2) he became quiet, then later became
   violent.  3) he became quiet, and then died without becoming violent.

31) What time did the Indian die?
   1) sunset  2) sunrise  3) high noon  4) midnight

32) When the Indian died, he fell down on the:
   1) floor  2) ground of the teepee  3) braided rug  4) ground
   outside the teepee  5) the place he fell was not specified

33) Which of the following happened when the Indian died?
   1) Blood rushed from his mouth  2) He jumped up, cried out, and died
   3) a puff of black smoke came out of his mouth  4) something black
   came out of his mouth

34) The people watching the death scene
   1) were speechless at the horrifying sight  2) remained calm
   3) jumped up and cried  4) became hysterical

35) The title of the story was:
   1) "The War of the Ghosts"  2) "A Ghostly Tale"  3) "The Ghost War"
   4) "Ghosts"
The young men went down to the river at night.
The title of the story was "The War of the Ghosts."
The young men went down to the river to fish.
The weather at the river was foggy and calm.
The first thing the men thought when they heard war cries was: "Maybe this is a war-party."
The young men then went ashore and hid behind a bush.
More than one canoe was coming up the river.
The number of men in the canoe coming up to them was five.
The first thing the people in the canoe said was "What do you think?"
The men in the canoe forced the one young man to accompany them.
The two males who were down at the river were young boys.
The people in the canoe said they were going up the river to make war on the people.
The people in the canoe answered the young man's statement that he had no arrows by saying that arrows would not be needed.
One young Indian stated "I will not go along."
He stated that his wife and children did not know where he had gone.
One of the young men went with the canoe and the other one returned home.
The warriors made war on a village called Kalama.
When the war party got to its destination, the people came down to the water to fight them.
The story indicated that none of the warriors in the attacking party got killed during the attack.
The reason the Indian felt that the war party was composed of ghosts was because he had been hit but yet did not feel sick.
The reason the canoes went back to Egulac was because they lost so many men.
22) It stated in the story that the Indian had a house.

23) After the Indian told his story he became quiet, then something black came out of his mouth, his face became contorted and he died.

24) The people who were watching him die were speechless at the horrifying sight.

25) The Indian died at Sunset.

Recall Questions

What time of the day was it when the Indians went down to the river?

How many Indians went down to the river?

Where did the Indians live?

Why did the Indians go down to the river?

What was the weather at that time?

Name two things they heard while down at the river?

1) 

2)

What did they think when they heard these sounds?

What action did they take after hearing these sounds?

How many men were in the canoe which came over to them?

What did the men in the canoe say?

Name two reasons given by one of the Indians for not wanting to go on the war party.

1) 

2)

After excusing himself, what did this Indian say to his companion?

Where did the war-party go then?

During the battle what statement did the young Indian hear about himself?

How did he interpret this statement?

What time of the day was it when the Indians went down to the river?

How many Indians went down to the river?
Where did the Indians live?

Why did the Indians go down to the river?

What was the weather at that time?

Name two things they heard while down at the river?

1) 

2) 

What did they think when they heard these sounds?

What action did they take after hearing these sounds?

How many men were in the canoe which came over to them?

What did the men in the canoe say?

Name two reasons given by one of the Indians for not wanting to go on the war party.

1) 

2) 

After excusing himself, what did this Indian say to his companion?

Where did the war-party go then?

During the battle what statement did the young Indian hear about himself?

How did he interpret this statement?

Why did the canoes go back to Egulac?

What did the Indian do when he got back to Egulac?

What happened after he told his story?

What time of the day was it when he died?
APPENDIX D

General Rating Instructions

In this experiment, college students read a story called "The War of the Ghosts." They were told that the accuracy of their memories would be tested at some later date. After varying intervals of time, they were given blank sheets of paper and told to reproduce the story as accurately as possible. Some of the students reproduced the story once; others reproduced the story several times. As you might expect, some of the reproductions are almost exact duplications of the story, while other reproductions show extensive changes.

Your job will be to rate certain portions of these reproductions to see whether or not certain kinds of changes are taking place in the story. Here is what you will be doing: First, you will note some of the differences that exist between the mimeographed copy of "The War of the Ghosts" and one of the attempted reproduction copies of "The War of the Ghosts." Second, you will then make a judgment as to whether or not the difference you observed is comparable to the kind of difference that will be described in detail for each rating scale item.

The written responses are to be scored 1, 2, 3, or 0 depending upon whether the story did or did not possess a particular characteristic. You should make a judgment even when you are not quite certain how to judge a particular response.

Each of the written reproductions will be rated on several different rating scales. Two rating standards will be used by you to make the ratings. The first of these standards is a general description of the type of change that is being rated. By comparing the specific written response with the general description, you should be able to make a judgment. The second rating standard consists of some sample responses that have been rated in advance according to the general description.

With the aid of the general description and the examples, you should be able to evaluate each response without too much difficulty. Most of the items to be rated are completely objective, others will require considerable evaluative judgment. On occasion you will undoubtedly find some responses which are different from all the other examples listed. No attempt has been made to cover all possible replies. In these instances you will have to use your own judgment.

In some stories, the event to be rated is not in the same time sequence as it is in the original. If any reference to the event is given in the story, the rating should be made.
General Scoring Standards for Rating Scale I

The type of change measured on this rating scale is characterized by:

1) Changes of particular words, phrases, and themes which tend to minimize the dramatic meanings or flavoring of the story. Such a change makes the story have less "color" than it did before.

2) Inclusions of words, phrases, and themes that are less descriptive and less dramatic.

3) Using phrases which summarize and simplify the events in the story.

4) Abbreviating, compressing, subordinating, and contracting of the events in the story.

5) Omissions of particular words, phrases, and themes without being replaced by words, phrases, and themes which are alike or nearly alike in meaning or significance.
General Scoring Standards for Rating Scale II

The type of change measured on this rating scale is characterized by:

1) Emphasizing and dramatizing the words, phrases, and themes of the story.

2) Including events that tend to maximize the dramatic meaning or flavoring of the story. The story has more "color" than it did before. This type of change includes the inclusion of "quiet type" events which give the story more suspense.

3) Using words that are more descriptive.

4) Giving more description of the events than was included in the original. Longer phrases are sometimes indication of additional description.

5) Changes in grammatical structure which emphasize the particular event. These changes in grammatical structure include: a) changing from the passive voice of the verb to the active voice b) using direct quotations c) using exclamation points and dashes d) use of the familiar "I" and personalization of the events.

6) Elaborating on the story by means of recalling events that were not in the original story or reproduction; importing new material into the story; inventing new material; adding embellishments to the story.

7) Making value statements about events in the story; making judgments about the events.

8) Using a journalistic style of writing; using words similar to those of newscasters, i.e., not a change to familiar words but to dramatic words.
General Scoring Standards for Rating Scale III

The type of change measured on this rating scale is characterized by:

1) changes in the story which make the words, phrases, and themes more reasonable, more plausible—changes in line with the type of experience the story writers have had.

2) changes which make the story become more connected, more coherent.

3) adding new words, phrases, or themes to the story which eliminates the necessity of having to explain some of the events in the story which do not make much sense or are mysterious. The old events are made more plausible as a result of the addition of a new event.

4) alterations of the original sequence of events which serve the purpose of making the story more reasonable.

5) giving causative reasons or explanations for the events in the story.

6) making the continuity of the story greater by the closing of gaps between ideas; forming transitions and solving contradictions between ideas.

7) transforming the unfamiliar into the familiar, the unlikely into the likely, stilted formal language is replaced by informal, conversational type language.

