MUSIC AS A FILM VARIABLE

THESIS FOR THE DEGREE OF PH.D.

MICHIGAN STATE UNIVERSITY

RICHARD H. GERRERO

1969

This is to certify that the

thesis entitled

Music as a Film Variable

presented by

Richard H. Gerrero

has been accepted towards fulfillment
of the requirements for

Ph. D. degree in Curriculum

Major professor

Date 12/23/68

O-169

ABSTRACT

MUSIC AS A FILM VARIABLE

By

Richard H. Gerrero

Educators, film makers and critics frequently question the function and value of music in the instructional film. A review of the sparse efforts to study music as a film variable revealed that "there is little experimental evidence to suggest that musical background has any marked effect on learning from instructional films." This view is not shared by those who design and produce films; consequently, film makers and media specialists who desire to employ music in their educational presentations must design their messages intuitively and according to traditional patterns. A more rational use of music in the design of instructional messages requires knowledge of the functions and interactions between the film and music elements. This study investigated congruency and structure as two of the conditions which systematically influence the relative effectiveness of the music component. The first level of the study, however, simply asked if the perceived judgments of a filmed visual can be significantly altered

by the music that is made to co-exist with the scene. The second level of the study investigated the usefulness of the point of resolution formula in predicting the judgments of film with music combinations from knowledge of the component parts. The third level considered the effects of congruency and structure and the interaction of these conditions on component performance.

The broadest generalization from the findings was that music appears to exercise considerable influence when made to co-exist with a film scene. The influence was systematic and was predicted with considerable accuracy with Osgood's point of resolution formula. Overall, the film component had a greater influence on the film with music combination than did the music. This influence, however, varied considerably among examples. The precision of the point of resolution predictions as well as the relative influence of the separate components seemed to be highly dependent on the degree of congruency existing between the two components. Structure, an assessment of viewer consensus, also affected component relationships, but to a lesser degree. Music influence was found to be greater than the film component influence only in an incongruous combination with high film structure and low music structure.

MUSIC AS A FILM VARIABLE

By

Richard H. Gerrero

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

College of Education

1969

ACKNOWLEDGMENTS

My debt of gratitude, although acknowledged, can never be repaid. Many have contributed to whatever intellectual merit may reside in this thesis. Their counsel, their guidance, their patience, unselfishness and generosity of time has allowed a curiosity to develop into a researchable idea.

In particular, I would like to thank Dr. Charles Schuller for his advise, help and encouragement throughout my graduate career. Professor Edward McCoy will always be remembered for his stimulating and penetrating discussions. I am also deeply indebted to Dr. Erwin Bettinghaus, for without his faith and genuine interest, my return to graduate study would not have been possible. And then there are all the graduate fellows, like Chuck Bollmann, who not only shared the midnight lamp to probe alternatives but also aided immensely in the routine tasks of collecting and scoring data. For all those who have assisted, helped, and tolerated me, I am grateful.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

THE PROBLEM

Need for the Study

Awkward as it may be for those who design and produce instructional materials to admit, very few decisions reflected in a film message or a TV lesson are based on either a theory of media design or the findings of empirical experiments. For most of the time, film makers and media specialists design their message or illustration intuitively according to traditional patterns, as Lumsdaine's extensive review of media research suggests concerning film:

> Often the content and sequencing are governed as much by practices and traditions borrowed from the field of theatrical motion pictures as by considerations of pedagogy. The respects in which films are likely to differ instructionally from kinescopes or video-tape recordings of "live" televised instruction probably lie more in philosophy and practice of production than they do in inherent media differences.[1]

Later Lumsdaine proposes:

> What is needed are experiments which seek to reveal the influence of specific factors in

---

[1]A. A. Lumsdaine, "Instruments and Media of Instruction," Handbook of Research on Teaching, ed. N. L. Gage, (Chicago: Rand McNally & Co., 1963), p. 588.

> the design characteristics of the media. . . . In this way we can obtain experimental data to support the validity of generalizations on which to base future design decisions about media.[2]

Among his "specific factors," Lumsdaine lists the use of music in instructional films, a frequent topic among film makers and critics. But the almost complete lack of research into the function or value of film music invites attention. As Travers puts it:

> If music makes any contribution to learning from film media, and this is an hypothesis yet to be tested, then the problem becomes one of establishing what is suitable and appropriate in terms of the effects that music has on the audience.[3]

Travers' comment implies two issues: first, that of establishing what effects film music has on an audience, and second, that of judging the suitability and appropriateness of those effects. This second question, truly a design question, may be evaluated once we identify a set of media elements that can be manipulated and establish some prediction of how these manipulations affect a target audience. The general task, then, is to determine the principles that govern the effectiveness of film music. This study, it is hoped, will investigate some of

---

[2] Ibid., p. 601.

[3] M. W. Travers et al., Research and Theory Related to Audiovisual Information Transmission, (rev. ed.: Kalamazoo, Western Michigan University, 1967), pp. 47-8.

the dimensions of film music and, hopefully, suggest some of the general principles underlying the functions of music as a film variable.

Purpose and Scope of the Study

This study seeks first to establish that music can influence how a film is interpreted and then to explore some of the relationships between the visual and musical components. More specifically, the study will undertake to answer the following:

> 1. Can different music cause a change in the perceived meaning for a given film example?
>
> 2. Can the judgments for a combined film with music presentation be predicted from knowledge or measures of the component parts?
>
> 3. Is the relative influence of the film and music components systematically influenced by conditions of congruency and structure?

To study music as a film variable, one must first determine whether the meaning of a scene sometimes depends upon the music which accompanies it. It certainly does in the movie industry when, for instance, most filmed scenes of wild animals fighting are in fact tamed animals playing; the addition of the "fight" music causes the audience to perceive the scene as a real fight.

One show on Walt Disney's Wonderful World of Color TV series, illustrating how films are made, presented a scene with two lions accompanied by playful music, and then repeated the scene with fight music: the two kinds of music produced unmistakably different effects. And similarly, Saul Bass discussing the famous "Cat Fight" used in the opening of his Walk on the Wild Side described the fight illusion thus:

> An examination of this footage will reveal that there is very little contact between the two cats. Actually-infact, [sic] there was no "fight." We threw the black cat on the white cat.[4]

Camera blurs and skillful editing of isolated cuts showing the cats snarling and pawing the air certainly aided the fight illusion. But it is doubtful that the audience could have perceived a fight without the fierce music used in the sound track.

Assuming that music can in fact alter our interpretation of a scene, we must then inquire into the relationships of the component parts. If the meaning is known for a film scene and also for the segment of music to accompany it, is it possible to predict the meaning that will be perceived when the two are combined? Will picture and music contribute equally to the combined interpretation, or will the influence of one predominate over that of the other?

Just as Kerrick's picture and caption studies[5] successfully predicted combined effects using Osgood's formula

---

[4]Saul Bass, "Opening for Walk on the Wild Side," Pagina, International Magazine of Graphic Design, (Milan, Italy, Gennaio 1964), pp. 16-7.

[5]Jean S. Kerrick, "The Influence of Captions on Picture Interpretation," Journalism Quarterly, 32:177-82 (Spring 1955).

for the point of resolution,[6] so the principles of congruency and the point of resolution formula might predict with equal success the combined effects of film and music. The studies involving photo-captions concerned the effect of the congruity and incongruity between pictures and captions on the final judgment.[7] Incongruent captions occasionally produced effects opposite to those predicted; and, when both components were on the same side of the scale, their combined effect summed rather than resolved as predicted by balance theory.

Kerrick suggests that a caption is better able to change the meaning of a picture if the picture is ambiguous,[8] although she did not investigate the effects of component ambiguity on interpretation. Such an investigation requires first that some gauge of ambiguity be established. In a study of producer consensus and audience consensus regarding a series of TV productions,[9] Greenberg compared the differences between all possible pairs in judgments toward the TV programs measured on a Semantic

---

[6]C. E. Osgood, G. J. Suci and P. M. Tannenbaum, The Measurement of Meaning, (Urbana: University of Illinois Press, 1957), p. 207.

[7]Jean S. Kerrick, "News Pictures, Captions and the Point of Resolution," Journalism Quarterly, 34:183-89 (Spring 1959).

[8]Ibid.

[9]Bradley S. Greenberg, "The Effects of Communication Incompatibility on Children's Judgments of Television Programs,: Journal of Broadcasting, 8:157-71 (Spring 1965.)

Differential, and computed a measure of "co-orientation"[10] for each evaluated program. Quite likely the same technique could be used to measure the relative ambiguity of film and music examples.

Only after thus scaling a series of musical examples and a series of filmic examples from high ambiguity to high consensus could one examine the relative influence of component ambiguity on total effect. For instance, music might function as a film variable only in the presence of a highly ambiguous picture, which would help explain some of the difficulty previous research has had in establishing the functions of music in film.

---

[10]Theodore M. Newcomb used the term co-orientation to describe the dynamic interaction of a communication system which involved the homogeneity of orientation toward certain objects, the homogeneity of perceived consensus, and the attraction among members. See "An Approach to the Study of Communicative Acts," Psychological Review, Vol. 60, No. 6. 1953, pp. 393-404. As pointed out by Newcomb, "The very fact of using language or gesture presupposes the assumption of consensus among communicants as to the information transmitted by the use of symbols."

In this present study, co-orientation refers to a static measurement technique that attempts to deal only with the homogeneity of orientation toward music and film examples. This measurement technique was developed by Richard R. Carter in a paper presented at the convention of the Association for Education in Journalism, "A Measure of Communication Effectiveness for Messages to Groups," Chapel Hill, North Carolina, 1962. Operational procedures for deriving levels of structure from measures of co-orientation are presented in Chapter III, pp. 28-9, and in Chapter IV, p. 43.

CHAPTER II

REVIEW OF THE LITERATURE

Film Variable Studies

Existing film research can be grouped under five major headings. The first and largest, stimuli comparison, sets one form of presentation against a conventional lecture or some other mode, the variable being recall or some other measure of learning. The second group of studies tests viewer preferences for color vs. black & white, picture vs. drawing, sound vs. silent, etc., and occasionally correlates these with age, sex and other viewer variables. The third classification manipulates one or another element of the medium as the experimental variable: e.g., camera angle, embellishments, or sound. The fourth type investigates utilization and environmental conditions such as group size, teacher and peer-group attitudes, viewer comfort, room noise, and other independent variables. And fifth, film may be used for testing postulates from other disciplines such as information theory[1] and learning theory.[2] Film studies in

---

[1] M. W. Travers et al., Research and Theory Related to Audiovisual Information Transmission, (rev. ed.: Kalamazoo, Western Michigan University, 1967).

[2] A. A. Lumsdaine, "Audio-visual Research in the U.S. Air Force," Audio-Visual Communication Review, 1:76-90, (Spring 1953).

which elements of the media are manipulated are perhaps the type to be found least frequently in the literature.

The majority of existing film variable studies grew out of three major research projects: the Pennsylvania State Army-Navy studies, 1942-50; the Yale Motion Picture Research Project, 1946-54; and the Air Force Human Resources Research Laboratories Studies, 1950-57. Since these three major efforts, few studies involving film variables have been conducted, and the number has been decreasing. Noting this trend, Greenhill states:

> This type of research has tapered off in recent years possibly as the result of a shift of emphasis to research on television and partly because such research studies require good film production facilities and the kind of adequate financing that can only come from a sustained program of research.[3]

Hoban and Van Ormer reported on the Pennsylvania State studies in the course of abstracting over 200 film research studies in Instructional Film Research 1918-1950,[4] and provided introductions, summaries, and implications for each class of research. May and

---

[3]Leslie P. Greenhill, "Review of Trends in Research on Instructional Television and Film," Research in Instructional Television and Film, (Washington: U.S. Government Printing Office, 1967), p. 15.

[4]C. F. Hoban, Jr. and E. B. Van Ormer, Instructional Film Research, 1918-1950, Pennsylvania State University Instructional Film Research Program, (Port Washington, N.Y.: U.S. Naval Training Device Center, Office of Naval Research, Tech. Rept. No. SDC 269-7-19, 1950).

Lumsdaine's book, Learning from Film,[5] develops and expands the principles investigated by the Yale research project. And a volume edited by Lumsdaine, Student Response in Programmed Instruction,[6] reports a large number of film variable studies growing out of the Air Force project investigating such principles of learning as repetition, motivation, feedback and others. Finally, Reid and MacLennan's Research in Instructional Television and Film[7] reviews about 100 film studies conducted since the three major research efforts referred to above.

Film Music Studies

Despite the considerable number of film variable studies, scarcely anyone has studied the music function in film. And the few studies that have been reported offer little evidence for the value of music. Hoban and Van Ormer state "there is little experimental evidence to suggest that musical background has any marked effect on learning from instructional films."[8] Lumsdaine and Gladstone find that films presented with musical

---

[5]M. A. May and A. A. Lumsdaine, eds., Learning from Films, (New Haven: Yale University Press, 1958.)

[6]A. A. Lumsdaine, ed., Student Response in Programmed Instruction, (Washington: National Academy of Science, 1961).

[7]J. C. Reid and D. W. MacLennan, eds., Research in Instructional Television and Film, (Washington: U.S. Government Printing Office, 1967).

