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Edmiston,

William Hunt, Jr.

1986

THE EFFECTS OF TIME-COMPRESSION ON RECALL UTILIZING A VIDEOTAPE PRESENTATION

A Thesis

Presented to

The Faculty of the Department of Psychology

Western Kentucky University

Bowling Green, Kentucky

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

William Hunt Edmiston, Jr.

August 1986

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THE EFFECTS OF TIME-COMPRESSION ON RECALL UTILIZING A VIDEOTAPE PRESENTATION

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TABLE OF CONTENTS

LIST OF TABLES

THE EFFECTS OF TIME-COMPRESSION ON RECALL UTILIZING A VIDEOTAPE PRESENTATION

William H. Edmiston, Jr. June 1986 41 pages

Directed by: Leroy Metze, James Sanders, and Daniel Roenker

Department of Psychology Western Kentucky University

Three population samples of college students were found to be similar on two stratifying variables, general intelligence and knowledge of conditioning principles, before viewing a time-compressed or non-compressed videotape presentation. The amount of unprompted information recalled did not differ significantly between the time-compressed and non-compressed treatment conditions. Additionally, neither treatment condition differed significantly on a multiple-choice posttest, although both groups did differ significantly from a control group that did not view the videotape. No significant difference was found between the time-compressed and non-compressed groups on their ratings of Quality of Narrator, Interest Level of Topic, and Overall Quality of Videotape Presentation. The time-compressed group rated their presentation as significantly faster than the non-compressed group.

Introduction

The purpose of this study was to investigate the effects of a time compressed educational videotape on recall. More specifically, posttest scores were compared between three groups: those exposed to a time-compressed version of a test-relevant topic, those exposed to a non-compressed version of a test-relevant topic, and a control group that did not view the videotape. Additionally, viewer ratings of the pace of presentation, interest level of topic, perception of speaker, and overall quality of presentation were compared to examine differences between groups with respect to subject interpretation of the different tape presentations. Significant differences between groups would serve to clarify the value of time-compression as a tool to enhance information processing and recall, as well as provide data that will bridge the gap of information that currently exists regarding the use of time-compression with full length video productions.

Literature Review

Cognitive psychologists point out that the human mind has the inherent capability not only to receive information, but also to process that same information input to formulate appropriate responses that make up two-way communication. Researchers have since been faced with the question: What occurs within this complicated process when the only demand placed on the individual is in the form of one-way communication? David Berlyne (1960) has offered the

theory that the mind will often wander during one-way communication since the brain prefers to receive information at a faster rate than usual, as long as it is not uncomfortably fast. Previous research in speech compression has been focused on determining the optimum level of presentation (Fairbanks, Guttman & Miron, 1957; Orr & Friedman, 1964; Foulke, 1966; Foulke, 1968; Foulke & Sticht, 1969; MacLachlan & LaBarbera, 1979).

Until recently, the majority of research on time-compression has dealt with compressed speech only, as well as its effects within a variety of settings and populations. Due to the nature of this study, most studies that deal with speech compression exclusively will not be included in this review. Early techniques for combining time-compressed recordings with visual augmentation were rather crude when compared to present day methods. The very limitations that plagued early research in this area bring into question the validity of the conclusions derived from these same studies. In addition, studies with visually compressed presentations have produced conflicting results. In 1949, Vincent, Ash and Greenhill studied learning efficiency by "packing" film segments with large amounts of factual information. Although the study failed to demonstrate significant differences in total measured learning, it was valuable in illustrating the difference between time-compression and early methods of altering the presentation of information. This study appears to have examined the effects of sensory "overload" on retention whereas in time-compression, what is

typically considered an "average" amount of visual and auditory material is presented at a faster rate of speed. Zuckerman (1953) and Jasper (1953) warned researchers that "packing" sound tracks with too much information could have a detrimental effect on comprehension; the rate of words per minute in film should be slow enough to permit the viewer to grasp the material as it is presented. Nichols and Stevens (1957) and Orr, Friednard and Williams (1964) disagree with these theories, proposing the alternative theory that listening at the average rate of presentation is an inefficient means of learning. Travers (1964) agrees, maintaining that the pace of human speech allows time for the brain, with its keen desire to draw information from all sensory modalities, to "wander" during the inflections, pauses, and redundancies during everyday speech.

Audiovisual Research

Travers determined that combined audiovisual presentations demonstrate no greater effectiveness on level of comprehension than solo video or audio presentations at average (200 words per minute) speeds. There was, however, a significant increase in learning when the audiovisual material was presented at faster speeds of presentation. Travers proposed a number of factors that might contribute to this phenomenon:

> This first factor is undoubtedly the fact that the speeding up of auditory material by time compression results in a loss of intelligibility, but there is no corresponding loss through speeding the

> presentation of visual material. The second is that the eye can scan reading material in such a way that the words or groups of words transmitting the most useful information are more readily received. A third factor is that most people have had some experience in receiving information at higher speeds through the visual sense, but few have had comparable experience with high speed audio transmission. A fourth factor is that the information needed to identify a word transmitted aurally takes an appreciable time to transmit; but when the same word is transmitted visually, the entire information needed to interpret the word arrives at the receptor level at the same instant (Travers, 1964).