8) repeating material which strengthens the coherence or connectedness of the reproductions.

9) omitting material which does not make much sense.
APPENDIX E

Part I

Rating Scale I

Directions: Place a 1 on the blank line to the left of the item if the paper you are rating shows that type of change. If the paper did not show this type of change, place a 0 on the blank line. A "0" is to be used for reproductions like the original or for changes that are not like those called for in the item.

For some of the scale items, a paper can be scored 1 for several different types of change. In this case, the paper is to be scored only 1 for that particular item. Not more than 1 point is to be counted for each scale item.

1) "One night" - line 1
   Score 1 if the time of the story was omitted.

2) "young men" - line 1
   Score 1 if:
   a) "people" or "fellows" is substituted for "men"
   b) "young" is omitted and no substitution is made.

3) "from Egulac" - line 1
   Score 1 for omission of location.
   Score 0 if Egulac is misspelled, or if paper admits lack of knowledge of place but knows they were from a particular place, or gives a place different from the original.

4) "down to the river" - line 1
   Score 1 for omission of "river."
   Score 0 if substitutions such as "lake," "ocean," or "shore" are made.
5) "to hunt seals" - line 1

Score 1 if:
   a) purpose for going to the river is not mentioned
   b) substitution of "went hunting," "went walking," "were canoeing," "were fishing (for fish)."

Score 0 for any other substitutions of other activities which are just as dramatic as seal hunting.

6) "foggy and calm" - line 2

Score 1 for:
   a) omission of weather
   b) "calm," "still and calm," "still and wet," "cloudy and cool."

Score 0 for "foggy and chilly," "foggy and rainy," "hot and muggy."

7) "Then they heard war-cries (line 2) and "they heard the noise of paddles" - line 4

Score 1 for an omission of either the war-cries or the noise of the paddles.

8) "Then they heard war-cries" (line 2) and "they heard the noise of paddles" (line 4)

Score 1 for an omission of both the war-cries and the noise of the paddles.

9) "hid behind a log" - lines 3 & 4

Score 1 for an omission of the fact that the two men hid themselves from the sight of the warriors. The object that the men hid behind has no bearing on the scoring of this item.

10) "Now canoes came up" - line 4

Score 1 if:
   a) no canoes are mentioned.
   b) only one canoe is mentioned in the total war party.

Score 0 if it is implied that there was more than one canoe.
11) "What do you think?" - line 6

Score 1 if phrase is omitted.

12) "We wish to take you along" - line 6

Score 1 if request to take the two Indians along is omitted.

13) Conversations in lines 6 through 12.

Score 1 if:
   a) all conversation is omitted.
   b) the conversations are very briefly summarized; e.g.,
      "The Indians asked them to go along with them so they
did," "We are going to have a war, come with us,"
      "There was some argument over the proposal to go up
the river but . . . ."

14) Arrow episode - lines 8 & 9

Score 1 if there is no mention of a refusal because of lack
of arrows.

15) "My relatives do not know where I have gone."

Score 1 if there is omission of the idea that someone
(relatives, wife, friends) would miss him if he went with
the war party.

16) "But you," he said turning to the other, "may go with them." -
line 11

Score 1 - omission of idea that he somehow permits, allows,
forces, or encourages the other to go.

17) "So one of the young men went, but the other returned home." -
line 12

Score 1 if it is not mentioned that the two men separate.

Score 0 for "one of the men went" (thus implying a separation)
or "one went home" (again implying that the other did not
go home).

18) "A town on the other side of Kalama" - line 13

Score 1 if the location of the town is omitted.
(Note that the town is not Kalama)
18) (contd.)

Examples: "reached their destination," "to the nearby village of Kalama," "went to the town," "went on down the river to the town."

Score 0 for:

a) accurate reproductions
b) descriptions of locations which are not correct according to the mimeographed story.

Examples: "to a place above Kalama," "tribe that lived north of Kalama," "past Kalama."

19) "The people came down to the water" - line 14

Score 1 for omission of fact that the opposition force came to meet the war-party.

20) "Many were killed" - line 14

Score 1 if:

a) no mention is made of the number killed
b) the number killed is minimized; e.g., "few were hurt," "none were killed," "it was a minor skirmish," "he was the only one to be hurt."

21) "But presently the young man heard one of the warriors say: "Quick, let us go home; that Indian has been hit." - lines 15 & 16

Score 1 if no mention is made that someone cries for the battle to cease.

Score 0 if someone other than the Indian himself cries out to bring attention to the casualty.

22) "So the canoes went back" - line 18

Score 1 for omission of fact that he returned by canoe; e.g., "They took him home," "He went home."

23) "And made a fire" - line 19

Score 1 if there is an omission of the fact that there was a fire. (The paper doesn't have to say that he built the fire, only that it was present.)
24) Lines 19 to 21 - story telling scene

Score 1 for a drastic summarization of the story telling scene or else no mention is made of his story-telling; e.g., "and he told his story," "and told of the fight they had had," "and told them all about it."

Score 1 if at least 3 of the following 6 ideas were omitted:
1) accompanied, ghosts 2) went to fight 3) many of ours were killed 4) many of other side were killed 5) they said he was sick 6) he did not feel sick

25) "ghosts" - lines 16 and 19

Score 1 if ghosts are not mentioned anywhere in the body of the story (overlook the title).

26) "did not feel sick" - lines 17 and 21

Score 1 if this idea was omitted in both lines (whether or not he is pictured as being sick during the death scene has no bearing on this item).

Score 0 if:
 a) idea is reproduced
 b) the following kinds of substitutions are introduced: "he felt nothing," "he felt no pain," "he didn't feel it," "it did not hurt," "did not realize he was shot."

27) "then he became quiet." - line 22

Score 1 for omission of fact that he became quiet at one time before he died.

28) "Something black" - line 23

Score 1 if no mention is made of "something black."

29) "His face became contorted." - line 23

Score 1 for omission of contortion.

30) "The people jumped up and cried." - lines 23 & 24

Score 1 if no mention is made of a dramatic emotional response from other people to the death of the man.

END — NOW CHECK THE PAPER TO MAKE CERTAIN THAT EACH ITEM IS SCORED 1 OR 0.
Part II

Rating Scale II

Directions: Place a 1 on the blank line to the left of the item if the paper you are rating shows that type of change. If the paper did not show this type of change, place a 0 on the blank line. (A "0" is to be used for reproductions like the original or for changes that are not like those called for in the item.)

For some of the scale items, a paper can be scored 1 for several different types of change. In this case, the paper is to be scored only 1 for that particular item. Not more than 1 point is to be counted for each scale item.

1) Opening sentence - line 1

Score 1 if "story-telling openings" are used.
   e.g., "This is a tale concerning two Indians."
   "This is the story of . . . ."
   "It came to pass that . . . ."
   "Once upon a time"

2) Description of time that story takes place - line 1

Score 1 if an adjective or adverb is used to describe the day or night; e.g., "dark night," "bright day."

3) Description of two young men - line 1

Score 1 if they are dramatized; e.g., "warriors," "hunters," "bowmen."

4) Activity of two men at river - line 1

Score 1 if their activity is given added emphasis.
   In particular, the phrase "went down to" is given a more specific description such as: "walked by the river," "were canoeing on the river," "were taking a little journey."

