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THE EFFECTS OF MODE OF INSTRUCTION
AND MEDIA OF PRESENTATION AS RELATED
TO IMAGEABILITY AND VERBAL ABILITY

A Thesis Presented

By

Steven M. Marantz

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AND MEDIA OF PRESENTATION AS RELATED
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INTRODUCTION

The present study is concerned with two related but independent problems. First, the study investigates the effects of movie and lecture modes of instruction on factual recall as related to verbal ability and Hidden Figures test scores. Secondly, the study investigates factual recall from film and video media of presentation as related to verbal ability. To investigate these problems jointly, each of mode of instruction, movie and lecture, was recorded both on film and video media.

Movie versus Lecture Modes of Instruction

Reviewers of the research on audio-visual instruction have reported that movies and lectures based on the same material usually produce no differences in factual learning (Hoban and Van Ormer, 1950; Allen, 1960; Briggs, Campeau, Gagne, and May, 1967). Factual learning is measured by performance (i.e., number of correct responses) on multiple choice and/or fill-in tests whose items were designed for the recall of information in the movie or lecture. The general procedure used in this type of research is to give factual posttests to Ss after viewing either a movie or a lecture. Typically, a lecture is constructed after viewing the movie several times and equating the running time of each presentation. Variations

of this procedure have included using delayed in addition to immediate posttests, showing a series of movies versus a series of lectures, using videotaped lectures instead of live lectures, and using repeated showings of the same movie and lecture.

As these experimental methods most often reveal no reliable differences between movie and lecture treatments, at least two interpretations of the data seem plausible. One is that a movie and an equivalent lecture are equally effective in teaching factual information. Another is that Aptitude x Treatment Interactions (ATI) are occurring in the respective instructional situations.

Aptitude Treatment Interaction research, initiated by Cronbach (1957) and discussed in depth in the literature (e.g., Snow and Solomon, 1968; Cronbach and Snow, 1969; Berliner and Cahen, 1972) is a supplemental approach to instructional treatment main effect analyses. Treatment main effects ignore the individual differences among Ss and do not reveal the possibility that certain types of Ss learn more from one treatment while other types of Ss learn more from the second treatment. Aptitude Treatment Interaction methodology investigates the interaction of individual differences with instructional treatments. The rationale is that certain identifiable aptitudes or learner characteristics will facilitate learning for some Ss in specific

instructional settings and will inhibit learning for other Ss in those settings. Once Ss are blocked on individual differences that interact (i.e., facilitate or inhibit) with instructional treatments, the ATI analysis can account for differential learning of Ss between those treatments.

Snow and Solomon (1968) relate the ATI format to research in instructional technology. They state that one of the questions researchers should ask is: "What aptitude variables are particularly relevant for filmed and/or televised instruction?" In the movie and lecture comparison, this question needs to include aptitudes that are applicable to these two modes of instruction. The search for relevant aptitudes should proceed from the basis of prior research and/or intuition.

One individual difference characteristic used in the present study is verbal ability (French, Eckstrom, and Price, 1963). See Appendix A for a copy of this test. The use of this aptitude in movie versus lecture research has a rationale in prior research. Snow, Siebert, and Tiffin (1965) performed an ATI study using 13 aptitudes to study the differential effects of a series of filmed physics demonstrations and a series of equivalent live lectures. No treatment main effect was indicated for factual learning on immediate posttests between Ss in the two methods of instruction.

However, a main effect in favor of Ss with prior knowledge of physics was reported. This effect limits the generalizability of this study. Also, as this was a long term study (i.e., one weekly presentation for 14 weeks) of movies and lectures within the context of a larger physics course, the effect of additional course content is unclear.

Snow et. al. (1965) reported that 6 out of 13 aptitudes interacted significantly with the modes of instruction. These aptitudes were: numerical ability, ascendancy, responsibility, verbal ability, past experience with entertainment films, and past use of college library films. These last two aptitudes may relate to the notion of film literacy. However, it generally seems that the aptitudes selected are measures pertaining to an overall learning style or are measures specific to learning the subject matter (physics) of the movies and lectures. With the exception of verbal ability, which has face validity, the aptitudes used do not seem relevant to a learning ability specific to movie and lecture instruction.

The above mentioned interaction of verbal ability and mode of instruction is pertinent to the present study. In the lecture condition, Ss high in verbal ability and having some previous knowledge of physics performed higher on immediate posttests than Ss low in verbal ability with some previous knowledge of physics. There were no learning

differences between high and low verbal ability Ss with some previous knowledge of physics in the movie condition. Nelson (1949) provides additional evidence that factual learning from movies may be independent of verbal ability. Nelson analysed factual posttests given to Ss after viewing a movie. Items on this test dealt with information contained in the pictorial and narrative content of the movie. Although the narration contained more testable factual information than the visual component of the movie, Nelson's analysis indicated that the visual component was almost as effective in communicating such material. The Nelson study supports the idea that film is a medium that communicates visually.

The present study used verbal ability as an aptitude to investigate differential learning between movie and lecture modes of instruction. The verbally presented lecture was constructed from both the visual and narrative elements of a movie. Consistent with previous findings, the hypothesis was a verbal ability x mode of instruction interaction: 1) in the lecture condition, high verbal ability Ss will perform significantly higher on an immediate factual posttest than low verbal ability Ss; 2) in the movie condition there will be no learning differences between high and low verbal ability Ss.

A second aptitude used in the present study of movie versus lecture instruction is the score on part I of the Hidden Figures test (French et. al., 1963). See Appendix B

for a copy of this test. Like verbal ability, this aptitude measure has been used with instructional research.

Koran (1969) and Koran, Snow, and McDonald (1971) manipulated a videotaped demonstration of a teaching procedure and a verbatim, written transcript of the videotape as modes of instruction. The Hidden Figures (HF) test was used as an aptitude measure in both studies. Both studies reported that low scorers on the HF test (part I only) learned more from the video presentation than did low HF scorers in the written condition. These results are reliable in that the demonstration presentation aided low HF subjects while the written presentation did not.

Although these studies did not use movie and lecture modes of instruction, the above mentioned results are consistent with a study reported by Marantz and Dowaliby (1973). They used the HF test as an aptitude measure in comparing a movie and an equivalent videotaped lecture. Factual learning was measured by an immediate posttest containing multiple choice (recognition) and fill-in (recall) items. Marantz and Dowaliby reported a significant interaction between HF ability and mode of instruction with the recall items as the dependent measure. This interaction was such that low HF Ss in the movie condition recalled more on the fill-in items than did low HF Ss in the lecture conditions. No posttest differences between modes of instruction was indicated for high HF Ss.

These researchers (Koran, 1969; Koran et. al., 1971; Marantz and Dowaliby, 1973) have suggested that the HF test is measuring a cognitive representational ability (i.e., the ability to translate, organize, and store non-pictorial information in pictorial terms). Given this argument and results of these studies, the video and written instruction used by Koran and Koran et. al. can be considered analogous to the movie and lecture instruction used by Marantz and Dowaliby. The written transcript and videotaped lecture are comparable in that each was a verbal, non-pictorial presentation of information. The videotaped demonstration and the movie are comparable as both presented visual information. Since low HF Ss did better in the visual conditions than in the verbal conditions, one could argue that the visual treatments provided low HF Ss with pictorial cues that they were unable to spontaneously generate from verbal material.

One purpose of the present study was to replicate the mode of instruction x HF interaction reported by Marantz and Dowaliby. To do this, the present study used a standardized videotaped lecture. The fill-in criterion test items were increased from 6 to 17 items in the present study.