[8]Hoban and Van Ormer, p. 8-33.

embellishments are actually less effective for learning than the plain version.[9] And Travers complains of a "dearth of experimental literature,"[10] reporting only one study in which music was experimentally manipulated.[11] Travers postulated that "experimentation here suggests that music does not add to the communicative effectiveness of an informational film."[12]

The most systematic effort to identify film music functions, the Zuckerman study,[13] reviewed the writings of film critics, film music composers and film makers to find what they considered the function of music to be in film. He states:

> Since there is no information provided by research on how motion picture music assists learning, if indeed it does, a beginning must be made somewhere. Intuitive conclusions, and opinions of composers, musicians, and film critics (mostly referring to entertainment film music and its functions), have been organized

---

[9]A. A. Lumsdaine, and A. I. Gladstone, "Overt Practice and Audio-Visual Embellishments," in M. A. May and A. A. Lumsdaine, eds., Learning from Films, (New Haven: Yale University Press, 1958), pp. 58-71.

[10]Travers, p. 47.

[11]D. M. Neu, "The Effect of Attention-gaining Devices on Film-mediated Learning," Journal of Educational Psychology, 42, 1951, pp. 479-90.

[12]Travers, p. 48.

[13]J. V. Zuckerman, Music in Motion Pictures: Review of Literature with Implications for Instructional Films. Pennsylvania State University Instructional Film Research Program, (Port Washington, N.Y.: U.S. Naval Training Device Center, Office of Naval Research, Tech. Rept. No. SDC 269-7-2, 1949.)

> here so that they may provide suggestions and even testable hypotheses for research on instructional films.[14]

Zuckerman thus assembled a series of functions claimed for music in motion pictures:

I. Informational Functions

a. Delineation of personality or of an actor's character.
b. Provision of subjective evaluation for an objective image.
c. Emphasis for action.
d. Telling a story.
e. Recalling past events.
f. Foretelling the future.

II. Emotional Functions

a. Establishment of atmosphere or mood.
b. Adding to the emotional tone or mood of incidents.
c. Pointing up dramatic or comic highlights of the film.

III. Conceptual and Integrative Functions

a. Unification of dramatic material.
b. Association of ideas.
c. Connection of dialogue sequences.
d. Accompaniment for sequences of silent action.

In the same way, certain film music techniques were identified and listed, for instance, the "Mickey Mouse" effect where music tempo and rhythm are synchronized with the film as in cartoons and comedy, and the use of loud or sinister chords to cue the audience to something unusual shortly to take place.

Zuckerman's lists, though scarcely exhaustive, certainly provide a starting point. A series of applications

---

[14] Ibid, p. 3.

to learning also presented by Zuckerman, derived from established learning principles, suggests that music can be used for perceptual direction, motivational reward, conceptual aid, memory reinforcement, and the determination of attitudes and opinion.[15]

Zuckerman's presumed intention was the testing of proposed relationships and functions, but no references identify the studies that must have followed. Perhaps his suggestions could not be confirmed and the studies were therefore not reported. But it is more likely that succeeding experiments focused on measuring and validating the claimed instructional merits of music, rather than identifying the performance characteristics of music as a film variable. So when the literature reports "music does not add to the instructional effectiveness," we do not know whether the functions claimed for music are invalid or if the way in which we now use music in educational films is simply inappropriate.

[15] Ibid, pp. 12-13.

CHAPTER III

METHODOLOGY AND PROCEDURE

This study investigated music as a film variable. The first attempt was to determine if the perceived judgments of a filmed visual with musical accompaniment can be significantly altered by the music that is made to coexist with the scene. The measuring instrument was the Semantic Differential. Given that an influence can be established for the musical accompaniment, the second level of the study investigated the usefulness of the point of resolution formula in predicting the judgments of the combined film with music from knowledge of the component parts. The third level considered the effects of congruency between film and music and the relative influence of the component parts. The final analysis was of the relative co-orientation between subjects on a given component and the effects of this structure or lack of structure on the performance of the component parts. Each level of the experimental design will be discussed after a review of the procedures.

Procedure

The sampling problem in this study involved the identification and selection of a set of film visuals and a set of musical examples with certain specific characteristics. That is, there needed to be some visuals that were ambiguous and others that were structured or reflected a high degree of consensus among the viewers. In addition to these needs, the samples had to be sufficiently diversified so that incongruous as well as congruous combinations could be made. A random sampling procedure was therefore not appropriate. A film editor and music expert were used to make preliminary selections. This insured that examples of the required characteristics and dimensions were at least available in the sample. Final selection was made through measures derived from the pilot population.

Film Examples

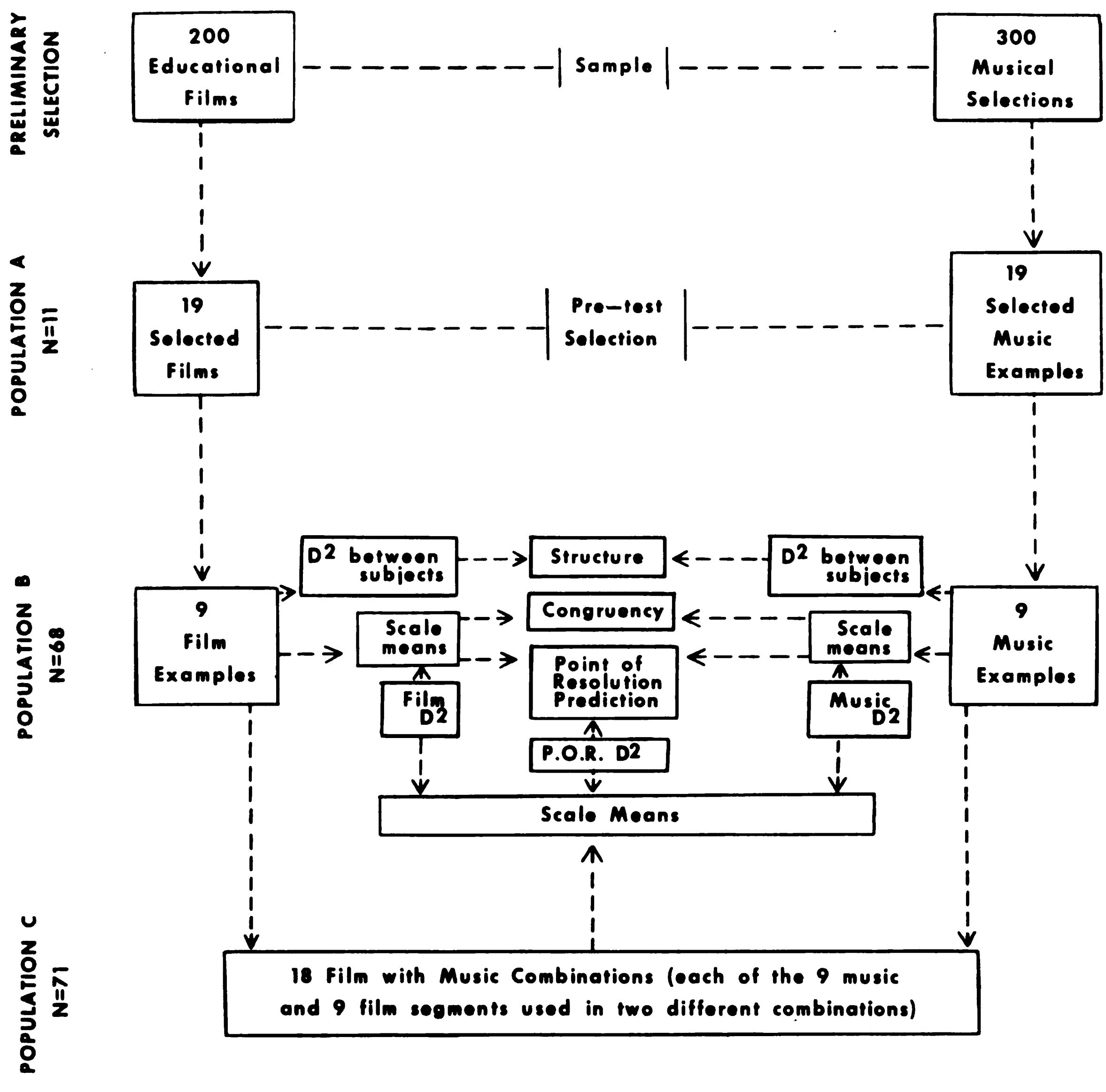
In order to obtain film examples that would reflect a range representative of the assumed dimensions of structure and meaning, about 200 educational films[1] were viewed on a high speed Moviola film reader. A variety of representative scenes were identified and excerpted (cut out of the film).[2] The 60 scenes so selected were then viewed repeatedly, each time selecting those which intuitively

---

[1]A collection of over 200 16mm sound motion pictures was made available through the courtesy of Dr. Elwood E. Miller, Director, United States Office of Education, Single Concept Film Clip Project. This collection was housed on the campus of Michigan State University. (OE-4-16-030)

[2]The sequence of procedures is shown in schematic form in Figure 1.

Figure 1 Design of the Experiment.



seemed to be the most useful. This continued until the 19 most "useful" were selected. These 19 film sequences were then presented to a pilot population of 11 doctoral students in Educational Media, hereafter referred to as Population A, for judgments on a series of Semantic Differential scales. By calculating the co-orientation for each example as expressed in the judgments of these "experts," the relative structure of the examples was determined. The highest and lowest structured examples were then used for further experimentation.[3]

Music Examples

Music examples that would reflect a range of type and structure were drawn from the more than 300 musical themes and selections contained in the Chappell[4] and the Corelli Jacobs[5] film music libraries. First, about 60 examples were selected for variety and assumed differences in structure. These were then dubbed from the masters and the selection process continued until 19 examples were finally chosen. Close examination of the musical phrases within each example showed that about 35 seconds was ideal for presenting a complete musical theme. Each example

---

[3] A listing of the selected films is given in Appendix A.

[4] Chappell Music Library, 117 West 46 Street, New York, N.Y.

[5] Corelli Jacobs Film Music Inc., 25 West 45th Street, New York, N.Y. The Corelli and Chappell collections were made available through the courtesy of Professor Edward McCoy, Head, Motion Picture Production, Michigan State University.

was then edited so that a musically logical beginning and end fell within the 35 seconds, that is, each example neither started nor stopped in the middle of a phrase.

The 19 selected examples, 35 seconds each in length, were then presented to Population A who judged them with the same Semantic Differential scales used for the film examples. Measures of co-orientation were used to determine the relative structure of the musical examples. The examples with the highest and lowest relative structure were selected for further experimentation.[6]

Questionnaire Construction and Administration

Since the goal was to determine the degree to which an audience shares in common a given set of judgments toward a series of film and music examples, a "structured response" approach was used. A questionnaire utilizing Osgood's Semantic Differential technique[7] was developed. The Semantic Differential is a combination of associational and scaling procedures and is regarded, by those who developed it, as a logic or technique rather than a test in any final form.[8]

---

[6] A listing of the selected musical themes is given in Appendix A.

[7] C. E. Osgood, G. J. Suci and P. H. Tannenbaum, The Measurement of Meaning, (Urbana: University of Illinois Press, 1957), Chapter 3.

[8] Roger Ellis Nebergall, "An Experimental Study of Rhetorical Clarity" (Ph.D. dissertation, University of Illinois, 1956) p. 39.

Earlier studies used the Semantic Differential technique primarily to assess meaning and attitude toward single words and concepts. Nebergall[9] and others have since used the technique for the evaluation and comparison of judgments toward entire messages. More recently, a considerable number of television versus face-to-face attitude studies have employed the Semantic Differential as a measuring instrument.[10] The least popular application of this instrument seems to be in the area of non-verbal and cross modal studies, but Osgood has pointed out that the Semantic Differential is quite useful in the study of non-verbal as well as complex sign situations.[11] Some representative studies however, which used the Semantic Differential with non-verbal stimuli are: Tucker's aesthetic judgments toward paintings study;[12] Tannenbaum and Osgood's studies of color meaning;[13] Kerrick's photo caption study;[14] Tannenbaum's musical background

---

[9] Ibid., p. 45.

[10] J. C. Reid and D. W. MacLennan, eds., Research in Instructional Television and Film, (Washington: U.S. Government Printing Office, 1967).

[11] Osgood, p. 24.

[12] William T. Tucker, "Experiments in Aesthetic Communications," (Ph.D. dissertation, University of Illinois, 1955).

[13] Percy Tannenbaum and Charles E. Osgood, 1952, reported in Osgood, The Measurement of Meaning, p. 299.

[14] Jean S. Kerrick, "The Influence of Captions on Picture Interpretation," Journalism Quarterly, 32:177-82, (Spring 1955).

study;[15] Mehling's photo study;[16] Greenberg's TV production study;[17] Harrison's pictic analysis;[18] and, Pallett's study of the connotative dimensions of music meaning.[19]

Although no known studies have utilized the Semantic Differential to investigate film music as a film variable, the variety of non-verbal and complex sign studies found in the literature suggested that this approach would be useful.

An 18 scale form of the Semantic Differential was used as the measuring instrument. The questionnaire was made up into a 22-page mimeographed booklet consisting of a cover page explaining the use of the rating scales, a practice page, and 20 sequentially numbered response pages.[20]

---

[15]Percy H. Tannenbaum, "The Effect of Background Music on Interpretation of Stage and Television Drama," Audio-Visual Communication Review, 4:92-103, (Spring 1956).

[16]Reuben Mehling, "Attitude Changing Effect of News and Photo Combinations," Journalism Quarterly, 34:169-198, (Spring 1959).

[17]Bradley S. Greenberg, "The Effects of Communication Incompatibility on Children's Judgments of Television Programs," Journal of Broadcasting, 8:157-71, (Spring 1964).

[18]Randall Paul Harrison, "Pictic Analysis: Toward a Vocabulary and Syntax for the Pictorial Code; With Research on Facial Communication," (Ph.D. dissertation, Michigan State University, 1964).

[19]Earl Marshall Pallett, "Music Communication Research: The Connotative Dimensions of Music Meaning," (Ph.D. dissertation, Michigan State University, 1967).