5) Location of the seal hunting expedition - line 1

Score 1 if a more specific description than just "river" is given; e.g., "bank of the river," "in the middle of the river," "a river near Egulac."
6) Description of weather change - line 2

Score 1 if the original phrase, "it became foggy and calm" is changed to a phrase with more dramatic emphasis.
   e.g., "very foggy and calm," "foggy and dreary,"
   "fog began to roll in," "fog fell," "fog descended,"
   "foggy and chilly," "foggy and rainy," "still and calm."

7) New material between first sentence and second sentence - line 2

Score 1 if new material is imported into the story at this point regardless of whether or not the new material constitutes a new sentence.
   e.g., "while they were working"
   "while in their canoe"

8) "Then they heard war-cries" - line 2

Score 1 if this description is given emphasis.
   e.g., "They promptly heard war-cries."
   "They heard loud war-cries."
   "They heard a strange noise."

9) Significance of war-party to the two men - line 3

Score 1 if the significance of the war-party becomes a more personalized event or dramatic event to the two Indians.
   e.g., "war party coming after us"
   "fearing that Indians might be attacking"
   "it might be a war party, one said"

10) "and hid" - line 3

Score 1 if "hid" becomes dramatized.
   e.g., "huddled," "crouched low," "took refuge."

11) "There were five men in the canoe" - line 5

Score 1 if extra description is given of the men or the canoe;
   e.g., "filled with men," "with fierce looking Indians,"
   "the large canoe," "ghosts with white faces,"
   "strangers," "friends," "men with war paint,"
   "they beheld five men."

12) Description of the meeting between the two men and those in the canoe - lines 4 and 5

Score 1 if stated that the five men were actively seeking them or caught them in their hiding place; e.g., "but the warriors found them," "the men spotted them."
13) Location of place to be attacked - lines 6 and 7

Score 1 if the location is described in more detail than the original copy; e.g., "a not too distant village," "a white settlement."

14) "Arrows are in the canoe" - line 9

Score 1 if this phrase becomes familiarized in journalistic style (giving the impression of a more intimate conversation between the Indians).

   e.g., "We have enough," "We have some extras,"
   "we have a supply," "you will not need arrows,"
   "that's o.k."

15) Description of the scene in which the two men decide whether to go or not to go with the war-party - lines 10 and 11

Score 1 if extra description is given during the decision scene or before the party departs for the fight.

   e.g., "I'll go if you go back and tell the people."
   "I'll go home and tell your family where you are."

16) The journey - line 13

Score 1 if a more specific description is given of the journey to a town on the other side of Kalama.

   e.g., "they paddled up the river," "get in their canoe,"
   "the canoe, which was filled with men, went . . . ,"
   "to a town across the river."

17) "The people came down to the water" - line 14

Score 1 if a more dramatic description is given.

   e.g., "the people came out and yelled," "The natives came down . . . ,"
   "All of a sudden, the people . . . ,"
   "with spears and guns."

18) Description of battle (not including the description of the wounding of the Indian) - line 14

Score 1 if a more dramatic description is given of the battle;

   e.g., "in the noise and confusion of the fighting,"
   "gory experience," "much bloodshed," "big fight,"
   "great battle," "hard fought," "lasted for days,"
   "dropped with arrows in them."
19) "that Indian has been hit" - line 16

Score 1 for an emphasized, dramatized, or more specific description.
   e.g., "our hero was hurt," "our leader has been hit,"
   "was wounded in the side," "that Indian has been hit!"
   "was wounded several times," "felt a sharp pain," "was bleeding."

20) "He did not feel sick" - line 17

Score 1 if added emphasis is given to this fact.
   e.g., "He was amazed that he didn't feel ill."
   "Strangely enough, he did not feel sick."
   "He didn't feel any pain."

21) The journey home - line 18

Score 1 if this journey is emphasized more than in the comparison copy of the story.
   e.g., "So they sailed back to Egulac," "He was
   carried back on a litter," "The men threw him into
   the canoe," "They dumped him out on the shore."

22) Preparations before the story telling scene - Line 19

Score 1 if the description of the preparations is made more colorful.
   e.g., "He was anxious to tell his story," "He vivaciously
demonstrated how . . ." "He wrapped a blanket
around himself," "He smoked a pipe," "The council
watched him with awe."

23) The story telling scene - Lines 19-21

Score 1 if elaborations are made upon his description of the battle.
   e.g., "The battle was fought furiously," "It was a
terrific battle," "I was the only survivor,"
   "They said I was killed," "In fact he felt very
good," "I did not feel sick or anything."

24) People's reaction to his story telling -not in story

Score 1 if any description is given of the people's reaction to his story.
   e.g., "The people did not believe him," "His friends
were amazed at the story," "There was rejoicing
over the outcome of the battle."
25) "Then he became quiet" - line 22

Score 1 if his becoming quiet is made more mysterious or dramatic.
   e.g., "He went into a trance."
   "He then became very quiet."

26) "Something black" - line 23

Score 1 if a more elaborate description is given.
   e.g., "Suddenly something black..."
   "face became dark," "tongue became black,"
   "black liquid (or smoke, foam, phlegm, blood)."

27) "Came out" - line 23

Score 1 if the exit of the "black something" from his mouth is made more dramatic than "came out."
   e.g., "poured out," "spewed out," "descended and engulfed him," "coughed out," "gushed out."

28) Pre-death reactions - lines 22-24

Score 1 if the pre-death reactions are made more elaborate (other than becoming quiet, falling down, black from mouth, and contortion of face).
   e.g., "he became violently ill," "he became delirious,"
   "he went into convulsions," "he let out a cry."

29) Reaction of the people of Egulac to his pre-death behaviors and his dying - line 23 & 24

Score 1 if their reactions are given added emphasis
   e.g., "The Indians became hysterical,"
   "They were speechless," "They were afraid of him."

30) "He was dead" - line 25

Score 1 if his actual death is given a more elaborate description.
   e.g., "He fell dead by the fire."
   "He fell dead in the arms of an Indian companion."

END — NOW CHECK THE PAPER TO MAKE CERTAIN THAT EACH ITEM IS SCORED 1 OR 0.
Rating Scale III

Directions: Place a 1 on the blank line to the left of the item if the paper you are rating shows that type of change. If the paper did not show this type of change, place a 0 on the blank line. A "0" is to be used for reproductions like the original or for changes that are not like those called for in the item.

For some of the scale items, a paper can be scored 1 for several different types of change. In this case, the paper is to be scored only 1 for that particular item. Not more than 1 point is to be counted for each scale item.

1) "night" - line 1

Score 1 if the time of the story is changed to "day."

2) "young men wish to take you along" - line 1 & 6

Score 1 if there is a change in "young men" to "young children" or "young boys" provided that this change is associated with the idea that the five Indians forced them to go along.

3) "river to hunt seals" - line 1

Score 1 if:
   a) a more plausible activity than seal-hunting is substituted; e.g., "hunting," "camping," "walking"
   b) or they went to the "ocean" or "shore" to hunt seals.

4) "hid behind a log" - lines 3 & 4

Score 1 if any reason is given for hiding other than hearing war-cries or thinking it was a war-party. e.g., "because they were afraid," "because they were afraid the warriors would see them." "Because they were frightened."

5) "heard war-cries heard the noise of paddles" - lines 2 & 4

Score 1 if only the war-cries were listed as being heard or if only the noise of paddles was listed as being heard.

Score 0 if both are listed or if neither are listed.
6) "heard war cries" and thought "Maybe this is a war-party." - lines 2 & 3

Score 1 if the word "war" is not duplicated as it is above.

7) "There were five men in the canoe, and they said:" - line 5

Score 1 if it is specifically stated that only one of the five men did the talking.
   e.g., "one of the individuals from the canoe said"
   "one of them said," "one man asked the other two."