The hypothesis of the present study was an HF test score x mode of instruction interaction: 1) in the lecture condition, high HF subjects will score significantly higher on a factual recall posttest than low HF subjects; 2) in

the movie condition, there will be no posttest differences between high and low HF subjects.

Filmed versus Televised Media of Instruction

There is apparently no published research directly comparing the instructional effects of televised and filmed media of presentation as related to individual differences. One underlying assumption of media researchers seems to be that film and television have essentially the same audio-visual instructional properties for all students. (Lumsdaine, 1963). This assumption has no real basis in empirical findings. The present ATI study using filmed and televised (video) presentation, addressed the question raised by Snow and Solomon (1968): "What media-attributes under what task requirements, are particularly likely to interact with aptitudes?"

McLuhan (1964, 1967, 1969) advances some constructs that have relevance to research investigating media attributes. He postulates that watching the medium of television requires an extensive use of the viewers' faculties. McLuhan calls television a "participatory medium." He argues that it requires equivalent aural and visual information processing. The McLuhan hypothesis asserts that film is a less involving medium than television and communicates its message almost solely in visual-form.

For McLuhan, film and television are quite different media.

A study by Bringmann, Balance, and Krichev (1969) used McLuhan's theoretical media distinctions between the participatory properties of film and television for an experimental rationale. They designed an experiment to investigate whether viewing a movie on film would lead to more emotional arousal than watching the same movie on television. Four conditions were used: film with sound, film without sound, television with sound, and television without sound. All Ss were given four pre-treatment administrations of a modified form of the Multiple Affect Adjective Check List (MAACL) in order to collect a composite pre-movie emotionality score. All Ss viewed the movie Signal 30. After viewing the movie in the respective treatments, all Ss immediately completed the MAACL. The results showed no pre-and post-movie MAACL differences for Ss in the television without sound condition. In the other three conditions, all Ss' MAACL post-movie scores were significantly higher than the pre-movie scores. However, there were no significant differences between conditions among the higher post-movie MAACL scores. Thus, Bringmann et. al. concluded that the results did not support the hypothesis that film and television per se produce differential emotional arousal.

A result of particular interest here were the

differences between Ss in the television without sound and the film without sound conditions. Film without sound Ss showed an increase in emotional arousal; television without sound Ss did not. These differences become relevant considering the movie shown. Bringmann et. al. state that Signal 30, a movie that graphically depicts automobile accidents "has been found to be highly effective in inducing strong unpleasant emotions...." One might argue that to investigate media effects on emotional arousal, the content of the message should be non-emotional. By using an emotionally arousing movie, any differential media effects may be obscured. Yet Signal 30 produced emotional changes in the film without sound condition but not in the television without sound condition. This result suggests that viewers receive some information (emotional or otherwise) visually from film that they receive aurally from television.

The present study presented each instructional mode, movie and lecture, on film and videotape. This design enabled, within each mode of instruction, the comparison of the possible different media attributes of film and television. In the context of ATI research, McLuhan's hypotheses, and the findings of Bringmann et. al., verbal ability appears to be an aptitude relevant to media attribute research. The hypotheses of the present study with this individual difference variable were: 1) in the

video presentation of the movie, high verbal ability Ss will perform significantly higher on the factual recall posttest than low verbal ability Ss; 2) in the film presentation of the movie, there will be no learning differences between high and low verbal ability Ss; 3) in the film and videotape presentations of the lecture there will be no learning differences between high and low verbal ability Ss.

To summarize, the present study is concerned with the effects of mode of instruction and media of presentation as related to individual differences. Verbal ability is related to both the problems under investigation. An interaction between verbal ability and mode of instruction was predicted: 1) in the lecture condition, high verbal ability Ss will score higher on the posttest than low verbal ability Ss; 2) in the movie condition there will be no learning differences between high and low verbal ability Ss. Verbal ability was also hypothesized to interact with media of presentation. This prediction is consistent with, but a refinement of the predicted verbal ability x mode of instruction interaction. The media of presentation x verbal ability interaction predicted: 1) in the film of the movie, there will be no learning differences between high and low verbal ability Ss; 2) in the video of the movie, high verbal ability Ss will score higher on the

posttest than low verbal ability Ss.

Hidden Figures test scores were predicted to interact only with mode of instruction. The hypotheses were: 1) in the lecture condition, high HF subjects will score higher on the posttest than low HF subjects; 2) in the movie condition, there will be no posttest differences between high and low HF subjects.

METHOD

Subjects

Two hundred and twenty four undergraduates enrolled in adolescent and educational psychology courses at the University of Massachusetts served as Ss.

Material and Design

The movie, Conflict (Yale Psychology Department, 1966) was shown on film and on videotape. A lecture, based on the material contained in Conflict was also used as a mode of instruction. The lecture was presented on film and videotape. The lecture was constructed after 4 viewings of the movie and listening to the narration on audio tape only. The movie ran about 18 minutes, the lecture about 15 minutes. The lecture was filmed first, and was put directly on videotape. The movie was also directly put on videotape.

The 224 Ss were randomly assigned to four treatments: 1) film of the movie; 2) videotape of the movie; 3) film

of the lecture; 4) videotape of the lecture. There were 56 Ss in each condition.

Aptitude Measures

The Hidden Figures test, part I, and the Advanced Vocabulary test (French et. al., 1963) were the aptitude measures taken by all Ss.

Additional Measures

The number of previous psychology courses taken was collected for each S. Subjects were also asked to complete a post-experimental questionnaire. Subjects recorded previous instructional film and television exposure. The time spent for entertainment film and television were estimated by each S. These answers were scored 3, 2, 1, from most to least viewing time. Finally, each S was asked to describe the learning and recall strategies used during the experimental treatment. See Appendix C for a copy of the post experimental questionnaire.

Criterion Measure

The posttest was factual and consisted of 17 fill-in items based on the information in the verbal and visual portions of the movie. Eighteen items were originally pretested with 30 naive Ss. One item was eliminated as more than 10% of the naive Ss answered it correctly. No more than 5% of the naive Ss correctly

answered any of the 17 items comprising the criterion test. See Appendix D for a copy of the criterion test.

The posttests were scored blindly by one E. Each item was scored 2, 1, or 0. The spread of possible scores was from 34 to 0. Forty posttests (10 from each treatment) were scored by a separate E to provide an estimate of reliability of the scoring procedure. Also, a split-half reliability estimate was computed for the criterion test.

Procedure

One week prior to the treatments, all Ss took both aptitude measures and listed their previous psychology courses.

Immediately prior to being exposed to their respective treatments, Ss were told that they would be tested on the information provided in each treatment. No note taking was allowed. Immediately upon completing a treatment, Ss took the criterion test. Following this, each S completed the questionnaire regarding prior media exposure and learning and recall strategies.

RESULTS

The 40 criterion tests scored by a separate E provided an inter-rater reliability of .9518 between scoring procedures. The split-half reliability esti-

mate, the Pearson-Product-Moment corrected for length by the Spearman-Brown Prophecy Formula, was .580.

See Appendix E for the means and standard deviations for all variables in each treatment condition.

Three separate analyses of variance were performed. Each analysis had the criterion test as the dependent measure. All hypotheses were tested at the .05 level.