This study was replicated with similar results two years later by Jester and Travers (1966).

Boyle (1969) paired three types of visual stimulation with four different rates of aural presentation. Types of visual stimulation included: no visual stimulation, irrelevant and unstructured visual stimulation, and relevant pictorial stimulation. The four word rates utilized were normal rate of speech at 178 words per minute (wpm), 228 wpm, 278 wpm and 328 wpm. Recall was measured immediately after presentation and one week following presentation. The results revealed no differences between the three visual presentation modes. There was, however, a significant inverse relationship between the four word rates with comprehension decreasing with increased word rate.

Slide-Augmented Research

Previously mentioned technological limitations in the field of time compression limited most major research to the use of compressed speech tapes paired with crude visual presentations. These presentations were comprised of still photographs, slides, or filmstrips displayed at specific time intervals estimated by the experimenter to best match the speed of the audio presentation. A study by Anderton (1969) in which four rates of presentation (150, 200, 250, and 300 wpm) were presented with and without pictorial embellishment failed to produce significant differences between tape-slide programs at different rates or between the use or absence of pictorial embellishments.

An experiment in which educable mental retardates served as subjects was developed to investigate comprehension differences between reading, aural-only, and aural-slide modes of presentation (Woodcock and Clark, 1968). Listening rates varied between 53 and 378 wpm. Scores on comprehension tests revealed the following: both auditory presentations were superior to reading in producing higher comprehension scores and auditory-slide presentations were more effective than auditory presentations alone. The authors state that the results "clearly indicate that rates in the auditory modes ranging from 178 to 278 wpm are generally more efficient with respect to the amount of learning per unit of time."

In a dissertation by Perry (1971) at Michigan State University, recall was measured after presentation of a

compressed slide-audio tape program. A 1700-word passage was presented at 150 and 250 wpm to 76 college students. Slides were manually synchronized with the compressed audio tape with no significant differences between the speed groups.

Film-Augmented Research

Research continued into the 1970's, focusing on the effect of time-compression on film. It was suggested that every eighth frame of a 16mm sound film could be deleted without any appreciable loss of content, while retaining an acceptable level of auditory content (Kauffman, 1967). One of the first studies involving the use of film was performed by Parker (1971). Implemented in this study were a normal presentation and three compressed versions where every sixth, eighth and tenth frame were deleted. Parker determined that no significant differences existed between levels of compression determined through comparison of group means on a 17 question posttest. Particularly noteworthy is the low rate of compression of the three experimental groups: 16.7%, 12.5%, and 10% for the six, eight, and ten frame deletion productions respectively.

Benz examined two factors in his 1971 study: the rate of compression (normal, one-third, one-half) and the effect of visual-augmentation on recall. At corresponding rates, the mean scores of the visually-augmented versions were significantly greater than the aural-only groups. This led Benz to conclude that visual presentations may be compressed

up to 33% without a significant loss in comprehension. Particularly noteworthy in this study is the lack of any pretest, making it difficult to rule out prior knowledge concerning the topic of presentation.

Related Studies in Education

With the ever increasing use of videotape presentation in the classroom, researchers have become more or less obligated to examine its efficacy when paired with time-compression techniques. The potential value of compressed videotape becomes more obvious when one considers how the use of instructional television has grown in the last fifteen years. Tapley (1981) points out that difficult concepts are better understood when presented on television. The ability to show a seed quickly blossom into a plant or to watch a house being built from the ground up in seconds provides the viewer with "systems" concepts that can not only be seen, but more easily grasped. Loper (1967) initiated a study to determine if television presentations could be speeded up while maintaining adequate comprehension and if a visual component would have an affect on comprehension. Three rates of presentation (normal, one-third, and one-half) were used. The 50% compressed and normal versions were found to produce greater scores on a posttest administered two weeks after the experiment. In general, the aural-only versions were comparable to the compressed versions on posttest scores. Loper concluded that visual augmentation did not enhance comprehension but did have a positive effect on retention of material when

presented at high speeds.

Sanders (1975) explored the effects of compressed videotape presentations on comprehension in elementary school children. Three levels of compression were utilized (20, 40 and 60 percent) to determine if there was a preferred rate of presentation. In addition, the effects of exposure to a pretest on posttest scores was investigated. Audio compression was performed, as in many other studies of this kind, at the Center for Rate-Controlled Recordings at the University of Louisville, Kentucky. Video compression was achieved by means of subjective scene-by-scene editing of the original 16mm film after being transferred to videotape. The editing of the video segments was performed after the compressed audio signals were dubbed onto each respective videotape. The author notes that no visual segment was totally deleted in the compression process and that retention of all visuals relevant to the audio portion of the tape was maintained. Results obtained from posttest revealed no significant differences in comprehension between the normal, 20, and 40 percent (275 words per minute) compression rates. The 60 percent (300 words per minute) compressed version produced significantly lower posttest scores, supporting Sanders' prediction that scores would differ significantly at this rate of presentation. The introduction of a pretest prior to viewing any version of the videotape had no significant effect on posttest scores. Sanders suggested that future research include the use of

different subject matter and grade levels, material of a highly visual nature, and the utilization of a larger sample on which to make statistical measurements.