8) "What do you think?" - line 6

Score 1 if: a) the phrase was omitted
   b) a more common form of greeting is substituted;
      e.g., "Guess what?" "Do you know what?"
      "What do you know?"

9) "We wish to take you along. We are going up the river to make war on the people" - lines 6 & 7

Score 1 if the war plans are mentioned first and then the invitation is given.

Score 0 if the original sequence is reproduced, or if only one of the above ideas is mentioned.

10) "To make war on the people" - line 7

Score 1 if a substitution is made for "the people" which sounds more natural, less formal, and more familiar or if "people" is omitted.
   e.g., "the people of Kalama," "the people of the neighboring town,"
   "make war on a town," "on another group of men," "to make war," "to fight a battle."

11) "My relatives do not know where I have gone." - lines 10 & 11

Score 1 if "relatives" becomes more personalized or familiar.
   e.g., "wife and children," "wife," "my family," "no one at home," "my friends," "personal obligations."
12) Reason why one of the Indians returned home - Lines 8-12

Score 1 if any explanation, other than he might be killed, and his people at home would not know where he was, is given for his return home.

   e.g., "because of a lack of arrows," "the coward returned home," "because he was feeling ill."

13) Reason why one of the Indians went with the war-party - Lines 8-12.

Score 1 if any reason is given. His reason for going is left unexplained in the original copy.

   e.g., "because he didn't have any family obligations," "he was forced to go."

14) "town" - line 13

Score 1 if "town" is changed to a more appropriate destination for an attack on people who are implied to be Indians;

   e.g., "village," "camp," "destination," "place."

(If the paper assumes that white men are being attacked, score a 0 for the item.)

15) "to the water" - line 14

Score 1 if "water" is changed to "shore," "beach," "landing," "river" or any term which seems more natural in this context.

16) "Many were killed" - line 14

Score 1 if a causative reason is given.

   e.g., "as it was a fierce battle," "as it was a vicious fight."

17) Reason for ending battle - line 15 & 16

Score 1 for a reason given for ending the battle other than the wounding of the Indian.

   e.g., "because they were losing," "because there were so many deaths," "after winning the battle."

18) "Oh, they are ghosts." - line 16

Score 1 if any reason is given for why the Indian suspected that he was associated with ghosts.

   e.g., "because none of the attacking Indians were injured," "because he was feverish," "because the arrows went right through them," "because even though he was shot he felt no pain," "the Indian tribe disappeared after he had been wounded."
19) "He did not feel sick, but they said he had been shot" - line 17

Score 1 if this contradiction is resolved in any way except by explaining it as being due to supernatural powers.
   e.g., "He was hit (and omission of sickness in the account)," "He was wounded and bled some," "He was shot, but he didn't feel much pain," "He was hit, but didn't die," "The fellow was apparently wounded although he felt no pain," "I don't feel bad, I haven't been hit."

20) "that Indian has been hit" - line 16 - "they said he had been shot" - line 17

Score 1 if this duplication is eliminated in the reproduction. (Whether or not this idea is repeated in the story telling scene has no bearing on the scoring of this item.)

21) "went ashore to his house" - line 18

Score 1 if stated that he returned to a more appropriate Indian dwelling.
   e.g., "village," "camp," "teepee," "igloo," "council," "home," "dwelling."

22) "and made a fire" - line 19

Score 1 if:
   a) this fact was omitted
   b) it was implied that the fire was already burning, or someone else made the fire, or he just lit the fire.

23) "Behold" - line 19

Score 1 if this word was omitted, or if a less formal word was substituted.

24) "those who attacked us were killed" - line 20

The idea is given here that the people on the other side of Kalama attacked the war-party?

Score 1 if this contradiction is solved either by omission or some other way.
   e.g., "many men were killed on both sides."
25) "and then he became quiet" - line 22

Score 1 if:
   a) the quietness is attributed to the other people; e.g., "the people did not make any comments to his story," "the people were quiet."
   b) a causative reason is given for why he became quiet; e.g., "he decided to rest," "he fell asleep," "he was tired from his wound."

26) "when the sun rose" - line 22

Score 1 if:
   a) the death scene was changed to "sunset" or "midnight."
   b) the time of the death scene was not mentioned.

27) "when the sun rose, he fell down" - line 22

Score 1 if a reason was given for why he was up. e.g., "still feeling healthy, he arose at sunrise."

28) "Something black" - line 23

Score 1 if a change is made which makes the "something black" more reasonable or familiar;
   e.g., "black liquid," "black blood," "blood," "black phlegm."

Score 0 for changes which are just as mystic as "something black;"
   e.g., "a black thing," "a black puff of smoke," "black ooze."

29) "He was dead" - line 25

Score 1 if a causative reason is given. e.g., "as a result of his earlier wound."

30) Moral - end of story

Score 1 if a moral is added.
   e.g., "The moral of the story is to beware of ghosts," "Moral—stay away from strangers."

END — NOW CHECK THE PAPER TO MAKE CERTAIN THAT EACH ITEM IS SCORED 1 OR 0.
APPENDIX F

Rating Scale

Directions: Some of the following items are rated in several different ways. The number of different ways to rate the item is indicated in the directions following each item.

A "1" represents the type of change outlined in "General Scoring Standards for Rating Scale I," a "2" for the changes described in "General Scoring Standards for Rating Scale II," and a "3" for those of "General Scoring Standards for Rating Scale III." A "0" is used for reproductions like the original or for changes that are not like the other changes which are described.

Your rating for each item is to be placed in the appropriate place on the special answer sheet.

1) Opening sentence - line 1

Score 2 if "story-telling openings" are used, e.g., "This is a tale concerning two Indians."
   "This is the story of . . . ."
   "It came to pass that . . . ."
   "Once upon a time"
Score 0 for reproductions like the original and other types of change.

2) "night" - line 1

Score 3 if the time of the story is changed to "day."
Score 0 if "night" was reproduced.
Score 1 if the time of the story was omitted.

3) "night" - line 1

Score 2 if an adjective or adverb is used to describe the day or night; e.g., "dark night," "bright day."
Score 1 if the time of the story was omitted.
Score 0 if reproduced and other kinds of substitutions.

4) "young men" - line 1

Score 1 if "people" or "fellows" is substituted for "man."
Score 2 if they are dramatized; e.g., "warriors," "hunters,"
   "bowman," "natives," "Indians."
Score 0 for reproduction and other kinds of substitutions.
5) "down to the river" - line 1

Score 1 for omission of "river."
Score 2 if a more specific description than just "river" is given; e.g., "bank of the river," "in the middle of the river," "a river near Egulac."
Score 0 for reproduction and other types of changes.

6) "river to hunt seals" - line 1

Score 1 if the purpose for going to the river is not mentioned.
Score 3 if: a) a more plausible activity than seal-hunting is substituted; e.g., "hunting," "camping," "walking"
    b) or they went to the "ocean" or "shore" to hunt seals.
Score 0 for reproduction or other types of changes.

7) "foggy and calm" - line 2

Score 1 for:
   a) omission of weather
   b) "calm," "still and calm," "still and wet," "cloudy and cool"
Score 2 if the original phrase, "it became foggy and calm" is changed to a phrase with more dramatic emphasis, e.g., "very foggy and calm," "foggy and dreary,"
   "fog began to roll in," "fog fell," "fog descended,"
   "foggy and chilly," "foggy and rainy," "still and calm."
Score 0 for reproduction or other types of changes.