Analysis of Variance: Mode and Media Effects

A 2 (movie and lecture) X 2 (film and video) analysis of variance was performed to investigate the effects of mode of instruction and media of presentation independent of the aptitude variables used. Table 1 presents the means and standard deviations of criterion test scores for all Ss in each treatment. Cochran's test for the homogeneity of variance indicated that the variances were heterogeneous ($C 4/55=0.389$, $p<.05$). Meyers (1972) states that when equal and large sample sizes are employed, the ratio of the largest to smallest variance must be greater than 20:1 for the error term to be mildly inflated. As the ratio of the largest to smallest variance in this data does not exceed 2:1, the violation of the assumption of homogeneity of variance presumably did not seriously affect the error rate.

Table 2 provides a summary of this analysis of

Table 1
Means and Standard Deviations on the Criterion
Test for each Treatment Group

Mode	Media of Presentation						
	Film			Video			
	\bar{X}	S.D	N	\bar{X}	S.D	N	
Lec- ture	19.59	5.8	56	20.50	5.3	56	
Movie	22.62	3.6	56	23.66	3.5	56	

Table 2
Analysis of Variance for Mode and Media Effects

Source	df	MS	F
Media (A)	1	53.04	2.39
Mode (B)	1	537.54	24.26**
A X B	1	0.21	0.01
S/AXB	220	22.15	

** p .01

variance. Contrary to previous findings, a mode of instruction main effect was evidenced ($F_{1/220}=24.26$, $p<.01$). The direction of the difference was in favor of the movie instruction.

Analysis of Variance with Ss Blocked on Verbal Ability

A 2 (movie and lecture) X 2 (film and video) X 2 (high and low verbal ability) analysis of variance was performed to test the hypotheses involving verbal ability and mode of instruction and media of presentation. The high and low Ss on this aptitude measure were the upper and lower quartiles on verbal ability. Table 3 presents the means and standard deviations of criterion test scores for high and low verbal ability Ss in each condition. Cochran's test indicated heterogeneity of variance ($C_{8/13}=0.278$, $p .05$). The no. of Ss per cell were equal and relatively large. Also, the ratio of the largest variance to the smallest variance in this data did not exceed 3:1. Consequently, the violation of the assumption of homogeneity of variance presumably did not affect this analysis of variance (Meyers, 1972).

Table 4 provides a summary of this analysis of variance. The first hypothesis with this aptitude predicted an interaction with mode of instruction. High verbal ability Ss would be superior to low verbal ability Ss in the lecture condition. No posttest

Table 3

Means and Standard Deviations on the Criterion
Test for each Condition with Verbal Ability as
the Aptitude Variable

		Media of Presentation											
		Film			Video								
Verbal Ability		Mode of Instruction		Mode of Instruction		Lecture	Movie						
		\bar{X}	S.D.	N	\bar{X}	S.D.	N	\bar{X}	S.D.	N			
Low		17.42	7.18	14	20.57	4.2	14	17.64	5.62	14	21.28	3.28	14
High		20.92	3.12	14	24.21	4.26	14	23.14	5.8	14	24.92	3.08	14

Table 4
 Analysis of Variance with Verbal Ability as the
 Aptitude Measure

Source	df	MS	F
Verbal Ability (A)	1	424.32	18.27**
Mode (B)	1	276.57	11.91**
Media (C)	1	26.03	1.12
A X B	1	5.14	0.22
A X C	1	12.89	0.55
B X C	1	5.14	0.22
A X B X C	1	7.00	0.30
S/AXBXC	104	23.22	

** $p < .01$

differences were predicted between high and low verbal ability Ss in the film of the movie condition. As indicated in Table 4, this verbal ability x mode of instruction interaction was not evidenced. A verbal ability main effect was evidenced ($F_{1/104} = 18.27, p < .01$). High verbal ability Ss were superior on the factual posttest to low verbal ability Ss in both lecture and movie instruction.

The second hypothesis with verbal ability predicted an interaction with media of presentation. High verbal ability Ss would score higher on the criterion test than low verbal ability Ss in the video presentation of the movie. No posttest differences were predicted between high and low verbal ability Ss in the film presentation of the movie. As indicated in Table 4, this verbal ability x media of presentation interaction did not occur. Rather, the verbal ability main effect in this analysis indicated that high verbal ability Ss were superior to low verbal ability Ss regardless of the media of presentation of the movie (or lecture).

An analysis of covariance was also performed with high and low verbal ability Ss. The covariates used were HF scores, number of previous psychology courses taken, and past experience with instructional film. This analysis produced results identical with the ori-

ginal 2 x 2 x 2 analysis of variance performed with high and low verbal ability Ss.

Analysis of Variance with Ss Blocked on HF Score

A 2 (movie and lecture) x 2 (film and video) x 2 (high and low HF subjects) analysis of variance was performed to test the hypothesis concerning HF score and mode of instruction. The high and low Ss on the aptitude measure were the upper and lower quartiles on the HF test. Table 5 presents the means and standard deviations of criterion test scores for high and low HF subjects in each condition.

Table 6 provides a summary of this analysis of variance. The hypothesis with this aptitude predicted a HF x mode of instruction interaction. As indicated in table 6, a significant HF main effect ($F_{1/104}=9.36$, $p<.01$) and a significant HF x mode of instruction interaction effect ($F_{1/104}=8.3$, $p<.01$) were evidenced. The main effect, in favor of high HF subjects, and the interaction effect can both be attributed to the performance of low HF subjects in the lecture condition.

By collapsing over the media of presentation, it is possible to see the relationship between HF test score, movie and lecture instruction, and criterion test score. Table 7 presents the means and standard deviations on the criterion test for high and low HF subjects in each mode of instruction. Figure 1 provides

Table 5
 Means and Standard Deviations on the Criterion
 Test for each Condition with HF Score as the
 Aptitude Variable

HF Score		Media of Presentation					
		Film			Video		
		Mode of Instruction		Mode of Instruction			
		Lecture	Movie	Lecture	Movie	Lecture	Movie
		\bar{X}	S.D.	N	\bar{X}	S.D.	N
Low		14.50	5.51	14	22.35	2.95	14
High		21.71	4.19	14	23.14	3.34	14
						20.78	5.32
						24.35	2.95
						23.42	5.95
						23.85	3.57

Table 6
 Analysis of Variance with HF Scores as the
 Aptitude Measure

Source	df	MS	F
HF (A)	1	180.0	9.36**
Mode (B)	1	308.8	16.0**
Media (C)	1	200.8	10.4**
A X B	1	160.3	8.3**
A X C	1	60.0	3.12
B X C	1	48.9	2.54
A X B X C	1	18.9	0.9
S/AXBXC	104	19.2	