[20]A copy of the instructions and a copy of the Semantic Differential scales used are reproduced in Appendix B.

The response pages were identical except for the example number printed at the top of each page. The instructions printed on the cover were read to the group. The idea that there were no right or wrong answers was stressed. Attention was also directed to the fact that the zero or central space was to be used to indicate indecision or that the respondent considered the adjective pair to be irrelevant for that example. A seven-step bi-polar scale was used.

3 : 2 : 1 : 0 : 1 : 2 : 3

GOOD_____:_____:_____:_____:_____:_____:_____BAD

Assigning a zero to the mid-point implies that though structured, the responses are not equivalent to a "forced choice." The scales were randomly ordered with the polarity positions systematically switched.

Eighteen adjective scales were picked from those developed in the studies of Harrison,[21] Kerrick,[22] Nebergall,[23] and Pallett.[24] A selection was made of those scales which seemed most likely to fit musical as well as film concepts. This first selection of scales was tested with Population A. A four rotation factor analysis of these scales showed the set to be more favorable to the

---

[21]Harrison, p. 126.

[22]Jean S. Kerrick, "News Pictures, Captions and the Point of Resolution," Journalism Quarterly, 34:183-89 (Spring 1959).

[23]Nebergall, p. 40.

[24]Pallett, p. 136.

film since 11% greater variance was accounted for in the film analysis than in the music analysis.[25] In addition, since five scales loaded on different factors for the film than for the music examples, it was decided to change certain scales. A four rotation factor analysis of the new set of scales showed that only 4% greater variance was accounted for in the film analysis, and that only three scales loaded on different factors. Further refinements would have been attempted had time permitted; however, with a difference of only 4% in the total accountable variance between the film analysis and the music analysis, it was felt that the set of scales was adequate for the needs of the study.

Experimental Populations

Three populations were involved in the entire study. First, there was a pilot study involving eleven graduate students in Educational Media, Population A, as previously mentioned. Population A was used to evaluate the Semantic Differential scales and to select the film and music examples that would be most useful for the experiment. The scales were evaluated by a four rotation factor analysis. The film and music examples were selected so that the highest and lowest structure, as reflected by measures of subject co-orientation, would be included in the experiment.

---

[25]A four rotation factor analysis of the scales used with Population A is given in Appendix B.

At a later date, these selected examples and scales were presented to Population B. Population B was used to establish the independent measures for the separate film and music examples. Predictions of Population C responses to combined film with music examples were based also on measures derived from Population B.

Populations B and C were randomly matched subsets of an undergraduate teacher education class of 140 students. Randomization was accomplished by having each student draw from a shuffled deck of marked cards as he entered the class. The cards were marked 1 or 2. All those drawing "1" were assigned to Population B, and "2's" were assigned to Population C. By tallying the sex of the students as the cards were drawn, it was established that half the males and half the females were represented in each population. However, a few students arrived late and were assigned to Population C causing a slight, but not significant, inequality in numbers between the two populations.

The students assigned to Population B were sent to a special room where the projectors and sound equipment had previously been set up, and test booklets had been distributed to each desk position. The subjects were asked to check their books for missing pages, to fill in their name, and to mark "Group 1" in the appropriate place. The instructions given on the cover page were read aloud to them. The practice music example was played and the subjects were asked to fill out the practice page. No questions having arisen, the subjects were told to turn the page when they had completed each example so the examiner could determine when all were ready for the next example. The number of each example was announced immediately before it was presented so that the subjects could make sure they were filling out the proper page. The sequence consisted of: 1 music practice example and 9 music test examples, then 1 film practice example followed by 9 film test examples, and finally, a repeat of the first film example as a test for practice effect. The entire procedure with Population B took about 45 minutes. The test books were collected and the subjects were asked to return to their classroom. Students that had drawn cards marked with a "2", plus the few late students, were instructed to go to the testing room as the "1" group returned.

During the time that it took for the two groups to exchange places, new test booklets were placed on the desks in the testing room and the projectors and sound equipment were made ready for the new sequence. Group 2 (Population C) was asked to fill in the same information on the test booklets and was read the same instructions. Population C received only film and music combinations. After a practice combination, a series of 18 film and music combinations were presented. The room lights were turned on after each film combination so that the test booklets could be marked. A new example was presented as soon as all pages were turned. The test with the second group also took about 45 minutes.

Equipment

The equipment used in the experiment consisted of two Graflex projectors and a Wollensak tape player fed through the testing room's permanent P.A. system. Back-up equipment was available but not needed. White leader was used to separate the film and music examples. Synchronization between film and music was accomplished by the timing marks on the leader for each music example and cue marks on the leader of each film example. Two film projectors were used so that film examples could be repeated and reordered without delay to the audience. Three persons were needed to run the presentation. One person ran the equipment, the second rewound and ordered the film and tape, and the third person called the new sequence number when all subjects had completed the previous example and turned the room lights on and off as required.

Presentation Order

The order of presentation for the separate music and film examples was established by random draw. Each music and film example was used twice to make up the eighteen combination film with music examples with Population C. The first order of presentation for the combined film with music examples was developed by using the random sequence established for the music examples and assigning the film examples on a "best match" basis in terms of congruency between scales. For the second set, the film order was repeated and music examples switched to produce a "mis-match." In this way, each film example received two music treatments, one treatment matching better than the other. The "mis-matched" combinations were necessary to insure a sample of incongruous examples.

Methodology

The focus of this study can be summarized in the following general hypothesis.

> General Hypothesis. The effectiveness of music when used with film is dependent on at least two conditions:
>
> 1. the congruency between the channels,
> 2. the relative structure of the two message components.

The strategy for the investigation of music as a film variable was to view the problem sequentially from three separate levels. The first level simply asked if the perceived judgments for a film are influenced by the music that co-exists with the film scene. The second level asked if the judgments for the combined film with music sequence can be predicted from measures of the component parts. The third level asked if the structure of and the congruency between the component parts systematically affects the relative influence of the components.

<u>Level One</u>. Can different music cause a change in the perceived meaning for a given film example?

A series of film examples and music examples, selected to include a variety of styles and types as judged by Population A were presented to Population B. The examples, each 35 seconds in length, were measured on a form of the Semantic Differential.[26] The mean of each scale for every music example and every film example was calculated.

Each film was then matched with two music examples, one being a better match than the other. The film with music combinations were then presented to Population C which was randomly matched with Population B. These combinations were judged on the same set of Semantic Differential scales and again the means were calculated for every scale for each combination. Since each film segment existed with two music treatments, it was possible to subtract, on every scale, the distance or D between scale positions. If the music did not systematically influence the combined judgments, then it would be expected that the D would be randomly distributed between the two music treatments. A statistical test for matched pairs was used to establish significance. Thus, level one dealt with:

> <u>Hypothesis 1</u>. Given a specific audience and a series of musical accompaniments to a film scene, the music can significantly change the interpretation the audience gives for the combined presentation as measured on a form of the Semantic Differential.

---

[26]Osgood, p. 19.

Level Two. Can the judgments for a combined film with music presentation be predicted from knowledge or measures of the component parts?

A series of musical examples and film examples were judged independently on a series of Semantic Differential scales by Population B. Combinations of these films and music examples were then given to randomly matched Population C. Predictions of judgments for the combinations were made using the congruency point of resolution model.[27] In scale units of the Semantic Differential, the point of resolution equals $\frac{F}{F + M}(F) + \frac{M}{F + M}(M)$, where F = the mean judgment of the film on a given scale and M = the mean judgment of the music on the same scale. A correlation between the scores predicted from measures of the component parts and scores observed for the combined presentation was used to test:

> Hypothesis 2. Given a set of film and music examples, the observed scores for the combinations will significantly correlate with scores predicted by the point of resolution formula.

Level Three. Is the relative influence of the film and music components systematically influenced by conditions of congruency and structure?

Congruency.--Separate measures were available for the film and the music components. The relationship of these measures on a given scale determines the congruency between the components.[28] If the measures for both

---

[27] Ibid, p. 207.

[28] Ibid, Chapter 5.

components fall on the same side of the scale, that is, if the music is judged, for example, to be happy and the film is also judged to be happy, then the combination is said to be congruous. If, on the other hand, the film is judged happy and the music sad, then the combination is said to be incongruous. The relative congruency of a combination was determined by the number of incongruent scales found for the combination. Using levels of congruency as the independent variable, the accuracy of the point of resolution prediction and also the influence of the components were analyzed as dependent variables. One-way analysis of variance and related statistical tests were used to test:

> Hypothesis 3. Given measures of film meaning and music meaning, the congruency between components will systematically affect the accuracy of the point of resolution predictions.

> Hypothesis 4. Given measures of film meaning and music meaning, the congruency between components will systematically affect the relative influence of the component parts.

Structure.--A measure of co-orientation was established for each example by calculating the absolute difference between all possible pairs in the sample and then summing the squares of their differences (D^2) across all scales of the Semantic Differential. The number of possible pairs in a sample of 70 people, for example, is 2,415 pairs $\left(\frac{N(N-1)}{2}\right)$. The number of D^2 scores, using a Semantic Differential with 18 scales, was thus 18 X 2,415 or 43,470. Given a range of 1 - 7 on each scale, there was a maximum absolute difference range of 6, and a D^2 range of 0 - 36 between any given pair on any given scale. So the theoretical range of averaged D^2 scores with 18 scales was 0 - 648 for each example (36 x 18). The film and music examples were then rank ordered according to their measure of co-orientation. High co-orientation reflected a high consensus within the sample audience and low co-orientation reflected low consensus within the sample audience. When referring to the examples rather than to the audience, it is more convenient to speak of high and low structure. Using levels of structure as the independent variable, the accuracy of the point of resolution prediction and also the influence of the components were analyzed as the dependent variables. One-way analysis of variance and related statistical tests were used to test:

> Hypothesis 5. Given measures of film structure and music structure, the structure of the components will systematically affect the accuracy of the point of resolution predictions.

> Hypothesis 6. Given measures of film structure and music structure, the structure of these components will systematically affect the relative influence of the film and music.

CHAPTER IV

RESULTS

There are three levels of data to be reported in this study. The first level asks if music can cause a change in the perceived meaning for a given film example. The second level asks if the judgments for a combined presentation can be predicted from knowledge of the component parts. And the third level asks if congruency and structure systematically influence the relative influence of the component parts. For the sake of simplicity, the results will be presented by units of function rather than levels of discourse. In addition, the connotative dimensions of film-music meaning will be reported as found in this study.

The data gathered in this study represents a total of more than 55,000 individual responses -- the main study of 140 subjects responding on 18 scales to each of 18 items, a retest of 70 subjects on 18 scales to three items, and a pilot study of 11 subjects responding on 18 scales to each of 36 items. These individual responses were analyzed by three separate procedures. First, the responses for each item were averaged across the group for each scale in the set. This established the semantic position of each scale for every item in the film set, the music set, and the combined music with film set. Second, each person was paired with every other person in the group and the difference in their responses on each scale to every item was tabulated. This established the relative structure of each item in the set, great differences between pairs being defined as low structure and small differences between pairs being defined as high structure. Third, the responses for each scale were analyzed across all items in the set and factored against all other scales giving the dimensional structures of connotation for the film set, the music set and the combined film with music set.

Summarization of the above three classes of information allows (1) investigation of the similarities between dimensional structure of picture connotation and music connotation in a film presentation, (2) investigation of the prediction of the combinations given knowledge of the elements, and (3) investigation of component conditions that inhibit or contribute to the combined film with music judgments.

Prerequisite Statistical Tests

Since neither a counterbalance such as a Latin-square nor a control group was used in the major design of this study, some assurance must be given that learning and order effect are not significantly evident. A test-retest situation was built into the overall design to provide for the prerequisite tests. For each mode, the first example after practice was repeated as the final example. A significant change between the two measures of the same example would be an indication of either learning or order effect. Two separate tests were performed on the retest example in each mode, a correlation of scale means, and a T-test for paired samples. The correlation of scale means between test and retest was .93 for music, .93 for film and .94 for the film with music combination. All correlations are highly significant. The T-test between means paired on each scale was below the .1 level of significance in all cases, therefore the null hypothesis of no significant difference could not be rejected. Thus it appears that it will not be improper to study the overall results, since neither learning nor order effects seem to have introduced an experimental bias.

Component Influence

The first task is to establish if music can change the connotative meanings judged for a given film segment. Each of the nine film sequences were presented with two different musical accompaniments. This allows asking if the judgments made for a film when viewed with music A are significantly different than judgments made of the same film when viewed with music B.

First, the measures for the film segments and the music examples must be established. The mean for each of the 18 scales across 68 subjects for the 9 film segments and the 9 music examples was calculated, 324 scale means in all.[1] Using these scale means, it was then possible to calculate two sets of difference or D scores, each set containing 18 scores, one for each scale. One set would be between the film alone and film with music A, the other set would be between the film alone and film with music B. Squaring these D scores allows adding across scales for each example or across the entire set of examples. If the music did not systematically influence the combined judgments, then it would be expected that the D^2 would be randomly distributed between the two music sets. The null hypothesis to be tested is that there is no significant difference between the two sets of scores.

The Wilcoxon test of Matched Pairs[2] was chosen as an appropriate statistical test in that the two sets of D^2 scores could be paired on each scale. This test is available on the Michigan State University 3600 computer[3] with Wilcoxon T approximations for a sample with N larger than 25. Essentially, it is a non-parametric test to determine the probability that two samples, in which the members of one sample are matched with members of the second sample, come from identical populations.

---

[1]Music scale means and film scale means are given in Appendix C.

[2]Sidney Siegel, Nonparametric Statistics for the Behavioral Science, (New York: McGraw-Hill, 1956) pp. 75-83.