Related Studies in Business and Industry

More recently, time-compression has been utilized as an integral part of advertising and marketing strategy. Using previous research as a premise for their studies, marketing researchers and have become increasingly interested in how to make the most of their advertising dollar. In today's media market, where a 30 second radio or television spot can run into hundreds of thousands of dollars, a major goal is to increase the amount of information presented without adversely affecting viewer interest or recall. In one particular study, six popular television commercials were shown to two groups of subjects (MacLachlin & LaBarbera, 1978). Each group viewed three of these commercials in their regular form, while three were compressed to a rate 25 percent faster than normal. The design allowed Group 1 to view a "normal" commercial, while Group 2 would see the compressed copy of the same commercial. On a six-point Likert scale ranging from "very dull" to "very interesting," subjects rated the faster paced commercials as more interesting in five of six cases. In an unannounced test two days later, subjects were asked to recall the commercials they had viewed earlier. No significant differences were found between the two experimental conditions. In this study, compression was achieved by using a relatively new device, the Lexicon Varispeech II,

which has the capability of processing recorded speech at a faster rate of speed while correcting for voice pitch variations. The result of this process is a compressed audio signal that sounds essentially normal. This device will be explained in greater detail in a later section of this study.

In a similar study by MacLachlan & Siegel (1980), 128 undergraduates viewed an edition of the television show 60 Minutes. Students were randomly assigned to one of two groups. Group 1 viewed the show that contained four normal 30-second commercials. Group 2 viewed the same show with six commercials (four 24-second compressed versions of the same commercials used in Group One, along with two additional time-compressed 12-second spots). No subjects were aware of any differences between compressed and non-compressed presentations. All participants were unaware that the commercials were the focus of the study. Two days later, students were presented with aided and unaided recall questions concerning the commercial content of the show. An unaided question was one in which students were asked to name the advertised products. Aided questions prompted the student with the name of the product before asking them to describe the content of the commercial. Results indicated that unaided recall was 36% greater for the time-compressed commercials; aided recall was 40% greater in favor of the time-compressed versions. The two additional 12 second commercials, which were only seen by Group 2, also produced significantly greater recall scores, 38% greater for unaided

and approximately 47% greater for aided recall questions. One theory proposed by MacLachlan and Siegel, viewer preference, for a specific compression rate (25% faster), was found to be the most likely to have an effect on recall. These results are in agreement with and support previous studies (Foulke and Sticht, 1969; MacLachlan & LaBarbera, 1978). LaBarbera (1980) points out:

> The optimal rate of compression in an educational context is idiosyncratic--some learners prefer faster rates, some slower. Obviously, the rate interacts with the type of material, the learning criterion measures, and the instructional environment.

She adds:

> Findings from speech compression studies also have implications for developers of instructional materials. Typically, speakers are directed to use a moderate rate of speech. It may be better to compress this rate by about 75% (speech compression) with no resulting loss of comprehension. (p. 1).

In an unpublished paper entitled "New Developments in Time Compression," MacLachlan summarizes," Undoubtably many exciting and unexpected applications will be discovered in the future. I expect that in the field of employee training and education that there is a great potential" (MacLachlan, 1981).

Despite these positive findings, time-compression is somewhat questionable in its effectiveness. Although his last study dealt solely with radio commercials, MacLachlan confirmed his previous findings that time-compression does not hinder, and in some instances enhances, listener perception in audio-verbal communication without music (MacLachlan, 1982). In a study to determine the effectiveness of time-compressed television commercials with older adults, it was found that compression had a negative effect on recall in the elderly (60-69 years), had no significant effect on the middle aged (40-49 years), and improved recall in young adults (20-29 years). The author points out that the elderly also performed poorly on the non-compressed version, leading to the conclusion that the aged do have difficulty processing information in general, and that this difficulty is compounded when the rate of information flow is faster than normal (Stevens, 1982). The author concluded that the age of the audience is significant in determining whether or not time-compression is to be utilized. Although not mentioned in the article, it is assumed that the method of compression was the same employed in the previous studies by MacLachlan and LaBarbera and MacLachlan and Siegel, since the author states that the experiment was designed to extend those authors' findings.

In another study designed to compliment MacLachlan's work, 1,777 adults in multiple locations viewed a seven commercial sequence, in which three were specifically targeted for compression (Riter, Balducci & McCollum, 1983).

Subjects were chosen to view either time-compressed or normal productions of these three test commercials. Three measures often used to evaluate advertising effectiveness were examined: clutter awareness, main idea registration and motivation. Clutter awareness, a commercial's ability to stand out from the remaining commercials, was found to be non-significant between groups. Although this finding agrees with the MacLachlan/LaBarbera (1978) study, the fact that there was also no significant increase in unaided recall is in opposition to the MacLachlan/Siegel (1980) study. Subjects' ability to recall the primary message or main idea of the commercial was significantly greater in two of the three compressed commercials, leading the authors to conclude that "the shorter versions are at least equal to their normal-length parents in message registration." Motivation, which was determined by an examinee's reported willingness to purchase the advertised brand over their stated brand preference, was not affected by time-compression. It is important to note, however, that the third commercial, which was the least affected by time-compression (it did in fact, display greater effectiveness in the 30-second mode), was also notably lower in awareness and main idea registration recall. The authors were in agreement with previous theory suggesting that commercials that are more complex may suffer from time-compression.