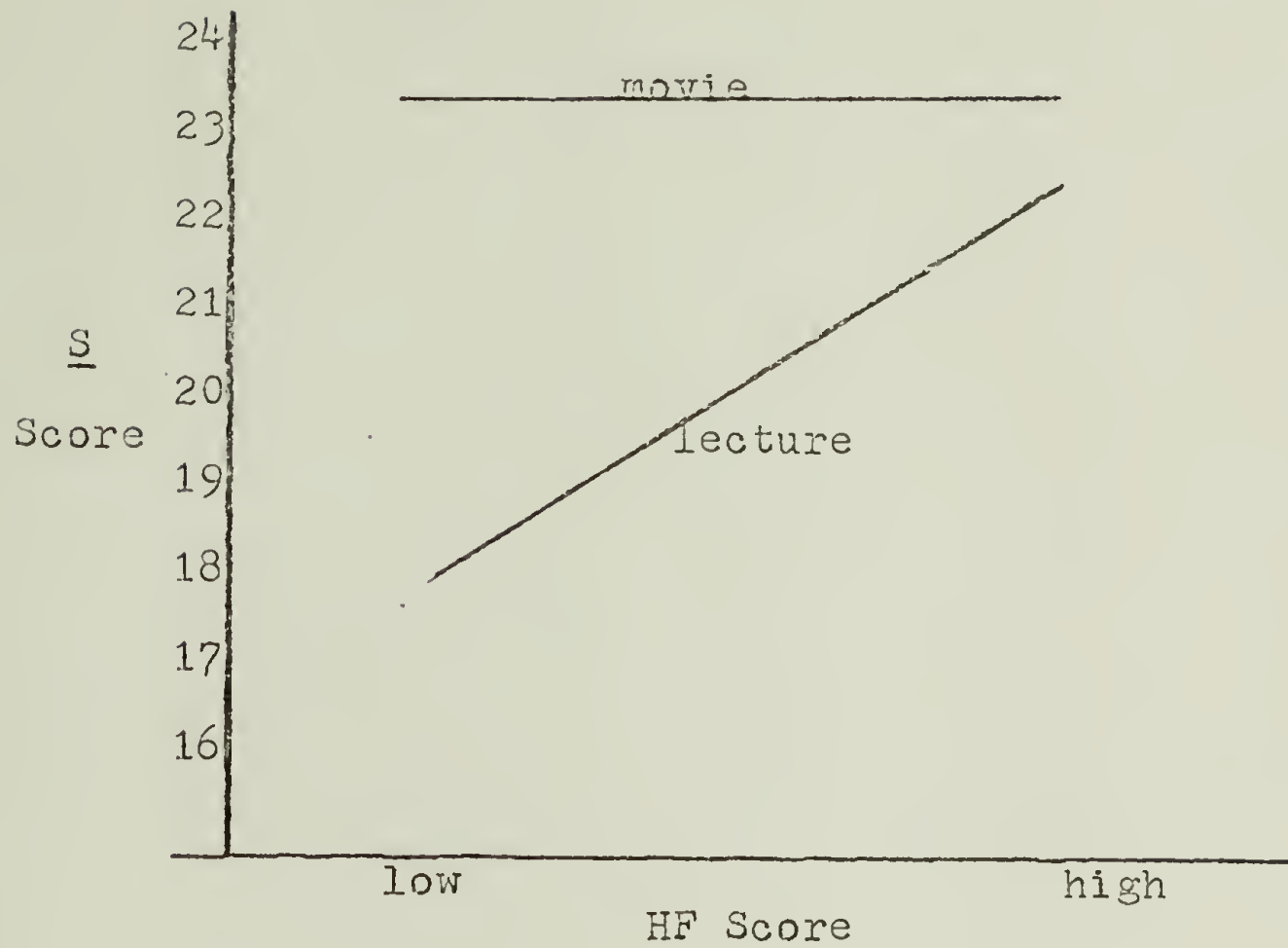
** $p < .01$

Table 7
Means and Standard Deviations on the Criterion
Test for each Mode of Instruction with HF Score
as the Aptitude Variable

		Mode of Instruction					
		Lecture			Movie		
HF Score		\bar{X}	S.D	N	\bar{X}	S.D	N
Low		17.64	6.23	28	23.36	3.06	28
High		22.57	5.13	28	23.50	3.41	28

Figure 1

Plot of Means for Low and High HF
Subjects on the Criterion Test



a visual display of these means. Examination of Table 7 and Figure 1 indicates that the source of the HF main effect was due to the posttest differences between low and high HF subjects in the lecture condition. Post-hoc contrasts using the Newman-Keuls procedure indicated this difference to be significant ($Q=3.06$, $p<.01$). There were no significant posttest differences between low and high HF subjects in the movie condition.

The HF x mode of instruction interaction was such that low HF subjects performed differently in the movie and lecture conditions, with the movie facilitating performance on the posttest. Post-hoc contrasts using the Newman-Keuls procedure between low HF subjects in the movie and lecture conditions indicated significance ($Q=3.47$, $p<.01$). No criterion test difference between movie and lecture conditions was evidenced for high HF subjects.

These results are consistent with the hypothesis: in the lecture condition, high HF subjects were superior on the factual posttest relative to low HF subjects. In the movie condition, there were no posttest differences between high and low HF subjects.

Although there was no hypothesis concerning high and low HF subjects and media of presentation, a media main effect was evidenced in this analysis of variance

($F_{1/104}=8.3$, $p<.01$). The media effect was in favor of the video conditions.

An analysis of covariance was also performed with high and low HF subjects. The covariates used were verbal ability, number of previous psychology courses, and past experience with instructional film. This analysis produced results consistent with the previous analysis of variance performed with high and low HF subjects.

Correlational Data

Correlation matrixes between all variables for each experimental group are presented in Appendix F. A summary of the significant correlations follows.

Verbal ability correlated significantly with the criterion test in all 4 groups. Hidden Figure test score correlated significantly with the criterion test in the lecture on film group. Verbal ability and HF test score correlated significantly in the lecture on film group. Past experience with instructional film correlated significantly with the criterion measure in the lecture on video and movie on video groups.

Results from the analyses of covariance using these measures (verbal ability, HF score, and past experience with instructional film) as covariates did not differ from the results of the original analyses of variance performed.

The learning and recall strategies collected from each S proved to be non-quantifiable. These questions were consequently discarded from the analyses.

DISCUSSION

Results from previous research have indicated no learning differences between Ss viewing a movie and Ss receiving a lecture on the same topic. Contrary to such findings, the present study found a significant learning advantage for Ss viewing the movie. This advantage was evidenced across the three analyses that were performed. It is quite possible that this effect is specific to the movie shown. The verbal narration of the movie Conflict was nearly continuous throughout the running time. Consequently, most of the criterion test relevant information was contained in the movie's commentary. Although such information was also provided by the movie's visual presentation, it is probable that the visual content of the movie provided very little new information to the Ss. The movie's visuals were basically related, concrete images of the verbal content of the movie's narration.

The lecture instruction did contain verbal descriptions of the movie's pictorial content. However, post-experimental analysis of the audio tapes of the

lecture and the movie indicate that both presentations provided Ss with essentially the same verbal information. Therefore, the lecture versus movie instruction here was not verbal versus visual instruction. Rather, it was verbal versus verbal plus visual instruction. Given such instructional treatments, it is likely that the verbal and pictorial treatment of the movie would prove superior to the solely verbal treatment of the lecture.

In the analysis with Ss blocked on verbal ability there was no verbal ability x mode of instruction interaction nor verbal ability x media of presentation interaction as predicted. A verbal ability main effect in favor of the high verbal ability Ss was evidenced.

This main effect can be most likely attributed to two major factors. First, the content and amount of the verbal presentations of the lecture and movie were quite similar. As the lecture was strictly verbal, it would be expected that high verbal ability Ss would be superior to low verbal ability Ss in the lecture condition. Similarly, as the movie's narration provided as much criterion test relevant information as the movie's pictorial content, high verbal ability Ss would be at an advantage relative to low verbal ability Ss in the movie instruction.

Second, the measure of verbal ability used in this study was probably closer to a general I.Q. mea-

sure than a measure of one's ability to understand the English language. Dowaliby (1973) reported the correlation between this measure of verbal ability and the Otis Lennon Mental Ability Test to be about .55. Thus, high verbal ability Ss were possibly just more intelligent than low verbal ability Ss.