[3]John Morris, "Technical Report 45," Computer Institute for Social Science Technical Reports, (East Lansing: Michigan State University, 1967).

The test was taken first across the total set of 162 paired D^2 scores (9 x 18 scales). A Wilcoxon T-test value of 4018.00 was found and therefore the null hypothesis of no difference was rejected at greater than the .005 level of confidence, two-tailed. Next, tests were calculated between the two music treatments for each of the nine film examples. The null hypotheses of no difference was rejected at the .005 level of confidence, two-tailed, for six of the nine examples.

Therefore, it seems safe to conclude that the music associated with a film scene can cause a difference in the way the film with music combination will be judged. However, it is noted that this difference is not the same for all examples. The task, then, is to determine if the combined judgments can be predicted and to identify the conditions that may inhibit or contribute to the combined music with film judgment.

Judgment Predictions

It was suggested in Chapter II that Osgood's point of resolution formula might be useful in predicting judgments of film with music combinations, given measures of the independent film and music components. The measures for the film segments and the music examples are available and given in Appendix C. They are the means for each of the 18 scales for the 9 music examples and the means of the 18 scales for the 9 film segments, 324 means in all. Utilizing the formula $\frac{F}{F + M}(F) + \frac{M}{F + M}(M)$, where

F = the film segment scale mean and M = the music segment scale mean, 324 predictor scores were calculated, 18 scales for each of the 18 film with music combinations. The observed means for each of the 18 scales taken across the 71 subjects for each of 18 film with music combinations are also available. The predicted scale means and the observed scale means are also given in Appendix C.

The 324 predicted combination means were then correlated with the 324 observed combination example means. The correlation between scores predicted from Population B and scores observed in Population C was .87, which is significant at greater than the .005 level. Since the overall correlation was rather high, it seems useful to look at each combination to see if the point of resolution prediction was more successful for some examples than others. The 18 predicted scores were correlated with the 18 observed scale scores for each of the 18 examples. The correlations range from a low of .13 to a high of .95, as shown in Table 1.

It is also interesting to look at the scales to see if the predictions are more accurate for some scales than for others by running correlations for each scale across the 18 combinations. These correlations are given in Table 2. Since the point of resolution formula is useful in predicting the judgments that will be made for a combined film with music presentation, it seems safe to conclude that both the film and music components contribute to whatever meanings the combination will be judged to have. However, it cannot be implied, at this point, that the influence is equal. It should also be noted that the predictions are more accurate for some combinations than for others. The next step, then, was to determine the relative influence of the component parts and to identify some factors that might help explain why the predictions are more accurate in some cases, than in others.

Table 1.--Predicted with observed scores correlated by examples.

Combination	Predicted-Observed Correlation	Combination	Predicted-Observed Correlation
1	.95	10	.72
2	.91	11	.79
3	.90	12	.13
4	.89	13	.95
5	.91	14	.80
6	.75	15	.98
7	.97	16	.68
8	.96	17	.94
9	.95	18	.86

.68 = P< .002

Table 2.--Predicted with observed scores correlated by scales.

Scale		Correlation	Scale		Correlation
1 Kind	Cruel	.96	10 Danger	Safety	.91
2 Heavy	Light	.90	11 Slow	Fast	.87
3 Sad	Happy	.89	12 Pleasant	Unpleasant	.95
4 Complex	Simple	.76	13 Weak	Strong	.79
5 Good	Bad	.94	14 Meaningful	Meaningless	.44
6 Passive	Active	.94	15 Violent	Peaceful	.97
7 Ugly	Beautiful	.94	16 Dishonest	Honest	.63
8 Excited	Calm	.93	17 Serious	Humorous	.86
9 Worthless	Valuable	.61	18 Harmonious	Dissonant	.78

.61 = P< .006

Relative Component Influence

It has been demonstrated that the meanings judged for a given film sequence change depending on the music used with it, and that this change is, in general, systematic. Therefore, it seems appropriate to ask which of the components contribute more to the combined judgments, the film or the music. In order to answer this question, it is necessary to determine if the judgments for the combined presentation are closer to one component than they are to the other. That is, are the judgments for the combination more like the judgments made for the film segment when viewed by itself or more like the judgments made for the music example when heard by itself. Given a set of judgments on a series of identical scales for the music example, for the film sequence, and also for the film with music combination, the difference between the combination and the music alone can be compared with the difference between the combination and the film alone, scale by scale. By squaring the differences and then summing across the scales, it is possible to determine if the total difference for the film set is greater or less than the music set for any combination or for all combinations. Using the responses for the 68 subjects to separate film sequence and music examples and the responses of the 71 subjects to the film with music combinations, the difference for each component and the combination was calculated and squared. This gave a total of 324 film difference scores and 324 music difference scores. Pairing these scores scale for scale, example by example, a T-test of correlated means was performed. A Fisher-Student T-test value of 2.87 was found and the null hypothesis of no difference between the film and music was rejected with a two-tailed probability significance of greater than .01. The greater differences were found in the music set; that is, the music had less overall influence on the combination than did the film. In that there is a significant difference between the film and music effects, it seems useful to look at the D^2 summed by examples, as shown in Table 3.

Table 3.--Sum of D^2 by types and combination.

Combination	Influence	Music	Film
1	F	23.34	4.13
2	F	18.58	2.16
3	F	17.89	3.11
4	F	14.34	5.24
5	F	21.71	15.76
6	M	30.93	42.67
7	M	6.37	7.99
8	M	5.58	7.20
9	F	13.21	5.44
10	F	57.39	14.43
11	F	37.34	9.93
12	M	26.26	35.66
13	F	9.49	4.38
14	M	16.04	19.70
15	F	7.62	1.86
16	M	19.10	32.49
17	M	5.59	7.58
18	M	9.78	20.49
Total	F	340.56	240.22

T between Music and Film = 2.87, $P < .01$

It is interesting to note that although the film was more effective overall, the music was more influential in 8 of the 18 combinations. It seems useful, therefore, to continue further analysis in an attempt to identify systematic factors contributing to this effect. The two factors investigated are congruency and structure.

Congruency

When any film segment is combined with any music example, two component measures are available on each scale. These measures represent the semantic judgment means of the 68 subjects to the separate components. If these measures both fall left or right of the scale center, then the two components are said to be congruent with each other on that scale. If, however, one component measure is found on one side of scale center and the other on the opposite side, then the combination is said to be incongruous. By counting the number of incongruous scales found in each combination, it is possible to say that some combinations are more incongruous than others. Taking the six combinations with the least number of incongruous scales gives a group of high congruency combinations, the next six gives the medium congruency combinations, and the six with the greatest number of incongruent scales makes up the low congruency group.

Congruency and Point of Resolution Predictions

It has already been observed that the point of resolution prediction correlated well with the actual observation. It was noted, however, that within this high overall correlation, the correlations of individual examples ranged from .13 to .96. In order to examine this in greater detail, D scores between the point of resolution prediction and the observed value were calculated for 18 scales in each combination. The less accurate the point of resolution prediction, the greater the D score between the predicted and observed values. A one-way analysis of variance (see Appendix D) performed on these 324 D^2 scores for the three levels of congruency gave a between cell significance of greater than .01. A T-test performed between the High Congruency and Low Congruency cells gave a T value of 2.44 and allowed rejection of the null hypothesis of no difference at a two-tailed significance of .02. No significance was found between medium congruency and high or between medium congruency and low. The point of resolution D^2 scores are given in the Table 4 summed across scales for each example. The smaller D^2 found for high congruency suggests that the point of resolution predictions are more accurate for combinations that are congruent and becomes less accurate as the number of incongruent scales is increased.

Table 4.--Sum D^2 by levels of congruency - point of resolution D^2, music D^2, film D^2 and summation effect

Combination	Greater Influence	Number of Incongruent Scales	P.O.R. D^2	Music D^2	Film D^2	Summation Effect
		HIGH CONGRUENCY				
8	M	0	3.06	5.58	7.20	8
1	F	1	5.77	23.34	4.13	11
17	M	1	5.98	5.59	7.58	17
3	F	2	5.62	17.89	3.11	9
4	F	2	7.02	14.34	5.24	13
15	F	2	2.34	7.62	1.86	9
			29.79	74.36	29.12	67
		MEDIUM CONGRUENCY				
13	F	3	2.43	9.49	4.38	10
2	F	4	6.38	18.58	2.16	10
18	M	4	5.82	9.78	20.49	6
7	M	5	0.98	6.37	7.99	2
11	F	5	13.26	37.34	9.93	10
5	F	7	4.42	21.71	15.76	5
			33.29	103.27	60.71	43
		LOW CONGRUENCY				
9	F	8	1.67	13.21	5.44	4
16	M	9	10.42	19.10	32.49	5
14	M	10	10.19	16.04	19.70	10
6	M	11	11.36	30.93	42.67	2
10	F	11	17.11	57.39	14.43	6
12	M	14	11.04	26.26	35.66	4
			61.79	162.93	150.39	31

Congruency and Component Effect

Just as the predicted score can be subtracted from the observed score, it is possible to subtract the mean judgment for the music component from the mean judgment of the combination on a given scale. This gives 324 difference scores for the 18 music segments that can be summed and compared. A set of 324 difference scores was also computed for the film components. These scores, summed across scales for each combination, are given in Table 4. The performance of analysis of variance and related T-tests for separate film and music D^2 score shows all but one level of congruency significantly different at greater than the .005 level for both film and music (see Table 27, Appendix D). This suggests that as the number of incongruent scales is increased, the distance between each component and the combination increases.

Summing the D^2 scores by levels of congruency, it is noticed that the film scores are much smaller than the music scores for both the high and medium congruency levels. This is consistent with the overall trend of film component having greater influence on the combination. However, the film D^2 and music D^2 scores are about equal for the low congruency level suggesting that film does not have the same primary effect for combinations of low congruency. The greater influence has been assigned to each combination by determining which component had the smaller D^2 and is listed in Table 4. There are 10 combinations in which the film component has a smaller D^2 and 8 combinations in which the music component has a smaller D^2. Looking at this by levels of congruency, it is noticed that a disproportionate number of music influence combinations fall in the low congruency level. At the high and medium congruency levels there are 4 combinations in which the film predominated and 2 for the music. At the low congruency level, however, the reverse is found. There are 4 combinations in which the music predominates and 2 for the film. This would seem to indicate that the music has a greater opportunity of influencing the film-music combination when the congruency between the components is low. It should be cautioned, however, that this should not be considered a conclusive finding because there are insufficient samples to establish significance.

Structure

For the purpose of this study, an example is said to have high structure when a high co-orientation is reflected in the judgments of the sample population. Low structure, then is the label given to an example that is relatively ambiguous to this population. The measure of co-orientation is derived by taking all possible pairs in the sample population and summing the difference between each pair of responses on every scale for each example. About 45,000 D scores are thus generated for each example or combination. Each score can range from 0 for no difference between the pair, to 6 scale points difference.

Summing across all 45,000 scores, a large D score reflects a large difference in judgments of the sample population, a small D reflects relative consensus. The example with the largest D score is said to have the lowest relative structure; the example with the smallest D score is said to have the highest relative structure. The film and music examples ranked according to their relative structure are shown in Table 5.

Table 5.--Rank order of relative structure.

MUSIC		FILM	
Example	D^2 Average	Example	D^2 Average
low		low	
6	72.84	5	95.34
4	66.50	1	77.25
9	64.66	2	68.07
7	63.17	8	67.28
1	59.43	3	65.29
2	58.33	9	64.58
3	57.81	4	63.70
8	47.87	7	55.65
5	47.64	6	53.78
high		high	

It is interesting to note that, over all, greater ambiguity was expressed for the film samples than was reflected by the music samples.

Structure and Point of Resolution Predictions

The ranked examples can be grouped into three levels of structure: high, medium and low. Using levels of structure derived from subject paired response differences as the independent variable and P.O.R. D^2 as the dependent variable, it is possible to compare the performance of the point of resolution prediction by component levels of structure. The sum of P.O.R. D^2 by component structure level is given in Table 6.

Table 6.--D^2 between point of resolution prediction and observed scale mean summed by levels of structure.

	Music	Film
High Structure	45.81	34.55
Medium Structure	32.58	33.19
Low Structure	46.48	57.13
	124.87	124.87

It will be noticed that the point of resolution prediction is most accurate for medium structure and least accurate for low structure. Separate one-way analysis of variance (see Appendix D) shows between cell significance (.007) for the film component but not for music.

Structure and Component Effect

It is also possible to look at the separate film and music D^2 scores as was done in the analysis of congruency. This is the distance of each component from the combination in which it appears. It will be remembered that, overall, the film component had a greater influence than the music. Therefore, the sum of the film D's will be less than the sum for the music D's. Table 7, below, gives the distance between the component and its combination for three levels of structure. Separate one-way

analysis of variance failed to establish between cell significance for either film or music. However, using only two levels of structure, high and low, significance of .05 was established for music and .005 for film (see Appendix D). It will be noticed in Table 7 that large D's are found with high structure and small D's with low structure. No satisfactory explanation can be given for this. In fact, the reverse was expected. One would expect an ambiguous component to have less influence than a highly structured one. But apparently the stronger component is used to develop the meaning of the weaker component and thus moves a greater distance than does the more ambiguous component.

Table 7.--D^2 between components and combined examples by levels of structure.