Cognitive Research

Schlinger, Alwitt, McCarthy & Green (1983) examined the effects of time-compression on attitudes and information

processing. Subjects viewed one time-compressed and two normal commercial productions. No subjects reported an awareness of a faster rate of presentation. Idea coding, a procedure that allows for the analysis of unprompted recall of details was also used. The authors described idea-coding as follows:

> An idea is defined as a proposition about the content of the commercial, including the narrative, product brand and sales message. A sentence may contain several ideas. For example, it may contain ideas about an action or the locale. An idea answers the question who, what, whom, when, where, why and how, and might consist of a word, part of a sentence or an entire sentence. An idea is counted once regardless of how many times it is repeated. Each respondent protocol was coded by counting the number of ideas expressed in such open-ended questions as, "In your own words, please describe what went on and what was said in the commercial." (p. 79).

Although data analysis revealed that more ideas were recalled from the normal version of one commercial, no significant difference was found between the compressed and non-compressed versions of the second commercial. There are, however, a few factors that do not allow for a direct comparison to be made between these two commercials. The

first commercial had been previously in the area from which subjects were drawn prior to the study, thereby making it difficult to control for an indirect form of "practice effect." In addition, the first commercial was described by the authors as being "more complex" than commercial two. The complexity of the presentation, as previously proposed by earlier research, may have an inverse affect on the purported benefits of time-compression. The second commercial was part of a series of advertisements that were described as being "familiar to many viewers." The authors hypothesize that commercial two may have demanded less cognitive effort to process, thereby providing a tentative explanation for the lack of difference between recall scores.

In summation, the literature thus far supports the need for future research into the applicability of time-compression as a tool that has the potential to

1. Enhance audiovisual communication in such a way that retention of content can be improved or maintained while shortening viewing time

2. Allow educational films and/or videotapes to be presented in a shorter time span, thus allowing more time for other classroom activities

3. Quicken the pace of instructional films that have a tendency to be "dull" in their rate and style of presentation.

Until a decade ago, most research was concentrated on speech compression, occasionally including a visual

component in the form of photographs or slides. Even the early work with film or videotape was often performed by splicing together makeshift frame-by-frame versions designed to serve as the time-compressed" counterpart to the compressed speech component. Only in the last few years have the advances in technology, and the sometimes resulting lower cost, allowed researchers to explore truly "time-compressed" modes of audiovisual presentation. There are a number of companies that now produce machines that eliminate most of the problems associated with traditional cut-and-splice methods which are capable of synchronized processing of both audio and visual information (Evantide Clockworks Timesqueeze System, Integrated Sound Systems' TDM-8000 Audio Time Compressor, Lexicon 1200 Audio Time Compressor, and the United Media Translator and Director System)(McCarthy, 1982). Conflicting results, vastly different experimental methodology and technical limitations make it necessary to explore the value of time-compression before it is discounted as a passing electronic fad or hailed as an educational and marketing panacea.

This study was designed to investigate the differences between groups who view a time-compressed and regular version of an instructional videotape. Specifically, it it is expected that the process of time-compression will not interfere with recall. In addition, it is expected that viewers will rate the time-compressed tape as more interesting than its non-compressed counterpart.

Method

Subjects

Students from three sections of Communication 204, the Persuasive Communication course at Northern Illinois University, were recruited as subjects for the experiment during April, 1985. Demographically, ages varied from 18 to 25 years, subjects hailed from large city urban (Chicago) to small rural towns, with both sexes equally represented in the final sample. Subjects were introduced to the study through a brief, in-class presentation which outlined their involvement in the study. The presentation was designed so as not to alert the students to the specific research design or the concept of time-compression. Subjects were offered extra credit toward their class grade for their participation. Course grades were determined by the number of accumulated points over the semester; consequently, the idea of offering extra credit was attractive to all students since it did not discriminate against those with high grades. Fifty-nine subjects appeared for the first experimental session on April 17, 1984, at 6:00 p.m. Subjects were randomly assigned to one of three groups through a blind drawing of their social security numbers, which were obtained at the time of sign-up. The second experimental session was held the following day, April 8, 1985, at 6:00 pm. Two subjects from the previous session

failed to arrive at the second session, resulting in their exclusion from the study. A die was used to determine the experimental conditions assigned to each of the three groups (see Table 1).

Table 1

Division of Experimental Conditions for Groups

Group	[a] n	Treatment Condition
1	18	No videotape presentation
2	21	Non-compressed videotape
3	18	Compressed videotape

[a]Numbers of subjects who participated in both experimental sessions.