8) Score 2 if the description of the war-cries is given emphasis.
   e.g., "They promptly heard war-cries," "They heard loud war-cries," "They heard a strange noise," "war party coming after us," "fearing that the Indians might be attacking."
Score 1 if the "war-cries" were omitted.
Score 0 for reproduction or other types of changes.

9) "hid behind a log" - lines 3 & 4

Score 1 for an omission of the fact that the two men hid themselves from the sight of the warriors.
Score 2 if "hid" becomes dramatized.
   e.g., "huddled," "crouched low," "took refuge."
Score 0 for reproduction or other types of changes.
10) "hid behind a log" – lines 3 & 4

Score 3 if any reason is given for hiding other than hearing war-cries or thinking it was a war-party.
   e.g., "because they were afraid," "because they were afraid the warriors would see them," "Because they were frightened."
Score 1 for an omission of hiding.
Score 0 for reproduction or other types of change.

11) "There were five men in the canoe" – line 5

Score 1 if no mention is made of the man in the canoe
Score 2 if extra description is given of the men;
   e.g., "with fierce looking Indians," "ghosts with white faces," "strangers," "friends," "men with war paint."
Score 0 for reproduction or other types of change.

12) Description of the meeting between the two men and those in the canoe – lines 4 and 5

Score 3 if stated that the five men were actively seeking them or caught them in their hiding place; e.g., "but the warriors found them," "the men spotted them."
Score 1 if any meeting was not mentioned.
Score 0 for reproduction and other types of change.

13) "There were five men in the canoe, and they said:" – line 6

Score 3 if it is specifically stated that only one of the five men did the talking.
   e.g., "one of the individuals from the canoe said" "one of them said," "one man asked the other two."
Score 1 if the canoe was not described as having more than one man or the conversations were not described.
Score 0 for reproductions and other types of change.

14) "What do you think?" – line 6

Score 1 if phrase is omitted.
Score 3 if a more common form of greeting is substituted;
   e.g., "Guess what?" "Do you know what?" "What do you know?"
Score 0 for reproductions and other types of changes.
15) "We wish to take you along. We are going up the river to make war on the people" - lines 6 & 7

Score 3 if the war plans are mentioned first and then the invitation is given.
Score 0 if the original sequence is reproduced, or if only one of the above ideas is mentioned.

16) Location of place to be attacked - lines 6 and 7

Score 1 if the location of war is omitted.
Score 2 if the location is described in more detail than the original copy; e.g., "a not too distant village," "a white settlement."
Score 0 for reproductions and other types of change.

17) "To make war on the people" - line 7

Score 3 if a substitution is made for "the people" which sounds more natural, less formal, and more familiar; e.g., "the people of Kalama," "the people of the neighboring town."
Score 1 if "people" is omitted.
Score 0 for reproductions and other types of change.

18) "Arrows are in the canoe" - line 9

Score 2 if this phrase becomes familiarized in journalistic style (giving the impression of a more intimate conversation between the Indians).
e.g., "We have enough," "We have some extras," "we have a supply," "you will not need arrows," "that's o.k."

19) "My relatives do not know where I have gone." - lines 10 & 11

Score 3 if "relatives" becomes more personalized or familiar.
e.g., "wife and children," "wife," "my family," "no one at home," "my friends," "personal obligations."
Score 1 if there is omission of the idea that someone (relatives, wife, friends) would miss him if he went with the war party.
Score 0 for reproductions or other types of change.

20) Reason why one of the Indians returned home - lines 8-12

Score 3 if any explanation, other than he might be killed, and his people at home would not know where he was, is given for his return home.
e.g., "because of a lack of arrows," "the coward returned home," "because he was feeling ill."
20) (contd.)
Score 1 if it is not mentioned that the two men separate.
Score 0 for reproductions or other types of change.

21) Reason why one of the Indians went with the war-party - Lines 8-12
Score 3 if any reason is given. His reason for going is left
unexplained in the original copy.
  e.g., "because he didn't have any family obligations,"
  "he was forced to go."
Score 1 if it is not mentioned that one man goes with the
war-party.
Score 0 for reproduction and other changes.

22) The journey - Line 13
Score 2 if a more specific description is given of the journey
to a town on the other side of Kalama.
  e.g., "they paddled up the river," "got in their canoe,"
  "the canoe, which was filled with men, went . . . ."
  "to a town across the river."
Score 1 if the journey is not mentioned.
Score 0 for reproductions and other changes.

23) "town" - Line 13
Score 3 if "town" is changed to a more appropriate destination
for an attack on people who are implied to be Indians; e.g.,
"village," "camp," "destination," "place."
Score 1 for omission of the destination of the attack.
Score 0 for reproductions and other changes.

24) "The people came down to the water" - Line 14
Score 1 for omission of fact that the opposition force came to
meet the war-party.
Score 2 if a more dramatic description is given.
  e.g., "the people came out and yelled," "The natives
came down . . . ." "All of a sudden, the people . . . ."
  "with spears and guns."
Score 0 for reproductions and other changes.

25) "to the water" - line 14
Score 3 if "water" is changed to "shore," "beach," "landing,"
"river," or any term which seems more natural in this context.
Score 1 for omission of fact that the opposition force came to
meet the war party.
Score 0 for reproductions and other changes.
26) Description of battle (not including the description of the wounding of the Indian) - line 14

Score 2 if a more dramatic description is given of the battle;
   e.g., "in the noise and confusion of the fighting"
   "gory experience," "much bloodshed," "big fight,"
   "great battle," "hard fought," "lasted for days,"
   "dropped with arrows in them."
Score 1 if:
   a) no mention is made of the number killed
   b) the number killed is minimized; e.g.,
      "few were hurt," "none were killed," "it was a minor skirmish,"
      "he was the only one to be hurt."
Score 0 for reproductions and other types of changes.

27) "Many were killed" - line 14

Score 3 if a causative reason is given for the number killed.
   e.g., "as it was a fierce battle," "as it was a vicious fight," "as it was only a minor skirmish."
Score 1 if no mention is made of the number killed.
Score 0 for reproductions and other types of changes.

28) "that Indian has been hit" - line 16

Score 2 for an emphasized, dramatized, or more specific description.
   e.g., "our hero was hurt," "our leader has been hit"
   "was wounded in the side," "that Indian has been hit!"
   "was wounded several times," "felt a sharp pain,"
   "was bleeding."
Score 1 if fact is not mentioned.
Score 0 for reproductions and other types of changes.

29) "He did not feel sick" - line 17 & 21

Score 2 if added emphasis is given to this fact.
   e.g., "He was amazed that he didn't feel ill."
   "strangely enough, he did not feel sick."
   "He didn't feel any pain."
Score 1 if idea was omitted in both lines.
Score 0 for reproductions and other types of changes.
30) "He did not feel sick, but they said he had been shot" – line 17 and 21

Score 3 if this contradiction is resolved in any way except by explaining it as being due to supernatural powers.
   e.g., "He was wounded and bled some."
   "He was shot, but he didn't feel much pain."
   "He was hit, but didn't die. "The fellow was apparently wounded although he felt no pain."
   "I don't feel bad, I haven't been hit."

Score 1 for omission of lack of illness.
Score 0 for reproduction and other types of changes.

31) "Oh, they are ghosts." – line 16

Score 3 if any reason is given for why the Indian suspected that he was associated with ghosts.
   e.g., "because none of the attacking Indians were injured," "because he was feverish,"
   "because the arrows went right through them," "because even though he was shot he felt no pain,"
   "the Indian tribe disappeared after he had been wounded."