	Music	Film
High Structure	157.31	94.63
Medium Structure	89.63	79.48
Low Structure	93.62	66.11
	340.56	240.22

Component Influence by Levels of Congruency and Structure

In order to make a comparison between the film component and the music component for a given combination, it is necessary to have separate measures for each component. The D scores between each component and its combination have already been calculated for every scale in each example. If the influence of the components is equal, then the D scores will be equal. If, however, the combination is more like one component than the other, the D score of the component having greater influence will be smaller. By summing across combinations, it was earlier determined that the film component had a greater overall influence. In that there have been indications that congruency and structure systematically affect the combination, it seems useful to look at the component influence by combined levels of congruency and structure. If the film D^2 score is subtracted from the music D^2 score, the difference represents the net amount that the combination favors the component with the smaller D^2. Averaging this across all combinations found within a given cell allows comparison of net effect between cells. This is expressed by the following formula:

$$\Sigma_k \frac{\Sigma_s\left(\frac{\Sigma M}{N} - \frac{\Sigma C}{N}\right)^2 - \Sigma_s\left(\frac{\Sigma F}{N} - \frac{\Sigma C}{N}\right)^2}{k}$$

Where:

M = Music Component Responses
F = Film Component Response
C = Combined Film with Music Responses
S = Semantic Differential Scales (18)
k = Combination
N = Subjects (68 in Population B, 71 in C)

For the sake of simplicity, two levels of congruency and two levels of structure are used to determine the cells. Less than five incongruent scales is considered a congruous example and five or more incongruous scales an

incongruous example. High and low structure is determined by the rank order of the components. There are four combinations of structure; high film with high music, high film with low music, low music with high film, and low music with low film.

Table 8.--Net difference between music influence and film influence by combined levels of structure and congruency.

Structure	Congruency	
	Congruent	Incongruent
High Music, High Film ($H_M H_F$)	5.20	5.76
Low Music, High Film ($L_M H_F$)	7.10	-9.02
High Music, Low Film ($H_M L_F$)	15.60	25.44
Low Music, Low Film ($L_M L_F$)	4.25	2.05

In Table 8, 0.00 would indicate equal film and music influence. The positive numbers indicate film influence, the negative number indicates music influence. The larger the number, the greater the influence. Thus it is seen that music has the greatest influence in an incongruent combination with low music structure and high film structure. Film has the greatest influence in an incongruent combination with high music structure and low film structure.

It will also be noted that very little difference is found between $H_M H_F$ and $L_M L_F$ structure levels. The film has a slightly greater influence than the music for both congruent and incongruent combinations. However, a

con
flue
comb
the c
found
low
a cov
tend
onl
to
grou

T
combine
Occasio
than ef
served c
rather th
out of the

[4] Jean
Point of Re
Spring 195

considerable difference is noticed for the mixed structure combinations $L_M H_F$ and $H_M L_F$. Taking only these four cells, a chi-square was used to test the null hypothesis of proportionate expectations. A chi-square of 13.34 gave a two-tailed significance of greater than .01. The only condition in which the music component had a greater influence than the film component was in an incongruent combination with low music and high film structure. On the other hand, the greatest film component influence was found in an incongruent combination with high music and low film structure. These results support the notion that a component with strong meaning (high co-orientation) will tend to strengthen the meaning of the ambiguous (low co-orientation) component. It is somewhat surprising, however to find that this tendency is even stronger for incongruous combinations.

Summation Effect

The point of resolution formula predicts that the combined value will fall between the two component values. Occasionally, however, the observed value will be greater than either of the components. The phenomenon of the observed combined value falling beyond either component rather than between them is called the summation effect.[4] Out of the 324 scores predicted by the point of resolution

---

[4]Jean S. Kerrick, "News Pictures, Captions and the Point of Resolution," Journalism Quarterly, 34:183-89 (Spring 1959)

formula, 139 exceeded one of the values. Of these 139 summations, 93 fell toward scale center and 46 away from the scale center. There were 91 summations found in congruous combinations and only 48 summations in incongruous combinations. In terms of structure, 68 summations were found in high structure and 71 found in low structure combinations. The summations favored the film component 75 times and favored the music component 64 times. In general, the summations increased as the number of incongruent scales increased and favored the music in low structured combinations and the film in high structured combinations. The trends, however, were below the .05 level of significance. Table 9 shows summation effects averaged by structure and congruency combinations.

Table 9.--Summation effect averaged by combined levels of structure and congruency.

Structure	Congruency	
	Congruent	Incongruent
High Music High Film	11	3
Low Music High Film	11	3
High Music Low Film	9	7
Low Music Low Film	9	7

Scales

There are three considerations that need to be investigated in terms of scale characteristics and scale

performance. These considerations are scale relevancy, direction consensus, and inter-scale relationships.

Scale Relevancy

At the time of the experiment, the subjects were instructed to check the central scale position if they felt an adjective pair was irrelevant. At a normal level, all responses can be placed into two groups (middle step/ non-middle step) for any given scale. The hypothesis was that a significantly greater number of people would judge a given scale to be relevant than would judge that scale to be irrelevant. A binomial (two category) exact test of statistical significance is most appropriate to test this hypothesis. The .05 level of significance (one-tailed) was selected and a total of 648 binomial tests were computed[5] -- 162 for the music examples, 162 for the film examples, and 324 for the film with music combinations. The results are given in Tables 10, 11, and 12 where an irrelevant scale is indicated with an "X". A greater proportion of non-relevant combinations were found for the film than for music: 16/162 for film to 6/162 for music. Since scale 16, Dishonest - Honest, was most frequently irrelevant for music, film and combined mode, its usefulness for this study is somewhat brought into question.

[5]U.S. Ordinance Corps, Table of Cumulative Binomial Probabilities, (Washington: ORDP 20-1, 1952).

Table 10.--Scale relevancy and direction consensus for music examples.

Scale		Example 1	2	3	4	5	6	7	8	9	Totals X	0
1. Kind	Cruel										0	0
2. Heavy	Light										0	0
3. Sad	Happy										0	0
4. Complex	Simple		0		0			0			0	3
5. Good	Bad	0									0	1
6. Passive	Active						0				0	1
7. Ugly	Beautiful									0	0	1
8. Excited	Calm										0	0
9. Worthless	Valuable	X					X	0	X		3	1
10. Danger	Safety										0	0
11. Slow	Fast										0	0
12. Pleasant	Unpleasant										0	0
13. Weak	Strong				0			0			0	2
14. Meaningful	Meaningless		0								0	1
15. Violent	Peaceful									0	0	1
16. Dishonest	Honest							X	X	⊠	3	1
17. Serious	Humorous										0	0
18. Harmonious	Dissonant	0									0	1
	Non-relevant	1	0	0	0	0	1	1	2	1	6	
	No Direction	2	2	0	2	0	1	3	0	3		13

X = irrelevant
0 = no direction consensus
⊠ = irrelevant and non-directional

Table 11.--Scale relevancy and direction consensus for film examples.

Scale			Example									Totals	
			1	2	3	4	5	6	7	8	9	X	0
1.	Kind	Cruel					0		⊠		X	2	2
2.	Heavy	Light					0					0	1
3.	Sad	Happy					0				X	1	1
4.	Complex	Simple	0				0		0	0		0	4
5.	Good	Bad					0					0	1
6.	Passive	Active			0							0	1
7.	Ugly	Beautiful					0		X			1	1
8.	Excited	Calm								0	0	0	2
9.	Worthless	Valuable			0							0	1
10.	Danger	Safety		X								1	0
11.	Slow	Fast				0					0	0	2
12.	Pleasant	Unpleasant										0	0
13.	Weak	Strong		0	⊠	⊠	0	⊠				3	5
14.	Meaningful	Meaningless										0	0
15.	Violent	Peaceful										0	0
16.	Dishonest	Honest	⊠	X	X		X	X		X	X	7	1
17.	Serious	Humorous										0	0
18.	Harmonious	Dissonant	0				⊠					1	2
		Non-relevant	1	2	2	1	2	2	2	1	3	16	
		No Direction	3	1	3	2	8	1	2	2	2		24

X = irrelevant
0 = no direction consensus
⊠ = irrelevant and non-directional

Table 12.--Scale relevancy and direction consensus for combined film-music examples.

Scales		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Totals X	Totals 0
1. Kind	Cruel						⊠	X		⊠									X	4	2
2. Heavy	Light										0									0	1
3. Sad	Happy												0							0	1
4. Complex	Simple		0				0		0		0								0	0	5
5. Good	Bad						0						0							0	2
6. Passive	Active				0								0						0	0	3
7. Ugly	Beautiful							X					0							1	1
8. Excited	Calm												0	0				0		0	3
9. Worthless	Valuable	X		0	0	0	⊠				0	0		0	0	X	⊠		0	4	10
10. Danger	Safety		X	X		0		0	X			X						X		5	2
11. Slow	Fast																0			0	1
12. Pleasant	Unpleasant						0			0			0							0	3
13. Weak	Strong		0	X	X	⊠						X	0	0	0	⊠	0	X	0	6	8
14. Meaningful	Meaningless			0	0	0	0					0	0				0			0	7
15. Violent	Peaceful					0		0					0							0	3
16. Dishonest	Honest	⊠	X	X	X	X	⊠	X	X	⊠	⊠	⊠	X	X	⊠	X	X	X	X	18	6
17. Serious	Humorous							0	0									0		0	3
18. Harmonious	Dissonant	0					0	0			0	0			0					0	6
	Non-relevant	2	2	3	2	2	3	3	2	2	1	3	1	1	1	3	2	3	2	38	
	No Direction	2	2	2	3	5	8	4	2	3	5	4	9	3	4	1	4	2	4		67

X = irrelevant
0 = no direction consensus
⊠ = irrelevant and non-directional

Direction Consensus

Direction consensus means that a significant number of people marked a scale in one direction or the other. Eliminating the central or non-relevant position, it is then possible to treat at a nominal level the responses as being right or left of center. The hypothesis was that a significantly greater number of subjects will judge the example in one direction or the other. A two-tailed binomial exact test of statistical significance is appropriate to test this hypothesis. The results of these 648 binomial tests (using the .05 level of significance) are given in Tables 10, 11 and 12. For ease of coding, a 0 is used to indicate a non-significant finding for any given scale in any given example. More non-directional cases were found for the film examples than for the music. The lack of direction consensus as well as irrelevancy was proportionately higher for the combination mode than for the film or music mode. It may well be that when the two symbol systems are combined, sufficient information is available to make some dimensions, such as honest - dishonest, less useful.

Factor Analysis

In order to compare the dimensional nature of film and music as well as the combination of film with music on a given set of scales, three factor analyses were applied to the three modes of presentation. A four factor solution was chosen in that only one variable was found to have its highest loading on additional rotations in each mode.

Over all, the scales factored in about the same way for film, music, and the combined film with music. Only 8 out of a possible 54 differences were observed as shown in Table 13. A binomial exact probability test shows this significance at greater than the .001 level, one-tailed.

Table 13.--Scale factor comparisons.

		MUSIC	FILM	F/M COMBINED
1. Kind	Cruel	I	I	I
2. Heavy	Light	I	I	I
3. Sad	Happy	II*	I	I*
4. Complex	Simple	IV	IV	IV
5. Good	Bad	I	I	I
6. Passive	Active	II	II	II
7. Ugly	Beautiful	I	I	I
8. Excited	Calm	II	II	II
9. Worthless	Valuable	III	III	III
10. Danger	Safety	I	I	I
11. Slow	Fast	II	II	II
12. Pleasant	Unpleasant	I	I	I
13. Weak	Strong	IV*	III	III*
14. Meaningful	Meaningless	III	III	III
15. Violent	Peaceful	I	I	I
16. Dishonest	Honest	I	I*	IV*
17. Serious	Humorous	II*	I	I*
18. Harmonious	Dissonant	I	I	I

*Differences in factoring between modes.

An orthogonal varimax rotation was used in order to emphasize the simple structure of the data. The four rotations accounted for the greatest amount of variance in

the music mode and the least variance in the film with music mode. However, the amount of variance accounted for was very close between modes for each factor as shown in Table 14.

Table 14.--Proportions of variance.

	Music	Film	F/M Combination
Factor I	.3443	.3539	.3394
Factor II	.1867	.1406	.1330
Factor III	.0739	.0939	.1179
Factor IV	.0832	.0559	.0493
	.6881	.6443	.6396

The percent of total variance reported here is somewhat higher than was found in the original Osgood studies,[6] but is rather close to that found in Harrison's Pictic Analysis[7] and Pallett's Music Meaning study.[8] The fact that the combined film with music extractable response

---

[6] C. E. Osgood, G. J. Suci and P. H. Tannenbaum, The Measurement of Meaning, (Urbana: University of Illinois Press, 1957), p. 37.

[7] Randall Paul Harrison, Pictic Analysis: Toward a Vocabulary and Syntax for the Pictorial Code; With Research on Facial Communication, (Ph.D. dissertation, Michigan State University, 1967) p. 85.

[8] Earl Marshall Pallett, Music Communication Research: The Connotative Dimensions of Music Meaning, (Ph.D. dissertation, Michigan State University, 1967), p. 85.

variance is less than found for the music or film alone, reinforces Pallett's suggestion that we should expect higher explainable variance when investigating a single symbol system.[9] The higher music proportion suggests that this set of scales is more relevant to the music examples, a condition that has already been noted in the discussion of scale relevance.

The values for each scale are reported in Tables 15, 16, and 17.

Although this study was not designed to map the dimension of film-music meaning, it may be useful in terms of future research to look at the way meaning is structured, given this set of scales.

The first factor is clearly what Osgood has labeled the evaluative factor: good, kind, beautiful, pleasant, etc. It seems to hold up well across all three modes. The second factor is the activity factor: fast, active, excited. It will be noticed that serious - humorous, and sad - happy factored in this category only for the music examples. This may well be due to the tendency for sadness and seriousness connotations to be influenced primarily by music tempo.[10]

---

[9] Ibid.