These two factors are probably part of the reason the verbal ability x media of presentation interaction did not occur. Verbal ability related more to the quantity of verbal information in the movie's narration than to the movie's media of presentation. Therefore, while film is a visual communicator, the amount of verbal information transmitted by Conflict was such that its film presentation was equally a verbal communication. Additionally, verbal ability is most likely not an adequate measure of the "aural participation" the medium of television may involve.

In the analysis with Ss blocked on HF test score a HF main effect and a HF x mode of instruction interaction occurred. These effects are consistent with the hypothesis: high HF subjects were superior on the factual recall test to low HF subjects in the lecture conditions. No posttest differences between high and low HF subjects in the movie conditions was observed.

A video main effect obscured an exact replication of the Marantz and Dowaliby study (1973) which used a

videotaped lecture only. The results here do conform to the previous research with the HF test (Koran, 1969; Koran et. al. 1971; Marantz and Dowaliby, 1973). That is, low HF subjects in this study learned more in the visual (movie) conditions than in the verbal (lecture) conditions. The differential performance of the low and high HF subjects in the lecture conditions indicate that high HF subjects process verbal material to be recalled more effectively than low HF subjects. The similar performance of low and high HF subjects in the movie conditions suggest that one method of aiding low HF subjects with the recall of factual information is to present information pictorially. Consequently, the assertion that the HF test is a measure of image-ability or cognitive representational ability is supported by the results of the present study.

The results of the present study demonstrate the strength of the HF test effect with visual and verbal modes of instruction. The same relationship between low and high HF subjects and factual recall from movie and lecture instruction has been evidenced with two different sets of instructional materials. Further research should establish the equivalence of the lecture mode of instruction used here and by Marantz and Dowaliby (1973) with the written mode of instruction used by Koran (1969) and Koran et. al. (1971). Such research would clarify the relationship between

cognitive representational ability and verbal (written and aural) instruction.

Also in the analysis with Ss blocked on HF test score a media main effect in favor of the video conditions was evidenced. This result was unexpected and the discussion is speculative. The fact that a media effect occurred only with Ss blocked on HF test score suggests relationships between the HF test, video media, and recall of verbal information. The facilitative effect of HF ability with factual recall from a verbal presentation has already been observed. Both the lecture and movie transmitted a large quantity of verbal (aural) information. Perhaps due to the aural nature of the video medium, the lecture and movie were best suited for video presentation. The verbally oriented instruction was therefore not entirely compatible with the visual medium of film. In the terms of McLuhan, watching television is an inherently aural and visual experience. Inherent or not, it is probable that the milieu of television viewing; distracting background noise, the lighting of the room, the reduced picture size; forces the viewer to use his aural capacities when processing a video presentation. The instruction used here was compatible with video and aural orientation.

The media effect, in favor of the video conditions, may indicate that to promote the recall of factual infor-

mation from a verbal presentation, that presentation should be on a video medium. In any case, this example of film and video media differences should be investigated further. The differences revealed here suggest that film and video media do have differential instructional effects for certain types of Ss with verbally presented material.

Appendix A

Name: _____

ADVANCED VOCABULARY TEST — V-4

This is a test of your knowledge of word meanings. Look at the sample below. One of the five numbered words has the same meaning or nearly the same meaning as the word above the numbered words. Mark your answer by putting an X through the number in front of the word that you select.

jovial

1-refreshing

2-scare

3-thickset

4-wise

-jolly

The answer to the sample item is number 5; therefore, an X has been put through number 5.

Your score will be the number marked correctly minus a fraction of the number marked incorrectly. Therefore, it will not be to your advantage to guess unless you are able to eliminate one or more of the answer choices as wrong.

You will have 4 minutes for each of the two parts of this test. Each part has one page. When you have finished Part 1, STOP. Please do not go on to Part 2 until you are asked to do so.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

Part 1 (4 minutes)

- | | | |
|--------------------------|------------------------------|--------------------------------------|
| 1. mumble | 7. veer | 13. replete |
| 1-speak indistinctly | 1-change direction | 1-full |
| 2-complain | 2-hesitate | 2-elderly |
| 3-handle awkwardly | 3-catch sight of | 3-resentful |
| 4-fall over something | 4-cover with a
thin layer | 4-discredited |
| 5-tear apart | 5-slide | 5-restful |
| 2. perspire | 8. orthodox | 14. frieze |
| 1-struggle | 1-conventional | 1-fringe of curls
on the forehead |
| 2-sweat | 2-straight | 2-statue |
| 3-happen | 3-surgical | 3-ornamental band |
| 4-penetrate | 4-right-angled | 4-embroidery |
| 5-submit | 5-religious | 5-sherbet |
| 3. gush | 9. stripling | 15. treacle |
| 1-giggle | 1-stream | 1-sewing machine |
| 2-spout | 2-narrow path | 2-framework |
| 3-sprinkle | 3-engraving | 3-leak |
| 4-hurry | 4-lad | 4-apple butter |
| 5-cry | 5-beginner | 5-molasses |
| 4. massive | 10. salubrious | 16. ignominious |
| 1-strong and
muscular | 1-mirthful | 1-inflammable |
| 2-thickly populated | 2-indecent | 2-elflike |
| 3-ugly and awkward | 3-salty | 3-unintelligent |
| 4-huge and solid | 4-mournful | 4-disgraceful |
| 5-everlasting | 5-healthy | 5-mysterious |
| 5. feign | 11. limpid | 17. abjure |
| 1-pretend | 1-lazy | 1-make certain |
| 2-prefer | 2-crippled | 2-arrest |
| 3-wear | 3-clear | 3-renounce |
| 4-be cautious | 4-hot | 4-abuse |
| 5-surrender | 5-slippery | 5-lose |
| 6. unwary | 12. procreate | 18. duress |
| 1-unusual | 1-sketch | 1-period of time |
| 2-deserted | 2-inhabit | 2-distaste |
| 3-incautious | 3-imitate | 3-courage |
| 4-sudden | 4-beget | 4-hardness |
| 5-tireless | 5-encourage | 5-compulsion |

Part 2 (4 minutes)

19. bayonet

- 1-small tent
- 2-basket
- 3-helmet
- 4-sharp weapon
- 5-short gun

20. astound

- 1-scold severely
- 2-make angry
- 3-surprise greatly
- 4-drive out
- 5-ascertain

21. contamination

- 1-contradiction
- 2-contempt
- 3-warning
- 4-pollution
- 5-continuation

22. amplify

- 1-electrify
- 2-expand
- 3-cut off
- 4-signify
- 5-supply

23. mural
pertaining to

- 1-growth
- 2-manners
- 3-the eyes
- 4-war
- 5-a wall

24. hale

- 1-glad
- 2-fortunate
- 3-tall
- 4-robust
- 5-ready

25. meander

- 1-marvel
- 2-predict
- 3-slope
- 4-forget
- 5-wind

26. burnish

- 1-polish
- 2-wave
- 3-dye
- 4-heat
- 5-consume

27. duplicity

- 1-extent
- 2-double-dealing
- 3-agreement
- 4-cleverness
- 5-overlapping

28. mundane

- 1-worldly
- 2-obstinate
- 3-deafening
- 4-servile
- 5-penniless

29. deleterious

- 1-injurious
- 2-hysterical
- 3-critical
- 4-slow
- 5-thinned out

30. nascent

- 1-colorful
- 2-broad
- 3-unpleasant
- 4-floating
- 5-beginning

31. prolific

- 1-freely reproductive
- 2-prehistoric
- 3-talented
- 4-highly temperamental
- 5-frivolous

32. paroxysm

- 1-bleach
- 2-disaster
- 3-storm
- 4-fit
- 5-revolution

33. antipodal

- 1-outmoded
- 2-slanted
- 3-melodious
- 4-opposite
- 5-four-footed

34. acrimony

- 1-promptness
- 2-boredom
- 3-divorce
- 4-stupidity
- 5-bitterness

35. lissome

- 1-lonely
- 2-young
- 3-dreamy
- 4-supple
- 5-dainty

36. succinct

- 1-sudden
- 2-concise
- 3-prosperous
- 4-literary
- 5-cunning

DO NOT GO BACK TO PART 1 AND

DO NOT GO ON TO ANY OTHER TEST UNTIL ASKED TO DO SO.