Apparatus

The videotape, a Harper and Row Media Program entitled "Classical and Instrumental Conditioning," was chosen due to its high level of visual and instructional content. The videotape was purchased through MTI Teleprograms Inc., 3710 Commercial Ave., Northbrook, Illinois, 60062. Copyright permission to duplicate this videotape for research purposes was obtained from MTI Teleprograms, Inc. prior to purchase. Each viewing room was equipped with a Sony one inch U-Matic videotape record/playback unit linked to a 19 inch Sony Trinitron Color television, Model no. KV 1917. A one-inch C format copy was produced at the Western Kentucky University Educational Television Center and sent to Teletronics Inc., a New York production facility for time-compression. The primary instruments used in producing a one inch compressed

version were the Lexicon Model 1200 Time Compressor/Expander and Sony Model 2000 U-Matic videotape machine. The videotape was compressed by 20%, resulting in a total viewing time of 16 minutes, while the non-compressed version ran 20 minutes in length.

Procedure

Subjects were seated in three identical classrooms selected for their seating capacity, lighting, and distance from extraneous stimuli. Three cohorts assisted with the administration of the test materials and served as monitors in each classroom. The first test administered was the Henmon-Nelson Test, a brief group intelligence test used to stratify subjects on general intelligence. Its ease of group administration and high correlation with other intelligence tests made it the best available choice for this study. Subjects were also presented with a pretest over basic classical and instrumental conditioning principles, composed of multiple-choice questions obtained from various introductory psychology instructor manuals. Of the 32 questions on the multiple-choice pretest, eight dealt specifically with conditioning principles (see Appendix A). Target questions were evenly dispersed throughout the pre-test so that subjects would not be cued as to the specific topic being measured. An individual's pretest score was determined by the number of correct responses on these eight questions. The Henmon-Nelson answer sheets were electronically scored through the use of a computer scanner. Pretests were scored by a trained graduate student at

Northern Illinois University, and were checked for accuracy by a second graduate student. Subjects reported to the same classrooms to which they had been assigned the previous evening. Subjects in Groups 2 and 3 were shown their respective videotape presentations, while subjects in Group 1 were presented with a brief article to read that was irrelevant to conditioning principles. Both presentations ran to their complete length, including end credits. Subjects were not allowed to discuss the videotape either during or after the presentation, and were instructed to sit quietly for a period of five minutes after viewing the videotape. Groups 2 and 3 were presented with a two-part posttest that was composed of 23 multiple-choice questions specific to the presentation (see Appendix B), as well as an open-ended essay question that encouraged them to write down as many aspects of the presentation as they could remember (see Appendix C). There was no time limit on either section of the posttest. Group 1 was limited to the multiple-choice portion of the posttest.

Two types of measures were employed in the construction of the posttest: multiple choice and idea coding. In order to elicit the correct answer on a multiple choice test, the question must contain enough content to jog the memory of the subject, thus serving as a cue to recall. A way to minimize this effect was to incorporate idea-coding into the posttest questionaire. With idea-coding, an open-ended essay question is used to elicit as many ideas as possible about a topic in order to measure an individual's unprompted

recall. Predetermined key words, representing ideas, are worth one point when they appear in an individual's essay (see Appendix D). Each key word can only be counted once, regardless of the number of times it appears in an essay. Idea-coding is valuable in extracting treatment-specific information that multiple choice questions cannot assess, and helps to counteract the bias inherent in cued recall questions.

Results

A oneway analysis of variance of the two covariate measures (Pre-experiment knowledge of subject matter, general IQ scores) produced no significant difference between group means. An analysis of covariance on one post-test measure (Multiple Choice test) revealed a significant difference between the three groups. A separate analysis of covariance on the second posttest measure (Essay test) revealed no significant difference between Groups 2 and 3. Mann-Whitney U tests were conducted on four Likert scales measuring the treatment groups subjective ratings of the videotape (see Appendix E) revealed only one factor, pace of presentation, as being significantly different between groups 2 and 3.

Pretest Data

Table 2 illustrates the means for each group on both pretest measures (Multiple Choice and Henmon-Nelson) and both posttest measures (Multiple Choice and Essay). An analysis of variance of the pretest means revealed no significant difference between the three groups, suggesting that the three groups were essentially similar with regard to the designated covariates. Group 1 (Control) was excluded from the Essay measure since those subjects did not view the videotape.

Table 2

Group Means on Pretest and Post-test Measures

	Pre-test Means		Post-test Means	
Group	Multiple Choice	IQ	Multiple Choice	Essay
1	4.00	53.17	8.33	----
2	4.24	53.29	12.33	25.28
3	4.17	54.39	11.61	28.38

Post-test Data

An analysis of covariance (ANCOVA) was conducted to determine the significance of differences between groups on the two post-test measures. A pretest/post-test design was preferred because it treats the pretest measures as covariates rather than include the pretest means in the calculation of the main effect, as in a split-plot design, which can mask or diminish the effects of the independent variable (Keppel, 1973). The analysis of the essay means revealed no significant differences between Groups 2 and 3 in their ability to recall key ideas and terms, regardless of presentation format. The same analysis of the multiple choice post-test yielded a significant difference between the three groups, $F(2, 54) = 9.35$, $p<.001$.

Orthogonal contrasts were employed to test the hypothesis that the observed F-value was primarily attributable to the difference between the control group mean and the average of the two treatment group means

(Contrast 1). A second contrast (Contrast 2) was conducted to rule out the possibility that the observed F-value reflected the difference between the treatment group means alone. Table 3 summarizes these contrasts, indicating that the obtained F-value was primarily attributable to the difference between the control group mean and the average of the treatment group means.