[10] Paul R. Farnsworth, The Social Psychology of Music, (New York: Holt, Rinehart and Winston, 1958), p. 99.

Table 15.--Rotated factor loadings - music examples.

			I	II	III	IV
7	Ugly	Beautiful	.8428	-.1036	.1598	-.1235
1	Kind	Cruel	-.8303	.1642	.0265	.2504
10	Danger	Safety	.8302	-.1426	-.0333	-.2698
12	Pleasant	Unpleasant	-.8239	.2044	-.1919	.1279
15	Violent	Peaceful	.8231	.1020	-.0003	-.2766
16	Dishonest	Honest	.8009	-.0373	.0794	-.1116
5	Good	Bad	-.7427	.3033	-.2197	.1495
2	Heavy	Light	.6514	-.4080	-.0140	-.4591
18	Harmonious	Dissonant	-.5524	-.0017	.2216	.0707
			I	II	III	IV
11	Slow	Fast	.2741	-.8522	-.1087	.0769
8	Excited	Calm	.1476	.8409	.0283	-.0860
6	Calm	Active	.0364	-.7866	.1462	.0614
17	Serious	Humorous	.3614	.6936	.1896	.3554
3	Sad	Happy	.5583	-.6338	.0430	.2913
			I	II	III	IV
14	Meaningful	Meaningless	-.0659	-.0672	-.7602	.1079
9	Worthless	Valuable	.3520	.0157	.6629	.0539
			I	II	III	IV
4	Complex	Simple	.3042	-.1635	.0173	-.6589
13	Weak	Strong	-.2411	-.1567	.2690	.5720

Table 16.--Rotated factor loadings - film examples.

			I	II	III	IV
12	Pleasant	Unpleasant	.8939	-.1599	.0383	.0503
3	Sad	Happy	-.8643	.0118	.1169	.2106
5	Good	Bad	.8619	-.0646	-.0842	-.0284
7	Ugly	Beautiful	-.8299	.1769	.1086	.0289
1	Kind	Cruel	.8247	-.2084	.0309	.1935
15	Violent	Peaceful	-.7942	.4254	-.0401	.0162
10	Danger	Safety	-.7659	.3251	-.0396	.1360
2	Heavy	Light	-.6588	.0487	.1649	.3971
18	Harmonious	Dissonant	.5692	-.2760	.2380	.0677
16	Dishonest	Honest	-.5629	.0907	.3068	.0351
17	Serious	Humorous	-.3677	-.2739	-.3409	.3506
			I	II	III	IV
8	Excited	Calm	-.3477	.7889	-.1345	.0568
11	Slow	Fast	.2560	-.7850	.1295	.0365
6	Passive	Active	.0965	.7425	.1221	-.2235
			I	II	III	IV
14	Meaningful	Meaningless	.0419	.1223	-.7575	-.0172
9	Worthless	Valuable	-.2554	-.1144	.7048	-.1563
13	Weak	Strong	.1198	.3488	.4753	-.2431
			I	II	III	IV
4	Complex	Simple	-.0947	.1934	-.1118	.6906

Table 17.--Rotated factor loadings - film with music combinations.

			I	II	III	IV
3	Sad	Happy	-.9045	-.0169	-.0543	.1727
12	Pleasant	Unpleasant	.8731	-.1853	-.0988	-.0604
1	Kind	Cruel	.8204	-.2033	-.0137	-.1757
7	Ugly	Beautiful	-.8104	.1972	.1539	.0063
2	Heavy	Light	-.7815	.0941	-.1262	.2913
5	Good	Bad	.7752	-.0786	-.2575	-.1678
15	Violent	Peaceful	-.7603	.4319	.0291	.1234
10	Danger	Safety	-.7558	.2923	.0502	.2178
17	Serious	Humorous	-.5634	-.2632	-.3677	.0734
18	Harmonious	Dissonant	.4343	.1440	.3666	.0884
			I	II	III	IV
11	Slow	Fast	.0745	.8290	.0437	.0519
8	Excited	Calm	-.3392	.7969	.0659	.0753
6	Passive	Active	.0478	-.7094	.2605	-.0740
			I	II	III	IV
14	Meaningful	Meaningless	.0394	.1031	-.7760	-.0053
9	Worthless	Valuable	-.1484	-.1010	.7591	.0048
13	Weak	Strong	.1504	-.2166	.5033	-.0925
			I	II	III	IV
4	Complex	Simple	-.3475	.0313	-.1801	.6121
16	Dishonest	Honest	-.2066	.0864	.4388	.4861

The remaining three scales are of questionable value in terms of film-music measures. Table 32 in Appendix C gives the averaged D^2 scores between all possible pairs summed across examples for each scale. Complex - Simple, Meaningful - Meaningless, and Worthless - Valuable will be found to be the most ambiguous scales across all three modes. Perhaps they factor together because they are equally useless. The main dimensions in this study, then, are evaluation and activity.

CHAPTER V

SUMMARY AND CONCLUSIONS

The broadest generalization is that music appears to exercise considerable influence when made to co-exist with a film scene. The influence is systematic and to a great extent it can be predicted with Osgood's point of resolution formula. Overall, the film component has a greater influence on the film with music combination than does the music component. This influence, however, varies considerably between examples. The precision of the point of resolution predictions as well as the relative influence of the separate components seem to be highly dependent on the degree of congruency existing between the two components. Structure, which is an assessment of viewer consensus, also affect component relationships, but to a lesser degree. Music influence was found to be greater than the film component influence only in those incongruous combinations with high film structure and low music structure. This finding was somewhat unexpected and no satisfactory explanation is to be found in the present data as to why the judgments of the film-music combinations were influenced by the more ambiguous component. It might be conjectured that the known moves to structure the

unknown. However, except for this one unexpected finding, all hypotheses were supported, as summarized below.

Hypotheses

> Hypothesis 1. Given a specific audience and a series of musical accompaniments to a film scene, the music can significantly change the interpretation the audience gives for the combined presentation as measured on a form of the Semantic Differential.

A matched, two-sample, non-parametric test between the two music treatments across all film samples resulted in the rejection of the null hypothesis of no difference at a two-tailed confidence level greater than .005. Therefore, it seems safe to conclude that the music associated with a film scene can cause a difference in the way the film with music combination is judged. Separate tests between the two music treatments for each film example, however, showed significance for only six of the nine examples. It is evident that the component influence is not equal in all conditions.

> Hypothesis 2. Given a set of film and music examples, the observed scores for the combinations will significantly correlate with scores predicted by the point of resolution formula.

Predictions of judgments for the combined film with music examples were calculated according to the Osgood point of resolution formula utilizing the mean response on each scale derived from independent assessment of the separate components. Overall, a highly significant correlation of .87 was found between the predicted and observed

scores. This suggests that the point of resolution formula is useful in this context and that both the film and music components contribute to whatever meanings the combination is judged to have. Separate correlations for each example, however, showed a correlation range from a low of .13 to a high of .95. It is again evident that the component influence is not equal in all conditions.

> Hypothesis 3. Given measures of film meaning and music meaning, the congruency between components will systematically affect the accuracy of the point of resolution predictions.

By counting the number of incongruous scales in each combination, it is possible to say that some combinations are more incongruous than others. The high congruency group was the set of 6 film and music combinations that had 0 to 2 incongruent scales between them. The medium congruency group was the set of 6 combinations that had from 3 to 7 incongruent scales. The 6 low congruency examples had from 8 to 14 incongruent scales in each example. The distance, or D score, between the point of resolution prediction and the observed scale mean was calculated and summed by levels of congruency. If levels of congruency did not influence the precision of the point of resolution predictions, it would be expected that the D^2 scores would be randomly distributed among the levels of congruency. A one-way analysis of variance performed on the three levels of congruency gave a between cell significance greater than .005. Related T-tests allowed rejection of the null hypothesis of no difference between high and low congruency at the .01 two-tailed level of confidence. No significance was found between medium congruency and high or between medium and low congruency. It is safe to conclude that predictions made with the point of resolution formula are more accurate for combinations that are congruent and that the predictions become less accurate as the number of incongruent scales increases.

> Hypothesis 4. Given measures of film meaning and music meaning, the congruency between components will systematically affect the relative influence of the component parts.

Assessment of component influence was made by calculating the distance, scale by scale, between the mean judgments of the combination and the mean judgment of each component. The component that is less distant from the combination measure is assumed to have the greater influence. Overall, film had a greater influence on the combination judgments since the sum of D^2 for the film component was significantly smaller than the sum of D^2 for the music component. In general, each component had a greater influence in high congruency combinations than it had in low congruency combinations, significant at greater than the .001 level. This suggests that as the number of incongruent scales is increased, the distance between each component and the combination increases. However, it was also noticed that the influence of the music component was about equal to that of the film component in cases of low congruency. This suggests that music has a greater opportunity to influence film-music combinations when the congruency between components is low.

> Hypothesis 5. Given measures of film structure and music structure, the structure of the components will systematically affect the accuracy of the point of resolution prediction.

Structure is an assessment of viewer co-orientation. High structure reflects relatively high consensus and low structure, relatively low consensus in the viewer sample toward a specific example. Structure is determined by calculating the difference between all possible pairs within the sample for each response item. Summing across the squares of differences between pairs gives an index of structure for each example. The rank order of these examples is used as the independent variable while analyzing the point of resolution D^2 scores. Using three levels of component structure, the point of resolution predictions were found to be most accurate for the medium structure and least accurate for low structure. Separate one-way analysis of variance showed between level significance of better than .01 for the film but not for the music. The fact that the point of resolution formula was the most accurate for both film and music at the medium level of structure points out the "normalizing" characteristic of the formula. The formula does not seem to take into consideration the extremes of structure and congruency.

> Hypothesis 6. Given measures of film structure and music structure, the structure of these components will systematically affect the relative influence of the film and music.

In general, there seems to be an inverse relationship between structure and component influence. That is, components that achieved high agreement among subjects shift more when combined with the second channel than do components that are relatively ambiguous. In its broadest generalization this finding may suggest that people are quite willing to change their judgments about something when new or different information is added. However, this finding was somewhat unexpected for which the data does not provide a satisfactory explanation. Apparently, the known makes a greater shift in order to structure the unknown.

Osgood's congruency concept may not be the most useful approach in answering the above unexpected finding for as Ivan Preston[1] points out, Osgood obtains great precision but in so doing he limits the generality of his predictive device. Under unbalanced circumstances, the evaluation of both components must change to a specified extent.

Balance theory, of course, is not the only approach to studying communication conflicts. Rokeach[2] deals with resolving informational conflicts in terms of the

---

[1]Ivan Preston, "A Review of Balance Theories," (unpublished mimeographed paper, Michigan State University, 1964).

[2]M. Rokeach, The Open and Closed Mind, (New York: Basic Books, 1960).

individual's personality as reflected by his belief system. Festinger[3] has looked at conflicting information and changes in belief as influenced by social or group pressures. From an information viewpoint, Broadbent[4] suggests that channel constraints limit informational input and therefore influences multi-sensory effectiveness. From a perception viewpoint, the human mind is seen to adjust incoming information to fit past expectations or basic "natural" principles. The Gestalt principle of closure is but one of the several concepts used to explain the ways in which informational parts are perceived, the way in which subwholes emerge, and the way in which the grouping of information occurs.[5] Marshall McLuhan,[6] on the other hand, is more concerned with how mediation of environmental information structures basic dimensions of cognition much as Benjamin Whorf[7] suggests that man's mental abilities develop within the constraints of his available language. From the McLuhan or Whorf view, the human mind is seen to

---

[3] Leon Festinger, Henry W. Riecken, Jr., and Stanley Schachter, When Prophecy Fails, (Minneapolis: University of Minnesota Press, 1956).

[4] D. E. Broadbent, Perception and Communication, (New York: Pergamon Press, 1958).

[5] William N. Dember, Psychology of Perception, (New York: Holt, Rinehart and Winston, 1960).

[6] Marshall McLuhan, Understanding Media: The Extensions of Man, (New York: McGraw-Hill, 1964).

[7] B. L. Whorf, Four Articles on Metalinguistics, (Washington: Foreign Service Institute, 1950).

evolve according to the classes of information it has developed a necessity to recognize.

It is impossible to suggest, at this time, whether the shifts toward the more ambiguous component as observed in this present study are a tendency to adjust to some greater whole and thus "close" on the unknown, whether the existing information available in the music and visual component has provided the necessary dimensions for structuring a new meaning in the ambiguous area, or whether additional investigation will provide a suitable explanation from a balance theory viewpoint.

Scale Analysis

Although this study was not designed to map the dimensions of film-music meaning, it may be useful in terms of future research to look at the way meaning is structured, given this set of Semantic Differential scales. A four rotation factor analysis was applied to each of the three modes of presentation. Overall, the scales factored in about the same way for film, music, and the combined film with music. Two main dimensions appeared in this selected set of scales -- evaluation and activity. In general, it seems quite possible to select a set of scales that are useful in judging separate film and music and film with music modes of presentation.

Future Research

The most obvious need is for research that looks systematically at the interaction between structure and congruency. This study has pointed to some trends but there were insufficient combinations available at the various levels of structure and congruency to establish the existing relations. To conduct such experiments a more refined method of pre-selecting the film and music samples is needed so that adequate representation of the sample space is insured. However, before a serious effort of sample selection can be made, a careful evaluation of the co-orientation measure of structure is also needed. The data in this study suggests that the rank order of example structure was not stable between the pilot and experimental populations. But since the pilot population was much more sophisticated in terms of media and non-verbal exposure, it is not known whether the measure lacks validity or whether the two populations were actually quite different in their perceptions of certain film and music examples. For whatever reason, this instability of the co-orientation measure caused certain inconveniences in the treatment of data and loss of significance for most of the tests involving measures of structure. Certainly, further use of this measure should not be encouraged until either its validity is established or its extreme sensitivity is understood.