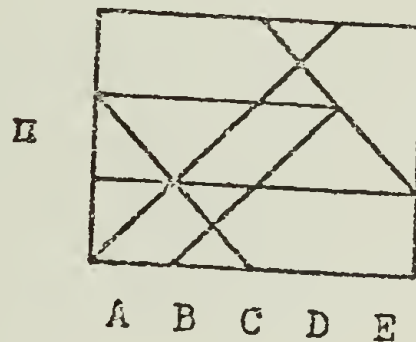
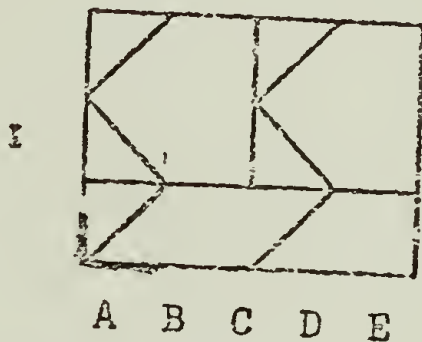
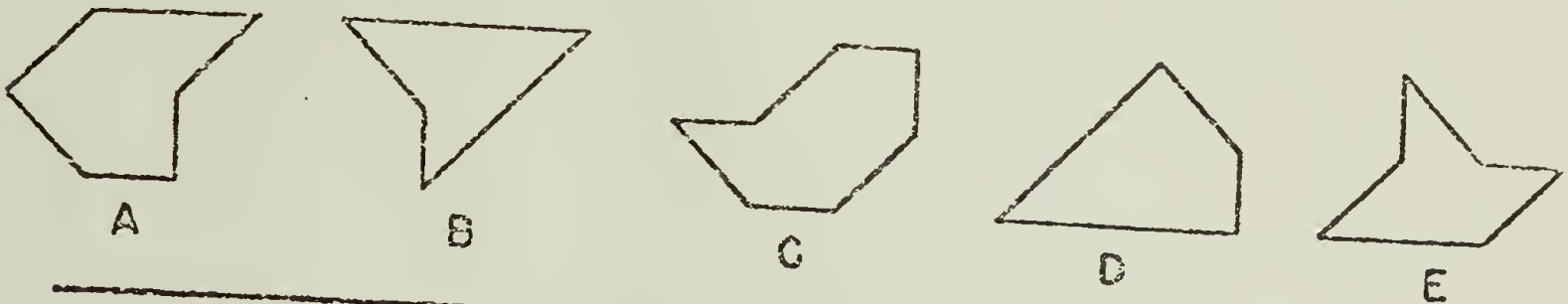
STOP.

HIDDEN FIGURES TEST — Cf-1

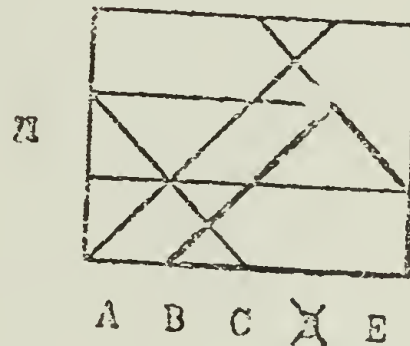
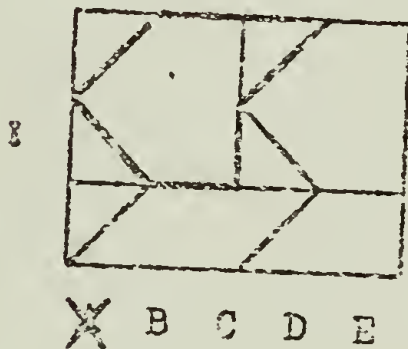
This is a test of your ability to tell which one of five simple figures can be found in a more complex pattern. At the top of each page in this test are five simple figures lettered A, B, C, D, and E. Beneath each row of figures is a page of patterns. Each pattern has a row of letters beneath it. Indicate your answer by putting an X through the letter of the figure which you find in the pattern.

NOTE: There is only one of these figures in each pattern, and this figure will always be right side up and exactly the same size as one of the five lettered figures.

Now try these 2 examples.



The figures below show how the figures are included in the problems. Figure A is in the first problem and figure D in the second.



Your score on this test will be the number marked correctly minus a fraction of the number marked incorrectly. Therefore, it will not be to your advantage to guess unless you are able to eliminate one or more of the answer choices as wrong.

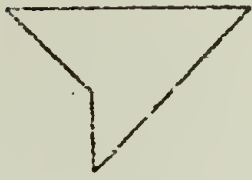
You will have 10 minutes for each of the two parts of this test. Each part has 2 pages. When you have finished Part 1, STOP. Please do not go on to Part 2 until you are asked to do so.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

Part 1 (10 minutes)