Table 3

Summary of Orthogonal Contrasts on Multiple Choice Post-test Measure

		Pooled Variance Estimate			
Contrast	Value	SE	T-Value	df	T-Prob.
1	3.64	.86	4.22	54	.000
2	-0.72	.97	-0.74	54	.460

Qualitative Ratings Data

Utilizing a five point Likert scale, subjects in Groups 2 and 3 were asked to rate the videotape presentation on four dimensions: Pace of Presentation, Quality of Narrators Presentation, Interest Level of Topic, and Overall Quality of Videotape (see Appendix E). The Wilcoxon Mann-Whitney U test was utilized to compare group means on these dimensions. Pace of Presentation was the only dimension rated as significantly different between the compressed and non-compressed groups, $z = -2.57$, $p<.05$.

Subjects who viewed the time-compressed videotape would appear to have "sensed" that the pace of the tape was slightly faster than normal, whereas the non-compressed group rated the tape as slightly slower than normal.

Discussion

The data fail to support that there is a difference between the time-compressed and non-compressed presentations, suggesting that if a difference exists between these modes of presentation, it cannot be found within the limitations of this study. Although previous studies have produced results suggesting that time-compression can enhance recall, the results from this study did not provide supportive data for the previous studies. Research results that have revealed a positive relationship between time-compression and enhanced recall have relied primarily on short television commercials rather than full-length productions. Consequently, it may be reasonable to hypothesize that the length of presentation plays an important role in determining the effectiveness of time-compression and that its positive effects on recall diminish over time. Additionally, the complexity of the material, an issue addressed in previous research, may have an effect on the overall efficacy of time-compression. This is not to suggest that time-compression is limited to television commercial enhancement alone. It may be well-suited for academic and business use, where brief videotape presentations are often used. The ability to reduce classroom and professional training time without adversely affecting recall may prove to be a valuable asset to these institutions. Time compression may, in fact, be the preferred method of editing since there is no loss

of continuity or content.

The data also failed to support the hypothesis that viewers of time-compressed material would rate their presentation more interesting and enjoyable. The difference between the treatment groups on their perception of presentation speed is unique to the literature; as viewing time increases, an individual may become indirectly aware of the time-compression process. Hypothesis' that may explain these results include the following:

1. Whether individuals have the ability, inate or otherwise, to sense what is "right" in terms of presentation speed, or,

2. Whether time-compression, when paired with longer presentations, demands a level of attention that ultimately results in an individuals perception of the information as being presented at an uncomfortably fast pace.

The previously reported benefits of time-compression, attribution of positive characteristics to the narrator, increased interest in the subject matter, and greater overall ratings of the presentation in general, may, as suggested by these data, dissipate over time.

Directions for future research are likely to be determined by the type of material presented, the degree of compression desired, and the needs of the institution for whom time-compression is considered. It may be discovered that although time-compression poses no threat to comprehension or recall, the maximum level of compression that can be used

effectively may not amount to a significant savings in time. Colleagues who wish to further explore its effects with instructional materials may wish to investigate these areas:

1. The relationship between time-compression and complexity of subject matter,

2. Its appropriateness between groups of individuals of varying learning abilities, and,

3. The interaction between length of presentation and comprehension with varying degrees of compression.

Although much more information will be needed before time-compression can or should be universally applied to instructional videotapes or film, it may, in the meantime, assist in researchers by providing a better understanding of how the human mind processes, stores, and retrieves information.

Appendix A

Pretest

1) Blue eye color is least likely to involve or illustrate:
   a. DNA
   b. genotype
   c. phenotype
   d. natural selection

2) If you convince yourself you love your father when you really hate him, you are showing the defense mechanism of:
   a. projection
   b. reaction formation
   c. displacement
   d. rationalization

3) The meat powder, which produced a salivation response in Ivan Pavlov's dogs without any prior conditioning, is the:
   a. unconditioned stimulus
   b. conditioned stimulus
   c. either a or b, depending on whether a conditioning trial or a test trial is being conducted
   d. positive reinforcer

4) Schizophrenia is a type of:
   a. neurosis
   b. mania
   c. psychosis
   d. character disorder

5) Which statement is not true?
   a. 20 percent of birth defects can be attributed to heredity.
   b. Twins occur every 190 births.
   c. One out of every 16 U.S. babies has birth defects
   d. If the mother has rubella in the first trimester, the child may be harmed.

6) The Oedipus complex, according to Freud, occurs in which stage?
   a. oral
   b. anal
   c. phallic
   d. latency

7) Who is known for his pioneering experiments in classical conditioning?
   a. Watson
   b. Pavlov
   c. Freud
   d. Skinner

8) A well-to-do student is paying for his groceries with a bad check. As he approaches the cashier he gets anxious and red because he dreads being asked for his I.D. Most likely he is experiencing:
   a. neurotic anxiety
   b. reality anxiety
   c. moral anxiety
   d. stranger anxiety

9) Children with phenylketonuria may display all but which one of the following?
   a. mental retardation
   b. hyperactivity
   c. visual disorders
   d. epileptic-like seizures

10) Probably the most widely used defense mechanism is:
a. projection
b. repression
c. fixation
d. reaction formation

11) While you are playing with your pet dog, a bee stings you. From now on each time you see the dog you feel uneasy and want to get away from the animal. The bee sting is a(n):
a. unconditioned stimulus
b. unconditioned response
c. conditioned stimulus
d. conditioned response

12) The book Sybil concerns a classical case of:
a. dissociative reaction
b. obsessive-compulsive reaction
c. paranoid reaction
d. manic-depressive reaction

13) Which statement is not true of genetically-related diseases?
a. 4 percent to 5 percent of American blacks are carriers of the gene for sickle-cell anemia.
b. 1 percent of American blacks suffer from sickle-cell anemia.
c. Sickle-cell anemia is ultimately fatal.
d. Cystic fibrosis afflicts only northern European whites.