This study was exploratory in nature. Some trends were identified and a few hunches confirmed. But very little has been done toward the development of a theoretical framework for instructional design. The next step would be to look at the congruency and structure interaction concept from a multi-channel, information theory viewpoint. It is very possible that the information overload problems found in multi-channel studies are indeed similar to the high structure, high incongruency interactions found in this study.

Conclusion

This study investigated congruency and structure as two of the conditions which systematically influence the relative effectiveness of the music component in a simultaneous film visual and music combination. The first level of the study simply asked if the perceived judgments of a filmed visual can be significantly altered by the music that is made to co-exist with the scene. It was found that the perceived judgments of the visual could be altered. The second level investigated the usefulness of the point of resolution formula for predicting the judgments of film with music combinations from knowledge of the component parts. It was found that the point of resolution was useful and, in general, extremely accurate. The third level considered the effects of congruency and structure and the interaction of these conditions on point of resolution predictions and component performance. The point of resolution predictions became less accurate as the number of incongruent scales increased. The music component was more influential when the congruency between the components was low. In terms of structure, the point of resolution predictions were more accurate at the medium level of structure for both film and music components. The low structured film component was most influential on combined judgments and the high structure least influential. For music, medium structure was most influential and high structure least influential. This tendency for meanings to shift toward the ambiguous component was somewhat unexpected and suggests some kind of perceptual "filling-in" or evolving of new meaning in these ambiguous or low structure areas. Finally, although the film component had a greater overall influence on the combination, congruency and structure seemed to interact so that the music component had a greater influence on the combined judgment under conditions of incongruent components with high film structure and low music structure.

Music, of course, is but one element in the total product called a film. Congruency and structure are but two of the many conditions existing between the variables, and film music does not function solely to alter the visual message. So, although congruency and structure have been shown to systematically influence the relative effectiveness of the music component, much remains undone. But as the flexibility and constraints of the film elements are identified, principles of design will emerge to serve the intentions of the educator.

BIBLIOGRAPHY

BIBLIOGRAPHY

Bass, Saul. "Opening for 'Walk on the Wild Side'." Pagina, International Magazine of Graphic Design. Milan, Italy: Gennaio, 1964.

Broadbent, D. E. Perception and Communication. New York: Pergamon Press, 1958.

Dember, William N. Psychology of Perception. New York: Holt, Rinehart and Winston, 1960.

Farnsworth, Paul R. The Social Psychology of Music. New York: Holt, Rinehart and Winston, 1958.

Festinger, Leon; Riecken, Henry W.; and Schacter, Stanley. When Prophecy Fails. Minneapolis: University of Minnesota Press, 1956.

Greenberg, Bradley S. "The Effects of Communication Incompatibility on Children's Judgments of Television Programs." Journal of Broadcasting, VIII (Spring, 1965), pages 157-171.

Greenhill, Leslie P. "Review of Trends in Research on Instructional Television and Films." Research in Instructional Television and Film. Washington: U.S. Government Printing Office, 1967.

Harrison, Randall Paul. "Pictic Analysis: Toward a Vocabulary and Syntax for the Pictorial Code; With Research on Facial Communication." Unpublished Ph.D. dissertation, Michigan State University, 1964.

Hoban, C. F., Jr., and Van Ormer, E. B. Instructional Film Research, 1918-1950. Pennsylvania State University Instructional Film Research Program. Port Washington, N.Y.: U.S. Naval Training Device Center, Office of Naval Research, Tech. Report No. SDC 269-7-19, 1950.

Kerrick, Jean S. "The Influence of Captions on Picture Interpretation." Journalism Quarterly, XXXII (Spring, 1955), pages 177-182.

Kerrick, Jean S. "News Pictures, Captions and the Point of Resolution." Journalism Quarterly, XXXIV (Spring, 1959), pages 183-189.

Lumsdaine, A. A. "Audio-visual Research in the U.S. Air Force." Audio-Visual Communication Review, I (Spring, 1953), pages 76-90.

Lumsdaine, A. A., ed. Student Response in Programmed Instruction. Washington: National Academy of Science, 1961.

Lumsdaine, A. A. "Instruments and Media of Instruction." Handbook of Research on Teaching. Edited by N. L. Gage. Chicago: Rand McNally & Co., 1963.

Lumsdaine, A. A., and Gladstone, A. I. "Overt Practice and Audio-Visual Embellishments." in Learning from Films. Edited by M. A. May and A. A. Lumsdaine. New Haven: Yale University Press, 1958.

May, M. A., and Lumsdaine, A. A., eds. Learning from Films. New Haven: Yale University Press, 1958.

McLuhan, Marshall. Understanding Media: The Extensions of Man. New York: McGraw-Hill, 1964.

Mehling, Reuben. "Attitude Changing Effect of News and Photo Combinations." Journalism Quarterly, XXXIV (Spring, 1959), pages 169-198.

Morris, John. "Technical Report 45." Computer Institute for Social Science Technical Reports. East Lansing: Michigan State University, 1967. (Mimeographed.)

Nebergall, Roger Ellis. "An Experimental Study of Rhetorical Clarity." Unpublished Ph.D. dissertation, University of Illinois, 1956.

Neu, D. M. "The Effect of Attention-gaining Devices on Film-mediated Learning." Journal of Educational Psychology, XXXXII (Spring, 1951) pages 479-490.

Newcomb, Theodore M. "An Approach to the Study of Communicative Acts." Psychological Review, LX (No. 6, 1953), pages 393-404

Osgood, C. E.; Suci, G. J.; and Tannenbaum, P. H. The Measurement of Meaning. Urbana: University of Illinois, 1957.

Pallett, Earl Marshall. "Music Communication Research: The Connotative Dimensions of Music Meaning." Unpublished Ph.D. dissertation, Michigan State University, 1967.

Preston, Ivan. "A Review of Balance Theories." (Unpublished mimeographed paper, Michigan State University, 1964.)

Reid, J. C., and MacLennan, D. W., eds. *Research in Instructional Television and Film*. Washington: U.S. Government Printing Office, 1967.

Rokeach, M. *The Open and Closed Mind*. New York: Basic Books, 1960.

Siegel, Sidney. *Nonparametric Statistics for the Behavioral Sciences*. New York: McGraw-Hill, 1956.

Tannebaum, Percy H. "The Effect of Background Music on Interpretation of Stage and Television Drama." *Audio-Visual Communication Review*, IV (Spring, 1956), pages 92-103.

Tannebaum, Percy H. and Osgood, Charles E. "Effects of Color on Meaning of Advertised Products." Reported in Osgood, *et al*. *The Measurement of Meaning*. Urbana: University of Illinois Press, 1957.

Travers, R. W., *et al*. *Research and Theory Related to Audiovisual Information Transmission*. rev. ed. Kalamazoo: Western Michigan University, 1967.

Tucker, William T. "Experiments in Aesthetic Communications." Unpublished Ph.D. dissertation, University of Illinois, 1955.

U.S. Ordinance Corps. *Table of the Cumulative Binomial Probabilities*. Washington: The Corps, 1952.

Whorf, B. L. *Four Articles on Metalinguistics*. Washington: Foreign Service Institute, 1950.

Zuckerman, J. V. *Music in Motion Pictures: Review of Literature with Implications for Instructional Films*. Pennsylvania State University Instructional Film Research Program. Port Washington, N.Y.: U.S. Naval Training Device Center, Office of Naval Research, Tech. Report No. SDC 269-7-2, 1949.

APPENDICES

APPENDIX A

1. Film examples
2. Music examples

FILM EXAMPLES

Scene	Film Title	Producer
1. Field mice attacked by bird.	"Life in The Desert"	Encyclopaedia Britannica
2. Balinesian dancers.	"Siam"	Walt Disney
3. Formal dinner scene.	"Un Restaurante Madrileno"	Neaubacher
4. Policemen at home.	"The Policeman"	Encyclopaedia Britannica
5. Running lemmings jump into the sea.	"White Wilderness"	Disney
6. Animated space ships.	"Mars and Beyond"	Disney
7. Boys playing baseball.	"Our Community"	Encyclopaedia Britannica
8. Animated paint brush and flowers.	"Secrets of the Plant World"	Disney
9. Native harbor and fishing nets.	"Mexican Fishing Village"	Bailey
<u>Practice</u>. Solar Flares	"Our Friend the Atom"	Disney

MUSIC EXAMPLES

Title	Library	Record Number
1. "Primitive People"	Corelli Jacobs	DW 2649 A
2. "Chinese Pictures"	Corelli Jacobs	DW 2734 B
3. "Intermezzo for Harp"	Chappell	C 511 B
4. "Dreamy Waltz"	Chappell	C 712 A
5. "Dancing Puppet"	Chappell	C 788 B
6. "Wall of Fear"	Chappell	C 788 A
7. "Pizzicato Strings"	Corelli Jacobs	DW 2719 A
8. "Mobile Pursuit"	Chappell	C 303 B
9. "Dramatic Playbill #3"	Corelli Jacobs	DW 2705 A
Practice. "Twist Cha Cha Cha"	Corelli Jacobs	DW 2731 A

APPENDIX B

1. Instruction Form Used with Population A
2. Response Form Used with Population A
3. Scale Analysis, Population A, Music
4. Scale Analysis, Population A, Film
5. Revised Instruction Form
6. Revised Response Form

INSTRUCTION FORM USED WITH POPULATION A

MUSIC - FILM INFLUENCE STUDY
Instructional Media Center
Michigan State University

NAME ______________________ MAJOR ______________________

STUDENT NUMBER ________ CLASS __________ MALE ____ FEMALE ____

INSTRUCTIONS:

You will be given a series of music and film examples. After each example is shown or played, you will be asked to respond to a series of adjective scales. A new page is to be used for each music/film presentation.

Each page contains eighteen adjective pairs. The word pairs are divided into three groups with directions for each group repeated on every page. Respond to all eighteen scales immediately after each presentation. All pages are the same.

The adjective pairs are separated by a scale containing seven positions. Please check at a point along each scale to indicate where you rate the music/film sample.

Here is an example:

3 2 1 0 1 2 3

NICE ___:___:___:___:___:___:___ AWFUL

This rating scale is bound by the words "NICE" and "AWFUL." The more "NICE" you feel the music/film is, the farther to the left of the scale you would place your check; the more "AWFUL" you feel the music/film is, the farther to the right you would place your check. If it is hard to decide if it is "NICE" or "AWFUL," or you feel the adjective pair is not relevant to the particular music/film sample, place a check in the central space, under the zero (0). This means "undecided" or "irrelevant."

There are no right or wrong answers. The best response is what you feel is appropriate. Do not spend too much time on any one item. PUT DOWN YOUR FIRST IMPRESSION. Be sure to place a check on every scale. When you have finished each page, turn the page, and the next music/film example will be given.

RESPONSE FORM USED WITH POPULATION A

FILM SAMPLE NO. __________

A THE SUBJECT OF THE FILM IS:

	3	2	1	0	1	2	3	
KIND								CRUEL
SAD								HAPPY
GOOD								BAD
UGLY								BEAUTIFUL
JOYFUL								MOURNFUL
AGITATED								RESTFUL

B. THE SITUATION INDICATES:

	3	2	1	0	1	2	3	
DANGER								SAFETY
SECURITY								JEOPARDY
PLEASURE								PAIN
EXCITEMENT								CALMNESS
VIOLENCE								PEACEFULNESS
FRUSTRATION								SATISFACTION

C. THE PICTURE IS:

	3	2	1	0	1	2	3	
REALISTIC								DISTORTED
WHIMSICAL								SINCERE
SERIOUS								HUMOROUS
DECEPTIVE								TRUSTWORTHY
HONEST								FALSE
SOLEMN								PLAYFUL

SCALE ANALYSIS, POPULATION A, MUSIC

Table 18.--Varimax rotation analysis of scales used with population A, music examples

		I	II	III	IV
1 Kind	Cruel	-.6608	-.4679	-.3254	.0521
2 Sad	Happy	.9243	-.0819	.1566	-.0951
3 Good	Bad	-.7493	-.3411	-.3383	.1355
4 Ugly	Beautiful	.5540	.4872	.3440	-.3492
5 Joyful	Mournful	-.9008	.0909	-.1814	.1692
6 Agitated	Restful	-.1276	.8362	.1378	-.1011
7 Danger	Safety	.7015	.4755	.3542	.2224
8 Security	Jeopardy	-.6845	-.4940	-.4040	-.1958
9 Pleasure	Pain	-.8805	-.2451	-.1787	.0542
10 Excitement	Calmness	-.2510	.8709	.0297	.0079
11 Violence	Peacefulness	.3982	.7932	.2202	.0881
12 Frustration	Satisfaction	.7085	.4331	.3076	-.0887
13 Realistic	Distorted	-.0893	.0151	-.7205	.1986
14 Whimsical	Sincere	-.7406	.1954	.3399	-.2981
15 Serious	Humorous	.9056	-.1307	-.0202	.1715
16 Deceptive	Trustworthy	.0927	.2259	.8474	.0741
17 Honest	False	-.1442	-.2171	-.8193	-.0610
18 Solemn	Playful	.9354	-.1368	.0434	.0270
Proportions of Variance		43%	20%	16%	03%

SCALE ANALYSIS, POPULATION A, FILM

Table 19.--Varimax rotation analysis of scales used with population A, film examples.