Score 1 if ghosts are not mentioned anywhere in the body of the story (overlook the title).
Score 0 for reproduction and other types of change.

32) Reason for ending battle – line 15 & 16

Score 3 for a reason given for ending the battle other than the wounding of the Indian.
   e.g., "because they were losing," "because there were so many deaths," "after winning the battle."

Score 1 if end of battle is not mentioned.
Score 0 for reproduction and other types of change.

33) The journey home – line 18

Score 2 if this journey is emphasized more than in the comparison copy of the story.
   e.g., "So they sailed back to Egulac," "He was carried back on a litter," "The men threw him into the canoe," "They dumped him out on the shore."

Score 1 if the journey home is not mentioned.
Score 0 for reproduction and other types of change.
34) "went ashore to his house" – line 18
   Score 3 if stated that he returned to a more appropriate Indian
dwelling.
   e.g., "village," "camp," "teepee," "igloo," "council,"
   "home," "dwelling."
   Score 1 if his return is not mentioned.
   Score 0 for reproduction and other types of change.

35) "And made a fire" – line 19
   Score 1 if there is an omission of the fact that there was a
fire. (The paper doesn't have to say that he built the
fire, only that it was present.)
   Score 3 if it was implied that the fire was already burning,
or someone else made the fire, or he just lit the fire.
   Score 0 for reproduction and other changes.

36) Preparations before the story telling scene – line 19
   Score 2 if the description of the preparations is made more
colorful.
   e.g., "He was anxious to tell his story," "He vivaciously
demonstrated how . . ." "He wrapped a blanket
around himself," "He smoked a pipe," "The council
watched him with awe."
   Score 0 for reproduction and other changes.

37) The story telling scene – lines 19-21
   Score 2 if elaborations are made upon his description of the
battle.
   e.g., "The battle was fought furiously," "It was a
terrific battle," "I was the only survivor,""They said I was killed," "In fact he felt very
good," "I did not feel sick or anything."
   Score 1 if the battle is not described.
   Score 0 for reproductions and other types of changes.

38) People's reaction to his story telling – not in story
   Score 2 if any description is given of the people's reaction to
his story.
   e.g., "The people did not believe him"
   "His friends were amazed at the story"
   "There was rejoicing over the outcome of the
   battle."
39) "then he became quiet." - line 22

Score 1 for omission of fact that he became quiet at one time before he died.
Score 2 if his becoming quiet is made more mysterious or dramatic.
   e.g., "He went into a trance"
   "He then became very quiet."
Score 0 for reproduction and other types of changes.

40) "and then he became quiet" - line 22

Score 3 if: a) the quietness is attributed to the other people;
   e.g., "the people did not make any comments to his story," "the people were quiet."
   b) a causative reason is given for why he became quiet; e.g., "he decided to rest," "he fell asleep," "he was tired from his wound."
Score 1 for omission of quietness.
Score 0 for reproduction and other types of changes.

41) "when the sun rose" - line 22

Score 3 if the death scene was changed to "sunset" or "midnight."
Score 1 if the time of the death scene was not mentioned.
Score 0 for reproduction and other types of changes.

42) "when the sun rose, he fell down" - line 22

Score 3 if a reason was given for why he was up.
   e.g., "still feeling healthy, he arose at sunrise."
Score 1 for omission of fact that he fell.
Score 0 for reproductions and other types of changes.

43) "Something black" - line 23

Score 2 if a more elaborate description is given.
   e.g., "Suddenly something black ..."
   "face became dark," "tongue became black,"
   "black liquid (or smoke, foam, phlegm, blood)."
Score 1 for omission of something black.
Score 0 for reproductions and other types of changes.

44) "Something black" - line 23

Score 3 if a change is made which makes the "something black" more reasonable or familiar.
   e.g., "black liquid," "black blood," "blood," "black phlegm."
Score 0 for changes which are just as mystic as "something black;" e.g., "a black thing," "a black puff of smoke," "black ooze."
Score 1 for omission of something black.
45) "Cam e out" - line 23

Score 2 if the exit of the "black something" from his mouth is made more dramatic than "came out."
   e.g., "poured out," "spewed out," "descended and engulfed him," "coughed out," "gushed out."
Score 1 if no mention is made of something black coming out.
Score 0 for reproduction and other types of changes.

46) Pre-death reactions - lines 22-24

Score 2 if the pre-death reactions are made more elaborate (other than becoming quiet, falling down, black from mouth, and contortion of face).
   e.g., "He became violently ill," "he became delirious," "he went into convulsions," "he let out a cry."
Score 1 if there is omission of all pre-death reactions.
Score 0 for reproduction and other types of changes.

47) "The people jumped up and cried." - lines 23 & 24

Score 1 if no mention is made of a dramatic emotional response, from other people to the death of the man.
Score 2 if their reactions are given added emphasis.
   e.g., "The Indians became hysterical," "They were speechless," "They were afraid of him."

48) "He was dead" - line 25

Score 1 if death is omitted.
Score 2 if his actual death is given a more elaborate description.
   e.g., "He fell dead by the fire."
   "He fell dead in the arms of an Indian companion."
Score 0 for reproduction and other types of change.

49) "He was dead" - line 25

Score 1 if death is omitted.
Score 3 if a causative reason is given.
   e.g., "as a result of his earlier wound."
Score 0 for reproduction and other types of change.

END - NOW CHECK THE PAPER TO MAKE CERTAIN THAT EACH ITEM IS SCORED 1, 2, 3, OR 0
APPENDIX G

Revised Rating Scale

Directions: Some of the following items are rated in several different ways. The number of different ways to rate the item is indicated in the directions following each item.

A "1" represents the type of change outlined in "General Scoring Standards for Rating Scale I," a "2" for the changes described in "General Scoring Standards for Rating Scale II," and a "3" for those of "General Scoring Standards for Rating Scale III." A "0" is used for reproductions like the original or for changes that are not like the other changes which are described.

Your rating for each item is to be placed in the appropriate place on the special answer sheet.

1) Opening sentence - line 1

Score 2 if "story-telling openings" are used.
   e.g., "This is a tale concerning two Indians."
   "This is the story of . . . ."
   "It came to pass that . . . ."
   Score 0 for reproductions like the original and other types of change.

2) "night" - line 1

Score 3 if the time of the story is changed to "day."
Score 0 if "night" was reproduced or if other kinds of substitutions were made.
Score 1 if the time of the story was omitted.

3) "night" - line 1

Score 2 if an adjective or adverb is used to describe the day or night; e.g., "dark night," "bright day."
Score 1 if the time of the story was omitted.
Score 0 if reproduced and other kinds of substitutions.

4) "young men" - line 1

Score 1 if "people" or a less emphatic word (not "boys") is substituted for "men."
Score 2 if they are dramatized; e.g., "warriors," "hunters," "bowmen," "natives," "Indians."
Score 0 for reproduction and other kinds of substitutions.
5) "down to the river" - line 1

Score 1 for omission of "river."
Score 2 if a more specific description than just "river" is given; e.g., "bank of the river," "in the middle of the river," "a river near Egulac."
Score 0 for reproduction and for other types of changes.

6) "river to hunt seals" - line 1

Score 1 if the purpose for going to the river is not mentioned.
Score 3 if: a) a more plausible activity than seal-hunting is substituted;
   e.g., "hunting," "camping," "walking"
   b) or they went to the "ocean," "shore," or "sea" to hunt seals.
Score 0 for reproduction or other types of changes.