14) If, as a psychotherapist, you have sex with a client and convince yourself that it was part of the client´s therapy, you are engaging in:
a. repression
b. reaction formation
c. rationalization
d. fixation

15) B. F. Skinner is famous for his work in:
a. biofeedback
b. contingency conditioning
c. punishment methods
d. operant conditioning

16) Dissociative reactions include all except:
a. amnesia
b. phobia
c. multiple personalities
d. sleepwalking

17) Which one of the following statements is not true of Down´s Syndrome?
a. It is inherited from the parents.
b. Children with this condition rarely have I.Q.´s over 50.
c. It is more likely if the pregnant woman is over 40.
d. Children with this condition have a flat face and slanted eyes.

18) Which one of the following is not true of the ego?
a. It makes sure impulses are gratified with socially acceptable bounds.
b. Its actions are usually in our awareness
c. It operates according to the pleasure principle
d. It is the executive part of the personality.

19) If you wear a blue dress to school one day and everyone comments on how good it looks on you, you are more likely to wear that dress again, as a result of:

a. Classical conditioning
b. cognitive learning
c. operant conditioning
d. observational learning

20) Depressions that do not have any apparent immediate cause are called:

a. reactive
b. exogenous
c. endogenous
d. manic

21) Which one of the following has not been linked with adverse affects on an unborn child?

a. nutrition
b. use of tobacco
c. use of alcohol
d. blood pressure

22) Which one of the following is not true of the superego?

a. It acquires the values of parents and society
b. It is the moral part of the self
c. It controls the ego
d. It looks at what is ideal

23) A neutral stimulus can be made to elicit a response similar to the unconditioned response. When this happens, we call the stimulus the:

a. unconditioned stimulus
b. learned stimulus
c. conditioned stimulus
d. conditioned response

24) A physiological factor associated with depression is:

a. decrease in norepinephrine
b. decrease in epinephrine
c. increase in norephinephrine
d. vitamin deficiency

25) Which of the following is not controlled by a single-gene pair?

a. Blood type
b. color vision
c. intelligence level
d. hair color

26) Which one of the following is not true of the Id?

a. It is the reservoir of our biological urges.
b. It is controlled by the superego.
c. Its actions are usually in our awareness.
d. It is interrelated with the ego and the superego.

27) Whenever you smell the antiseptic odor of alcohol, it makes you sick to your stomach because you associate it with the time you spent in a hospital when you were very ill. Your reaction to the alcohol is:

a. instinctual
b. an unconditioned response
c. a conditioned stimulus
d. a conditioned response

28) The schizophrenic who is apathetic, seclusive and rarely has delusions and hallucinations is called:

a. simple
b. catatonic
c. hebephrenic
d. paranoid

29) Which statement is least accurate of the relationship between genes and behavior?

a. Genes affect the development of the brain and the nervous system.
b. Genes affect the enzymes that help regulate our chemical processes.
c. The grey rat is tamed more easily than the white rat.
d. Genes do not produce behavior; people do.

30) Which one of the following is not true of Freud's theories?

a. Freud's theories have generally not been proven.
b. The subduing of biological urges cleanses people of emotional conflicts.
c. The latency period is longer than the first three periods combined.
d. Freud believed that human behavior was dominated by instinctual urges.

31) Classical conditioning involves:

a. operant responses
b. skilled responses
c. involuntary responses
d. voluntary responses

32) A mother's withdrawal from her son's affectionate hug followed by her statement that "you should not be so easily embarrassed and afraid of your feelings" is an example of:

a. a dissociative reaction
b. double-bind communication
c. loose association
d. bizarre ideation

Appendix B

Posttest

1) The process of learning in which actions are strengthened or weakened by their consequences is called:
   a. classical conditioning
   b. reinforcement conditioning
   c. instrumental conditioning
   d. associative conditioning

2) The stimulus that uniformly and consistently elicits an identifiable response prior to the experiment is called:
   a. conditioned response b. learned response
   c. unconditioned response d. operant response

3) The narrator of the videotape was:
   a. Harold Winston, Ph. D. b. Daniel Moates, Ph.D.
   c. Albert Ellis, Ph.D. d. Howard Rachlin, Ph.D.