A



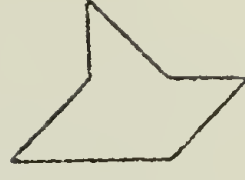
B



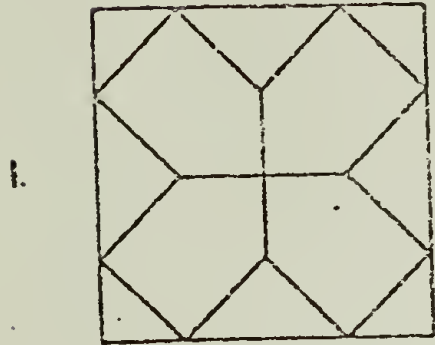
C



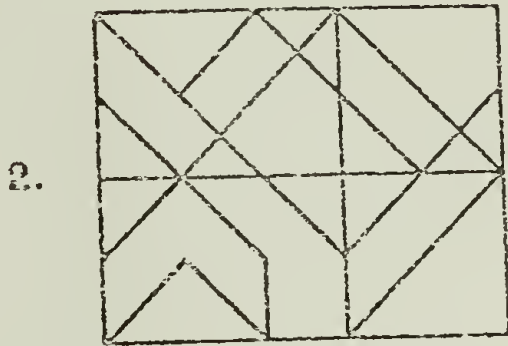
D



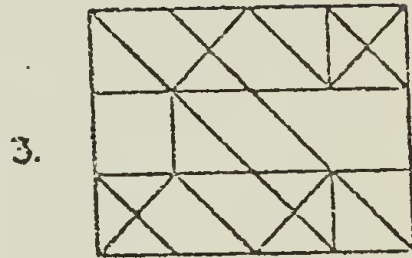
E



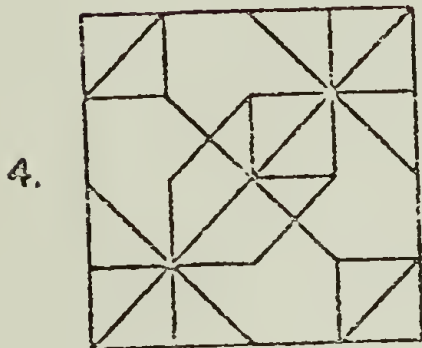
A B C D E



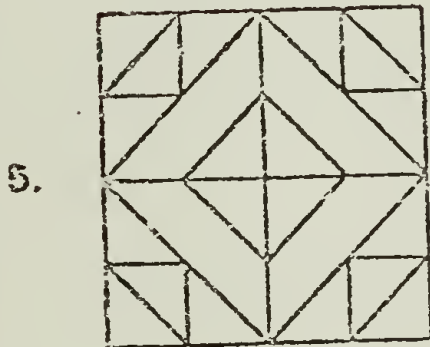
A B C D E



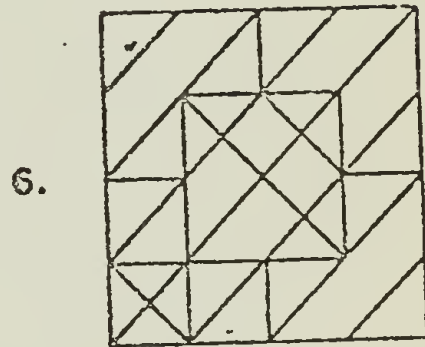
A B C D E



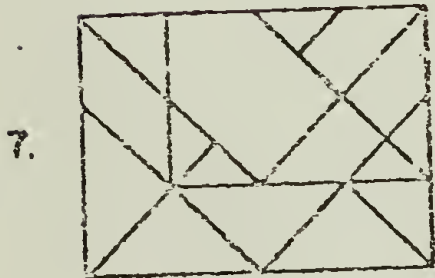
A B C D E



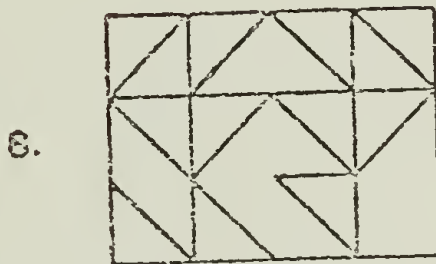
A B C D E



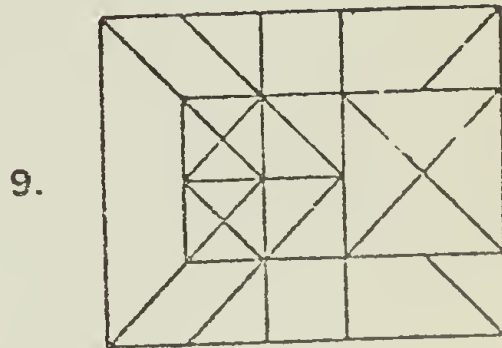
A B C D E



A B C D E



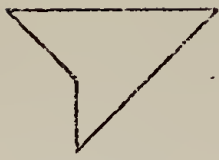
A B C D E



A B C D E



A



B



C

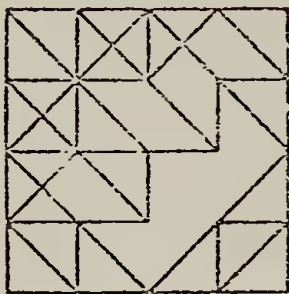


D



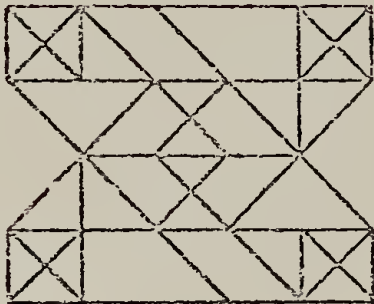
E

10.



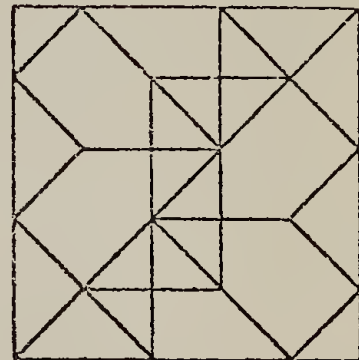
A B C D E

11.



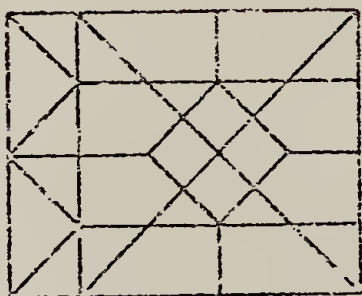
A B C D E

12.



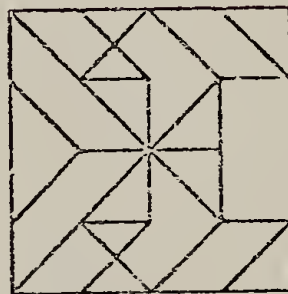
A B C D E

13.



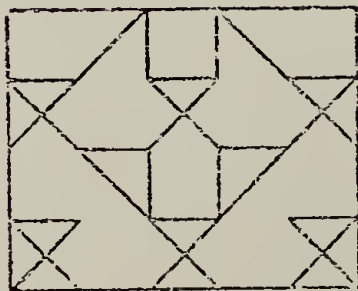
A B C D E

14.



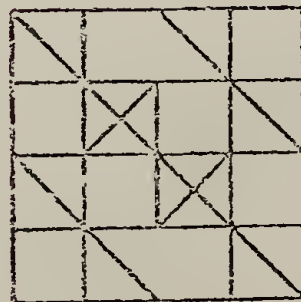
A B C D E

15.



A B C D E

15.



A B C D E

Appendix C

1. If possible, please briefly describe the strategy or strategies you used to learn the material in the presentation.

2. If possible, please briefly describe the strategy or strategies you used to recall the information on the posstest.

3. Approximately how much highschool and college classroom experience have you had with instructional television (or video)? more than 7 hours____, 2-7 hours____, less than 2 hours____

4. Approximately how much television (for entertainment) do you watch a week? more than 16 hours____, 5-16 hours____, 0-5 hours____

5. Approximately how much highschool and college classroom experience have you had with instructional film? more than 7 hours____, 2-7 hours____, less than 2 hours____

6. Approximately how much movie viewing (for entertainment) do you do? 5 or more movies a month____, 1-4 movies a month____, 0-1 movies a month____

1. In order to resolve a conflict, Charlie had to give up one of two sports. What were the two sports?

2. What kind of behavior is characteristic of all approach-avoidance conflicts?

3. What type of conflict did Charlie face at the telephone?

4. What type of conflict was illustrated by the young bather's behavior at the seashore?

5. What is the type of conflict that is likely to produce emotional outbursts in young children?

6. What does the severity of any conflict depend upon?

7. What was used to generate approach behavior in the rats?

8. To study conflict behavior in the laboratory, what was the experimental apparatus used?

9. What is the type of conflict that is most likely to produce neurosis?

10. What type of conflict results in escape behavior, given that an avenue of escape is open to the organism?

11. With approach-avoidance conflict, what happens as the organism gets closer to the goal?

12. What type of behavior should we observe if we place a naive rat in the experimental apparatus used to study conflict?

13. What is the simplest type of conflict?

14. What choices did Charlie face in order to resolve his first conflict of his day?

15. What kind of behavior is characteristic of approach-approach conflict?

16. When an organism must decide whether attaining a goal is worth the price he must pay, what type of conflict is he facing?