7) "foggy and calm" - line 2

Score 1 for an omission of the weather.
Score 2 if the original phrase, "it became foggy and calm" is changed to a phrase with more dramatic emphasis.
   e.g., "very foggy and calm," "foggy and dreary," "fog began to roll in," "fog fell," "fog descended," "foggy and chilly," "foggy and rainy."
Score 0 for reproduction or other types of changes.

8) Score 2 if the description of the war-cries is given emphasis.
   e.g., "They promptly heard war-cries," "They heard loud war-cries," "They heard a strange noise," "war party coming after us."
Score 1 if the "war-cries" were omitted.
Score 0 for reproduction or other types of changes.

9) "hid behind a log" - lines 3 & 4

Score 1 for an omission of the fact that the two men hid themselves from the sight of the warriors.
Score 2 if "hid" becomes dramatized.
   e.g., "huddled," "crouched low," "took refuge."
Score 0 for reproduction or other types of changes.

10) "hid behind a log" - lines 3 & 4

Score 3 if any reason is given for hiding other than hearing war-cries or thinking it was a war-party.
   e.g., "because they were afraid," "because they were afraid the warriors would see them," "because they were frightened," "fearing that Indians might be attacking, they hid."
10) (contd.)
Score 1 for an omission of hiding.
Score 0 for reproduction or other types of change.

11) "There were five men in the canoe" - line 5
Score 1 if no mention is made of the men in the canoe.
Score 2 if extra description is given of the men;
e.g., "with fierce looking Indians," "warriors,"
"ghosts with white faces," "strangers,"
"man with war paint"
Score 0 for reproduction or other types of change.

12) Description of the meeting between the two men and those in the canoe - lines 4 & 5
Score 2 if extra description is given of the activity of the five men in the canoe, or if their approach is given emphasis.
e.g., "The canoe stopped and . . .," "A group of boats pulled up," "The canoe came closer and came right up to the boys," "paddling up to the bank."
Score 1 if the approach of the five men is omitted.
Score 0 for reproductions and other types of changes.

13) Description of the meeting between the two men and those in the canoe - lines 4 and 5
Score 3 if stated that the five men were actively seeking them or caught them in their hiding place, or that the two men voluntarily displayed themselves from their hiding place;
e.g., "but the warriors found them," "the men spotted them."
Score 1 if any meeting was not mentioned, or if it was not mentioned that the two men were hiding.
Score 0 for reproduction and other types of change.

14) "There were five men in the canoe, and they said:" - line 5
Score 3 if it is specifically stated that only one of the five men did the talking.
e.g., "one of the individuals from the canoe said"
"one of them said," "one man asked the other two."
Score 1 if the canoe was not described as having more than one man or the conversations were not described.
Score 0 for reproductions and other types of change.
15) "What do you think?" - line 6

Score 1 if phrase is omitted.
Score 3 if a more common form of greeting is substituted;
e.g., "Guess what?"
"Do you know what?" "What do you know?"
Score 0 for reproductions and other types of changes.

16) "We wish to take you along. We are going up the river to make war
on the people" - lines 6 & 7

Score 3 if the war plans are mentioned first and then the
invitation is given.
Score 0 if the original sequence is reproduced, or if only one
of the above ideas is mentioned.

17) Location of place to be attacked - lines 6, 7, & 13

Score 1 if the location of war is omitted.
Score 2 if the location is described in more detail than the
original copy; e.g., "a not too distant village," "a white
settlement."
Score 0 for reproductions and other types of change.

18) "To make war on the people" - line 7

Score 3 if a substitution is made for "the people" which sounds
more natural, less formal, and more familiar;
e.g., "the people of Kalama," "the people of the
neighboring town," "tribes."
Score 1 if "people" is omitted and no substitution is made.
Score 0 for reproductions and other types of change.

19) "Arrows are in the canoe" - line 9

Score 3 if answer is converted into informal, conversational
type language.
e.g., "We have enough," "We have some extras"
"we have a supply," "you will not need arrows,"
"that's o.k."
Score 1 if answer concerning arrows is omitted.
Score 0 for reproductions and other types of changes.

20) "My relatives do not know where I have gone." - lines 10 & 11

Score 3 if "relatives" becomes more personalized or familiar.
e.g., "wife and children," "wife," "my family," "no one at
home," "my friends," "personal obligations."
Score 1 if there is omission of the idea that someone (relatives,
wife, friends) would miss him if he went with the war party.
Score 0 for reproductions or other types of change.
21) Reason why one of the Indians returned home - lines 8-12

Score 3 if any explanation, other than he might be killed, and his people at home would not know where he was, is given for his return home.
   e.g., "because of a lack of arrows," "the coward returned home," "because he was feeling ill."
Score 1 if it is not mentioned or implied that the two men separate.
Score 0 for reproductions or other types of change.

22) Reason why one of the Indians went with the war-party - lines 8-12

Score 3 if any reason is given. His reason for going is left unexplained in the original copy.
   e.g., "because he didn't have any family obligations," "he was forced to go."
Score 1 if it is not mentioned that one man goes with the war-party.
Score 0 for reproduction & other changes.

23) The journey - line 13

Score 2 if a more specific description is given of the journey to a town on the other side of Kalama.
   e.g., "they paddled up the river," "got in their canoe," "the canoe, which was filled with men, went ..." "to a town across the river."
Score 1 if the journey is not mentioned.
Score 0 for reproductions and other changes.

24) "town" - line 13

Score 3 if "town" is changed to a more appropriate destination for an attack on people who are implied to be Indians;
   e.g., "village," "camp," "destination," "place."
Score 1 for omission of the destination of the attack.
Score 0 for reproductions and other changes.

25) "People" - lines 7 & 15

Score 3 if assumed that "people" up the river were Indians.
Score 1 if no mention is made of group up the river who fought the men in the canoes.
Score 0 for reproductions and other changes.
26) "The people came down to the water" - line 14

Score 1 for omission of fact that the opposition force came to meet the war-party.
Score 2 if a more dramatic description is given.
  e.g., "the people came out and yelled," "The natives came down . . ." "All of a sudden, the people . . ." "with spears and guns."
Score 0 for reproductions and other changes.

27) "to the water" - line 14

Score 3 if "water" is changed to "shore," "beach," "landing," "river" or any term which seems more natural in this context.
Score 1 for omission of fact that the opposition force came to meet the war party at the water.
Score 0 for reproductions and other changes.

28) Description of battle (not including the description of the wounding of the Indian) - line 14

Score 2 if a more dramatic description is given of the battle;
  e.g., "in the noise and confusion of the fighting," "gory experience," "much bloodshed," "big fight," "great battle," "hard fought," "lasted for days," "dropped with arrows in them."
Score 1 if:
  a) no mention is made of the number killed
  b) the number killed is minimized; e.g., "few were hurt," "none were killed," "it was a minor skirmish." (Score 1 only if battle has not been described more dramatically.)
Score 0 for reproductions and other types of changes.

29) "Many were killed" - line 14

Score 3 if a causative reason is specifically given for the number killed.
  e.g., "as it was a fierce battle," "as it was a vicious fight," "as it was only a minor skirmish."
Score 1 if no mention is made of the number killed.
Score 0 for reproductions and other type of changes.