4) If you turn on the aquarium light each time you feed your fish, you will note that after a while the fish will come to the top of the tank as soon as the light is turned on. The aquarium light has become:
   a. an unconditioned stimulus
   b. a conditioned stimulus
   c. an unconditioned response
   d. a conditioned response

5) Pavlov believed that conditioning took place solely because of:
   a. expectancy b. contiguity
   c. both a and b d. neither a nor b

6) The title of the videotape is:
   a. Behavioral Conditioning
   b. Conditioning Techniques
   c. Classical and Instrumental Conditioning
   d. Learning through Conditioning

7) If conditions are arranged so that the responses, emitted when some stimulus (e.g., a light) is present, are reinforced but responses emitted in the absence of the stimulus are not reinforced, the stimulus is serving as:
   a. a discriminative cue b. an operant
   c. an unconditioned stimulus d. a conditioned stimulus

8) The meat powder, which produced a salivation response in Pavlov's dog without any prior conditioning, is the:
   a. unconditioned stimulus
   b. conditioned stimulus
   c. either a or b, depending on whether a conditioning trial or a test trial is being conducted
   d. positive reinforcer

9) The name of the clinic in which the boy had his reflexes tested was:
   a. General Medical Center
   b. Elm Professional Plaza
   c. Lakewood Medical Plaza
   d. Bay Village Professional Plaza

10) Increasing the probability of a particular response through reinforcement describes a kind of learning known as:
   a. instrumental conditioning
   b. classical conditioning
   c. operant conditioning
   d. both a and c

11) Before B. F. Skinner coined the term "operant conditioning," another behaviorist referred to the procedure as "instrumental conditioning." This person was:
   a. Watson
   b. Pavlov
   b. Thorndike
   d. Roenker

12) What was the subject of the book the boy was reading?
   a. Chemistry
   b. English
   c. History
   d. Math

13) In operant conditioning, extinction is said to occur when:
   a. a discriminative stimulus is not present
   b. an operant is punished
   c. an operant is negatively reinforced
   d. an operant is not reinforced

14) The price of the lemonade the boy purchased was:
   a. 5 cents
   b. 10 cents
   c. 15 cents
   d. 3 cents

15) Ivan Pavlov was a:
   a. behavioral geneticist
   b. physiologists
   c. psychologist
   d. both b and c

16) The fact that a dog will no longer salivate in response to a bell after a number of extinction trials suggests that:
   a. the organism is adapting to a change in the environment
   b. the animal´s learning was weak
   c. the organism´s behavior is fickle and inconsistent
   d. the animal is not as intelligent as a human being

17) Instrumental and classical conditioning were initially researched in the
   a. 1870´s
   b. 1900´s
   c. 1920´s
   d. 1880´s

18) A student studies because of fear of flunking a test. Studying reduces the fear. Skinner would say that studying is a(n):
   a. operant
   b. conditioned response
   c. unconditioned response
   d. reflex

19) The pigeon learned to look towards the key due to a process called:

a. acquisition
b. orientation
c. shaping
d. approximation

20) In classical conditioning, the extinction process involves repeated presentation of the:

a. CS without the CR
b. US without the UR
c. CS without the US
d. CR without the UR

21) Emitted VS. elicited responses differ in which way?

a. both are part of classical conditioning
b. emitted is part of operant conditioning, elicited is part of classical conditioning.
c. both are part of operant conditioning
d. emitted is part of classical conditioning, elicited is part of operant conditioning

22) The enclosure in which the pigeon was contained is called:

a. conditioning box
b. Skinner box
c. Pavlovian box
d. training box

23) The can the boy was kicking was a:

a. Coca-Cola can
b. 7-up can
c. Dr. Pepper can
d. Lipton Tea can

Appendix C

Essay Test

Please describe in as much detail as possible (e.g., as if you were telling a story) the videotape you have just viewed. Be sure to include any terms and demonstrations or examples used in the film. There is no time limit and you are encouraged to write down everything that you can recall from the film. Additional paper will be supplied if necessary.

Appendix D

Key Words

boy, doctor, hospital, clinic, reflexes, knee

lemonade stand, children, girl, friends, bike, boy lemon, salivate

classical conditioning, Pavlov, dog, tubes, slit, powder, food, tuning fork, tone, bell, salivation, UCS, UCR, CS, CR

man, narrator, gun shots, pistol shots, blanks, bullets

boy, kicking, can

emitted responses, elicited responses

boy, basketball game

instrumental conditioning, Thorndike, Skinner, operant conditioning, learned, learning

pigeon, bird, Skinner box, box, cage, feeder, buzzer, sound, key, light, reinforcement, food, rewards

boy, sitting on steps, book, bicycle, math, homework

extinction trials

man and woman, car, station wagon, down hill, brakes, classical conditioning, operant conditioning

lady, girl, crossing street, almost hit by car

man, supermarket, store, buying cigarettes, hit machine, money

Appendix E

Qualitative Ratings Scales For Videotape

Please rate the videotape you have just viewed. Circle one:

Pace of presentation:

1	2	3	4	5
(very slow)	(slow)	(normal)	(fast)	(very fast)

Narrator:

1	2	3	4	5
(poor)	(below average)	(average)	(above average)	(excellent)

Interest level of topic:

1	2	3	4	5
(very boring)	(dull)	(average)	(mildly interesting)	(very interesting)

Overall rating of tape:

1	2	3	4	5
(bad)	(below average)	(average)	(above average)	(excellent)

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