17. Describe the rat's behavior in the experimental apparatus during avoidance-avoidance conflict?

Appendix E

Means and Standard Deviations for each Group

for all Variables

	Lecture on Film		Lecture on Video		Movie on Film		Movie on Video	
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.
Verbal Ability	21.14	5.63	21.09	5.17	19.37	5.00	21.93	5.07
HF Test	4.42	2.80	5.08	3.09	4.64	2.49	5.32	3.28
Number of Previous Psychology Courses	4.00	2.66	4.23	2.36	4.17	2.20	4.66	3.37
Instructional Video Time	1.43	0.65	1.46	0.68	1.64	0.81	1.42	0.68
Entertainment Video Time	1.96	0.48	1.25	0.54	1.26	0.55	1.35	0.58
Instructional Film Time	2.17	0.89	2.33	0.79	2.33	0.74	2.35	0.79
Entertainment Film Time	1.80	0.51	1.71	0.65	1.83	0.68	1.69	0.56
Criterion Test	14.59	5.86	20.50	5.31	22.62	3.64	23.66	3.56

Appendix F

Correlation Matrix for all Variables for Each Group

		Lecture on Film						
	1	2	3	4	5	6	7	8
1	1.00	0.29*	0.29*	ns.	ns.	ns.	ns.	0.32*
2		1.00	ns.	ns.	ns.	ns.	ns.	0.37**
3			1.00	ns.	ns.	ns.	ns.	ns.
4				1.00	ns.	0.43**	ns.	ns.
5					1.00	ns.	ns.	ns.
6						1.00	ns.	ns.
7							1.00	ns.
8								1.00

*p<.05
**p<.01

- 1-Verbal Ability
- 2-HF Test
- 3-Number of Previous Psychology Courses
- 4-Instructional Video Time
- 5-Entertainment Video Time
- 6-Instructional Film Time
- 7-Entertainment Film Time
- 8-Criterion Test

Appendix F (Continued)

		Lecture on Video						
	1	2	3	4	5	6	7	8
1	1.00	ns.	ns.	ns.	ns.	ns.	ns.	0.36**
2		1.00	ns.	0.29*	ns.	ns.	ns.	ns.
3			1.00	ns.	ns.	ns.	ns.	ns.
4				1.00	ns.	ns.	ns.	ns.
5					1.00	ns.	0.35*	ns.
6						1.00	ns.	0.42**
7							1.00	ns.
8								1.00

*p < .05
 **p < .01

- 1-Verbal Ability
- 2-HF Test
- 3-Number of Previous Psychology Courses
- 4-Instructional Video Time
- 5-Entertainment Video Time
- 6-Instructional Film Time
- 7-Entertainment Film Time
- 8-Criterion Test

Appendix F (Continued)

Movie on Film

	1	2	3	4	5	6	7	8
1	1.00	ns.	ns.	ns.	ns.	ns.	ns.	0.38**
2		1.00	ns.	ns.	ns.	ns.	ns.	ns.
3			1.00	ns.	ns.	ns.	ns.	ns.
4				1.00	ns.	0.44**	ns.	ns.
5					1.00	ns.	ns.	ns.
6						1.00	ns.	ns.
7							1.00	ns.
8								1.00

**p<.01

- 1-Verbal Ability
- 2-HF Test
- 3-Number of Previous Psychology Courses
- 4-Instructional Video Time
- 5-Entertainment Video Time
- 6-Instructional Film Time
- 7-Entertainment Film Time
- 8-Criterion Test

Appendix F (Continued)

Movie on Video

	1	2	3	4	5	6	7	8
1	1.00	ns.	ns.	ns.	ns.	ns.	ns.	0.44**
2		1.00	ns.	ns.	ns.	ns.	0.39**	ns.
3			1.00	ns.	ns.	ns.	ns.	ns.
4				1.00	ns.	0.48**	ns.	ns.
5					1.00	0.28*	0.28*	ns.
6						1.00	ns.	0.38**
7							1.00	ns.
8								1.00

*p<.05
**p<.01

- 1-Verbal Ability
- 2-HF Test
- 3-Number of Previous Psychology Courses
- 4-Instructional Video Time
- 5-Entertainment Video Time
- 6-Instructional Film Time
- 7-Entertainment Film Time
- 8-Criterion Test

REFERENCES

- Allen, W. H. "Audio-Visual Communication." in the Encyclopedia of Educational Research, (C. W. Harris, Ed.), 1960.
- Berliner, D. & Cahen, L. "Some Continuing Conceptual and Methodological Problems in Trait x Treatment Interaction Research." Paper presented at the American Psychological Association, Honolulu, Hawaii, September, 1972.
- Briggs, L., Campeau, P., Gange, R. & May, M. Instructional Media: A Procedure for the Design of Multimedia Instruction, A Critical Review of Research, and Suggestions for Future Research. American Institute for Research, 1967.
- Bringmann, W., Balance, W. & Krichev, A. "Experimental Investigation of McLuhan's Ideas Concerning Effects of 'Hot' and 'Cool' Communications Media." Psychological Reports, 1969, 25, 447-451.
- Cronbach, L. J. "The Two Descriptions of Scientific Psychology." American Psychologist, 1957, 12, 671-684.
- Cronbach, L. J. & Snow, R. "Individual Differences in Learning Ability as a Function of Instructional Variables." Final Report, March, 1969, School of Education, Stanford University, Contract No. OEC 4-6-061269-1217, U. S. Office of Education.

- Dowaliby, F. J. "Adjunct Questions in the Classroom."
Unpublished Doctoral Dissertation, University of
Massachusetts, 1973.
- French, J., Ekstrom, E. B. & Price, L. A. Manual for
Kit of Reference Test of Cognitive Factors. E. T. C.,
Princeton, N. J., 1963
- Hoban, C. F. & Van Ormer, E. Instructional Film Research
1918-1950. Technical Report SDC 269-7-19. State
College Pa., Pennsylvania State College, Instruc-
tional Film Research Program, 1950.
- Koran, M. L. "The Effect of Individual Differences on
Observational Learning in the Acquisition of a
Teaching Skill." Unpublished Doctoral Dissertation,
Stanford University, 1969. (Cited in Cronbach and
Snow, 1969).
- Koran, M. L., Snow, R. & McDonald, F. J. "Teacher Ap-
titude and Observational Learning." Journal of
Educational Psychology, 1971, 62, 219-228.
- Lumsdaine, A. A. "Instruments and Media of Instruction."
in the Handbook of Research in Teaching. (N. C.
Gage, Ed.) 1963.
- Marantz, S. & Dowaliby, F. J. "Film vs. Lecture Methods
Instruction as Related to Imageability." Paper pre-
sented at American Educational Research Association,
New Orleans, La., February, 1973.
- McLuhan, M. Understanding Media: The Extensions of Man.
Signet Books, N. Y., 1964.

- McLuhan, M. & Fiore, Q. The Medium is the Message.
Bantam Books, N. Y., 1967
- McLuhan, M. Counterblast. Harcourt, Brace, & World Co.,
N. Y., 1969
- Meyer, J. Fundamentals of Experimental Design. Second
Edition, Allyn & Bacon Inc. Boston, 1972.
- Nelson, H. E. "The Relative Contributions to Learning
of Video and Audio Elements in Film." Progress
Report No. 13. State College, Pa., Penn. State
College, Instructional Film Research Program, 1949.
(Cited in Hoban & Van Ormer, 1950).
- Snow, R. & Solomon, G. "Aptitudes and Instructional
Media." Audio-Visual Communication Review. 1968,
16, 341-357.
- Snow, R., Tiffin, J. & Siebert, W. "Individual Differences
and Instructional Film Effects." Journal of Educa-
tional Psychology. 1965, 56, 315-326.
- Yale Psychology Department, Conflict. 1966.