30) "that Indian has been hit" - line 16. "He did not feel sick" - lines 17 & 21

Score 2 for an emphasized, dramatized, or more specific description.
  e.g., "our hero was hurt," "our leader has been hit," "was wounded in the side," "that Indian has been hit!" "was wounded several times," "felt a sharp pain," "was bleeding," "He was amazed that he didn't feel ill," "strangely enough, he did not feel sick."
Score 1 if both facts are not mentioned.
Score 0 for reproductions and other types of changes.
31) "He did not feel sick, but they said he had been shot" - lines 17 and 21

Score 3 if this contradiction is resolved or minimized in any way except by explaining it as being due to supernatural powers; such as saying he was shot and did feel pain, or that he was not shot and did not feel any pain, or that he was shot but it was a minor wound.

   e.g., "He was wounded and bled some."
   "He was shot, but he didn't feel much pain."
   "He was hit, but didn't die." "The fellow was apparently wounded although he felt no pain,"
   "I don't feel bad, I haven't been hit."

Score 1 for omission of lack of illness and being shot.
Score 0 for reproduction and other types of changes.

32) "Oh, they are ghosts." - line 16

Score 3 if any reason or implied reason is given for why the Indian suspected that he was associated with ghosts.

   e.g., "because none of the attacking Indians were injured," "because he was feverish," "because the arrows went right through them," "because even though he was shot he felt no pain," "the Indian tribe disappeared after he had been wounded."

Score 1 if ghosts are not mentioned anywhere in the body of the story (overlook the title).
Score 0 for reproduction and other types of change.

33) Reason for ending battle - line 15 & 16

Score 3 for a reason given for ending the battle other than the wounding of the Indian.

   e.g., "because they were losing," "because there were so many deaths," "after winning the battle."

Score 0 for reproduction and other types of change.

34) The journey home - line 18

Score 2 if this journey is emphasized more or if more specific description is given than in the comparison copy of the story.

   e.g., "So they sailed back to Egulac," "He was carried back on a litter," "The men threw him into the canoe," "They dumped him out on the shore," "They took him back to Egulac."

Score 1 if the journey home is not mentioned.
Score 0 for reproduction and other types of change.
35) "went ashore to his house" - line 18

Score 3 if stated that he returned to a more appropriate Indian dwelling or place.
   e.g., "village," "camp," "teepee," "igloo," "council," "home," "dwelling."
Score 1 if his return is not mentioned.
Score 0 for reproduction and other types of change.

36) "And made a fire" - line 19

Score 1 if there is an omission of the fact that there was a fire. (The paper doesn't have to say that he built the fire, only that it was present).
Score 3 if it was implied that the fire was already burning, or someone else made the fire, or he just lit the fire.
Score 0 for reproduction and other changes.

37) Preparations before the story telling scene - line 19

Score 2 if the description of the preparations is made more colorful.
   e.g., "He was anxious to tell his story," "vivaciously demonstrated how . . ." "He wrapped a blanket around himself," "He smoked a pipe," "The council watched him with awe," "He began to tell his adventures."
Score 0 for reproduction and other changes.

38) "And he told everybody and said:" - line 19

Score 3 if "everybody" is changed to:
   a) a listening audience which is more limited in scope than everybody.
   e.g., "his people," "the tribe," "his family,"
   b) "everything"
Score 1 for omission of phrase provided that no substitutions are made.
Score 0 for reproductions and other types of change.

39) The story telling scene - lines 19-21

Score 2 if elaborations are made upon his description of the battle.
   e.g., "The battle was fought furiously," "It was a terrific battle," "I was the only survivor," "They said I was killed," "In fact he felt very good," "I did not feel sick or anything."
Score 1 if the battle is not described.
Score 0 for reproductions and other types of changes.
140) People's reaction to his story telling - not in story

Score 2 if any description is given of the people's reaction to his story.
   e.g., "The people did not believe him."
   "His friends were amazed at the story."
   "There was rejoicing over the outcome of the battle."
Score 0 for reproductions.

141) "then he became quiet." - line 22

Score 1 for omission of fact that he became quiet at one time before he died.
Score 2 if his becoming quiet is made more mysterious, dramatic, or emphatic.
   e.g., "He went into a trance"
   "He then became very quiet."
Score 0 for reproduction and other types of changes.

142) "he fell down" - line 22

Score 2 if his falling (before he died) is made more dramatic or if more specific description is given. "Suddenly he fell," "he dropped over," "slumped to the ground."
Score 1 if falling is omitted before he actually died.
Score 0 for reproductions and other types of changes.

143) "when the sun rose, he fell down" - line 22

Score 3 if a reason was given for why he was up or why he fell down before he died.
   e.g., "still feeling healthy, he arose at sunrise."
Score 1 for omission of fact that he fell before he died.
Score 0 for reproductions and other types of changes.

144) "Something black" - line 23

Score 2 if a more elaborate description is given.
   e.g., "Suddenly something black .. ." "face became dark,"
   "tongue became black," "black liquid (or smoke, foam, phlegm, blood)."
Score 1 for omission of something black.
Score 0 for reproductions of other types of changes.
45) "Something black" - line 23

Score 3 if a change is made which makes the "something black" more reasonable or familiar - a "something" which has a basis in reality.
   e.g., "black liquid," "black blood," "blood," "black phlegm."
Score 0 for changes which are just as mystic as "something black," for reproductions, or for other types of changes.
Score 1 for omission of something black.

46) "Came out" - line 23

Score 2 if the exit of the "black something" from his mouth is made more dramatic than "came out."
   e.g., "poured out," "spewed out," "descended and engulfed him," "coughed out," "gushed out."
Score 1 if no mention is made of something black coming out.
Score 0 for reproduction and other types of changes.

47) Pre-death reactions - lines 22-24

Score 2 if the pre-death reactions are made more elaborate (other than becoming quiet, falling down, black from mouth, and contortion of face).
   e.g., "He became violently ill," "he became delirious," "he went into convulsions," "he let out a cry."
Score 1 if there is omission of all pre-death reactions.
Score 0 for reproduction and other types of changes.

48) "The people jumped up and cried," - lines 23 & 24

Score 1 if no mention is made of a dramatic emotional response from other people to the death of the man.
Score 2 if their reactions are given added emphasis
   e.g., "The Indians became hysterical," "They were speechless," "They were afraid of him."
Score 0 for reproductions and other types of changes.

49) "He was dead" - line 25

Score 1 if death is omitted.
Score 2 if his actual death is given a more elaborate description or if grammatical emphasis is given.
   e.g., "He fell dead by the fire," "He fell dead in the arms of an Indian companion," "He was dead!"
   "He dropped dead."
Score 0 for reproduction and other types of change.
50) "He was dead" - line 25

Score 1 if death is omitted.
Score 3 if a causative reason is given.
   e.g., "as a result of his earlier wound."
Score 0 for reproduction and other types of change.

END - NOW CHECK THE PAPER TO MAKE CERTAIN THAT EACH ITEM IS SCORED 1, 2, 3, OR 0
APPENDIX H

Revised Rating Answer Sheets for "Ghosts"

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BIBLIOGRAPHY


22. Irwin, F. W., and Seidenfeld, M. A. The application of the method of comparison to the problem of memory change. J. exp. Psychol., 1937, 21, 363-381.


I, Ronald Engle Johnson, was born in Dayton, Ohio, on July 28, 1932. My secondary education was received in the public schools of Montgomery County in Ohio. Two years of my undergraduate training were taken at Wilmington College, Ohio. The remaining two years were taken at Ohio State University, which granted me the Bachelor of Arts degree in 1954. During my graduate training at Ohio State University, I was graduate assistant to Dr. Horace B. English for one year and was a graduate teaching assistant for two years. From 1958 to 1960, I was an Assistant Professor of Psychology at College of the Pacific while completing the requirements for the degree Doctor of Philosophy.