			I	II	III	IV
1	Kind	Cruel	-.6810	-.5115	-.0042	-.1807
2	Sad	Happy	.8457	.1925	-.0852	.2599
3	Good	Bad	-.8018	-.2031	-.1924	-.0549
4	Ugly	Beautiful	.6621	.2739	-.0209	.0102
5	Joyful	Mournful	-.8121	-.0890	.0905	-.3167
6	Agitated	Restful	.2170	.8469	.0535	.0562
7	Danger	Safety	.5249	.7283	-.0530	.0925
8	Security	Jeopardy	-.5767	-.6622	-.0210	-.1427
9	Pleasure	Pain	-.7449	-.3800	.0144	-.2306
10	Excitement	Calmness	.1381	.8560	.0273	-.0229
11	Violence	Peacefulness	.4818	.7567	.0003	.1631
12	Frustration	Satisfaction	.6314	.4888	.1177	.0835
13	Realistic	Distorted	.0763	.0485	-.7761	-.0014
14	Whimsical	Sincere	-.0918	.0381	.6967	-.4271
15	Serious	Humorous	.1903	.0890	-.2282	.8063
16	Deceptive	Trustworthy	.0839	.1119	.7947	-.0685
17	Honest	False	-.1014	-.0115	-.7734	.1108
18	Solemn	Playful	.2959	.0899	-.1069	.8009
	Proportions of Variance		27%	21%	14%	10%

REVISED INSTRUCTION FORM

MUSIC - FILM INFLUENCE STUDY
Instructional Media Center
Michigan State University

NAME ______________________ MAJOR ______________________

STUDENT NUMBER __________ CLASS _______ MALE ____ FEMALE ___

INSTRUCTIONS:

You will be given a series of music and film examples. After each example is shown or played, you will be asked to respond to a series of adjective scales. A new page is to be used for each example.

Each page contains eighteen adjective pairs. Respond to all eighteen scales immediately after each presentation. All pages are the same.

The adjective pairs are separated by a scale containing seven positions. Please check at a point along each scale to indicate where you rate the example.

Here is an illustration:

3 : 2 : 1 : 0 : 1 : 2 : 3

NICE ___:___:___:___:___:___:___ AWFUL

This rating scale is bounded by the words "NICE" and "AWFUL." The more "NICE" you feel the example is, the farther to the left of the scale you would place your check; the more "AWFUL" you feel the example is, the farther to the right you would place your check. If it is hard to decide if it is "NICE" or "AWFUL," or you feel the adjective pair is not relevant to the particular example, place a check in the central space, under the zero (0). This means "undecided" or "irrelevant."

There are no right or wrong answers. The best response is what <u>you</u> feel is appropriate. Do not spend too much time on any one item. PUT DOWN YOUR FIRST IMPRESSION. Be sure to place a check on every scale. When you have finished each page, turn the page, and the next example will be given.

REVISED RESPONSE FORM

E X A M P L E N U M B E R

PRACTICE

	3 : 2 : 1 : 0 : 1 : 2 : 3	
KIND	___:___:___:___:___:___:___	CRUEL
HEAVY	___:___:___:___:___:___:___	LIGHT
SAD	___:___:___:___:___:___:___	HAPPY
COMPLEX	___:___:___:___:___:___:___	SIMPLE
GOOD	___:___:___:___:___:___:___	BAD
PASSIVE	___:___:___:___:___:___:___	ACTIVE
UGLY	___:___:___:___:___:___:___	BEAUTIFUL
EXCITED	___:___:___:___:___:___:___	CALM
WORTHLESS	___:___:___:___:___:___:___	VALUABLE
DANGER	___:___:___:___:___:___:___	SAFETY
SLOW	___:___:___:___:___:___:___	FAST
PLEASANT	___:___:___:___:___:___:___	UNPLEASANT
WEAK	___:___:___:___:___:___:___	STRONG
MEANINGFUL	___:___:___:___:___:___:___	MEANINGLESS
VIOLENT	___:___:___:___:___:___:___	PEACEFUL
DISHONEST	___:___:___:___:___:___:___	HONEST
SERIOUS	___:___:___:___:___:___:___	HUMOROUS
HARMONIOUS	___:___:___:___:___:___:___	DISSONANT

APPENDIX C

1. Music Scale Means
2. Film Scale Means
3. Predicted Scale Means
4. Observed Scale Means

MUSIC SCALE MEANS

Table 20.--Population B, music example scale means, N=68.

	Example								
Scale	1	2	3	4	5	6	7	8	9
1	5.53	2.26	1.90	1.98	1.94	5.41	2.56	2.88	5.00
2	1.87	6.35	5.15	5.20	6.79	1.72	6.07	5.25	1.65
3	2.22	6.03	3.23	5.13	6.84	1.59	6.14	5.85	1.59
4	2.41	4.25	4.47	3.63	5.93	2.10	4.45	3.04	2.40
5	4.45	2.04	2.31	2.18	1.78	5.12	2.57	2.28	4.75
6	4.85	5.57	2.88	3.29	6.03	3.38	5.72	6.12	3.29
7	2.95	5.76	6.07	6.23	5.44	2.65	5.18	5.26	3.69
8	3.03	3.38	6.19	5.73	2.44	4.75	2.29	1.81	5.13
9	4.38	5.00	5.16	5.16	4.84	4.19	4.16	4.66	4.43
10	1.66	5.19	5.48	5.73	5.75	1.93	5.06	4.76	3.32
11	2.51	5.10	1.98	2.59	5.82	1.70	5.73	6.40	2.22
12	4.78	2.04	1.98	1.87	1.68	5.28	2.45	2.43	4.47
13	5.85	4.32	3.45	4.28	4.40	5.35	4.07	5.19	4.90
14	2.66	2.90	2.70	2.78	3.28	3.18	3.76	3.32	2.97
15	2.32	5.50	6.32	6.25	5.50	3.01	5.20	4.48	4.04
16	2.82	4.94	5.44	5.32	5.38	2.90	4.76	4.84	3.95
17	1.79	4.73	2.47	3.07	6.07	1.78	5.44	4.90	1.66
18	4.28	3.00	2.26	1.95	2.41	4.15	2.85	2.82	3.48

FILM SCALE MEANS

Table 21.--Population B, film example scale means, N=68.

	Example								
Scale	1	2	3	4	5	6	7	8	9
1	6.34	2.62	3.01	2.10	4.32	2.20	4.07	2.09	3.70
2.	2.16	4.76	4.76	5.28	4.22	5.50	4.63	5.94	3.50
3	1.93	4.82	5.68	5.54	3.78	5.41	4.57	6.29	4.22
4	3.53	3.25	4.91	5.03	4.29	5.25	3.98	3.68	1.98
5	5.43	2.56	2.35	2.37	3.76	2.19	3.07	2.01	2.97
6	6.31	4.69	3.90	4.43	5.85	2.57	6.51	5.76	5.34
7	2.62	5.88	5.09	5.06	4.10	6.56	4.44	6.35	5.01
8	1.44	5.28	4.97	4.62	2.53	6.32	1.82	3.88	3.82
9	5.32	5.13	4.26	4.69	4.57	5.20	5.12	5.22	5.45
10	1.43	4.84	5.29	5.26	2.88	5.90	3.63	5.25	3.60
11	6.04	2.20	3.10	3.88	5.26	2.25	6.12	4.66	3.86
12	5.81	2.37	2.09	2.48	4.47	1.60	3.37	1.81	3.31
13	5.62	4.15	3.87	4.20	4.57	4.28	5.23	4.82	5.29
14	1.84	2.84	3.40	2.94	3.18	2.69	2.66	2.78	2.73
15	1.63	5.84	5.73	5.38	3.16	6.54	3.32	6.01	4.88
16	3.82	4.98	4.97	5.44	4.40	5.20	4.44	5.03	4.60
17	1.84	2.51	3.48	3.12	3.35	2.97	3.35	4.48	2.32
18	4.53	2.70	2.88	2.78	4.03	2.37	4.18	2.60	2.98

PREDICTED SCALE MEANS

ble 22.--Film with music combination predicted scale means, P.O.R.

	Example																	
ale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	5.96	2.45	2.58	2.04	3.58	4.48	3.49	2.55	4.45	5.26	2.33	4.64	2.35	4.68	2.06	4.83	2.18	3.10
	2.03	5.67	4.96	5.24	5.80	4.60	5.45	5.62	2.91	4.35	5.95	3.94	5.70	3.50	5.33	3.84	6.15	4.52
	2.09	5.49	4.79	5.34	5.75	4.54	5.47	6.08	3.50	4.88	6.00	4.71	5.86	3.13	[illegible]	3.80	6.16	4.72
	3.08	3.82	4.70	4.44	5.24	4.35	4.23	3.39	2.21	3.30	4.98	4.09	4.76	3.61	4.99	3.33	3.99	3.05
	4.99	2.33	2.33	2.28	3.12	4.24	2.85	2.15	4.07	4.50	2.24	3.72	2.47	4.31	2.25	4.36	2.03	2.64
	5.68	5.17	3.47	3.94	5.94	3.03	6.14	5.95	4.56	6.22	5.44	4.43	5.16	4.93	2.73	5.44	5.67	4.56
	2.79	5.82	5.62	5.71	4.86	5.43	4.84	5.86	4.45	4.38	5.67	4.30	5.12	3.91	6.32	3.77	6.07	5.69
	2.52	4.54	5.65	5.23	2.49	5.65	2.08	3.22	4.57	1.65	4.38	4.24	3.85	4.27	6.26	3.94	3.65	4.97
	4.90	5.07	4.75	4.94	4.71	4.75	4.69	4.96	4.99	5.01	4.99	4.32	4.44	4.50	5.18	4.70	5.11	5.31
	1.55	5.02	5.39	5.51	4.79	4.92	4.40	5.02	3.47	3.99	5.33	4.42	5.16	3.12	5.70	3.04	5.22	4.91
	5.00	4.23	2.66	3.36	5.55	2.01	5.93	5.67	3.26	6.23	4.83	2.84	4.98	4.36	2.12	5.16	4.89	3.35
	5.35	2.22	2.04	2.22	3.71	4.42	2.98	2.17	3.98	4.81	2.08	3.96	2.47	4.47	1.81	4.54	1.93	2.79
	5.74	4.24	3.67	4.24	4.49	4.87	4.72	5.01	5.10	5.41	4.28	5.06	4.14	4.74	3.91	5.29	4.58	4.84
	2.32	2.87	3.09	2.86	3.23	2.96	3.30	3.07	2.86	2.79	3.08	3.08	3.40	3.08	2.70	2.94	2.84	2.76
	2.04	5.68	6.04	5.85	4.65	5.43	4.47	5.36	4.50	3.72	5.68	4.75	5.29	3.65	6.43	3.17	5.77	5.65
	3.40	4.96	5.22	5.38	4.94	4.38	4.61	4.94	4.30	4.39	5.19	4.19	5.12	4.19	5.32	3.83	4.99	4.99
	1.82	3.96	3.68	3.10	5.10	2.52	4.64	4.70	2.04	4.06	5.03	2.91	4.59	2.79	2.74	2.81	4.61	2.75
	4.41	2.86	2.61	2.44	3.42	3.50	3.64	2.71	3.25	3.87	2.56	3.72	2.82	3.78	2.32	4.17	2.81	2.57

OBSERVED SCALE MEANS

le 23.--Film with music combination observed scale means, N=71.

le	Example 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	6.42	2.83	2.94	2.41	3.38	3.97	3.56	2.72	4.03	5.46	3.07	4.35	2.77	5.63	2.56	5.07	2.96	3.25
	2.10	5.35	5.14	5.20	5.73	2.82	5.62	6.18	2.73	3.80	5.37	2.94	5.73	2.14	5.50	2.38	5.55	5.11
	1.83	5.38	5.53	5.38	5.41	3.32	5.46	6.13	3.35	2.72	5.38	3.90	5.63	2.13	5.38	2.75	5.59	4.83
	3.98	3.83	5.21	5.29	4.84	3.77	4.75	4.11	2.34	3.93	4.46	3.49	5.13	2.97	5.26	3.45	4.75	4.29
	4.84	2.37	2.70	2.83	2.79	3.72	2.91	2.11	3.59	4.84	2.90	4.24	2.59	4.98	2.33	4.70	2.53	2.96
	6.21	4.84	3.48	4.08	5.93	3.25	6.06	5.84	4.65	5.86	4.55	3.96	4.76	5.03	3.00	5.00	4.96	4.21
	2.51	6.01	4.77	4.91	5.03	5.51	4.62	6.07	5.03	3.34	5.60	3.89	5.00	3.07	6.28	3.25	5.90	5.45
	1.77	5.51	5.75	5.39	2.82	5.29	2.28	2.66	4.60	2.03	4.96	4.18	4.04	3.27	6.26	3.01	4.22	5.37
	4.31	4.72	3.56	3.76	3.73	3.97	4.15	4.69	4.48	3.89	3.82	3.17	4.07	3.93	4.31	3.59	4.34	4.32
	1.41	5.00	4.91	4.86	3.56	3.34	4.08	4.42	3.01	2.08	4.76	3.39	5.07	2.27	5.48	2.69	4.73	4.91
	5.76	2.63	2.79	3.11	5.35	2.28	5.79	5.83	3.18	5.96	3.18	3.28	4.46	3.77	2.26	3.90	4.38	3.11
	6.13	1.98	2.15	2.65	3.27	3.63	2.90	1.83	3.56	5.21	2.66	4.15	2.70	5.31	1.78	5.03	2.20	2.56
	4.98	4.03	3.42	3.59	4.14	4.49	4.53	4.76	4.88	4.51	3.58	3.97	4.03	4.28	3.94	4.41	4.24	3.96
	3.01	3.10	4.18	3.73	3.91	3.97	3.42	3.49	3.15	3.59	3.91	4.55	3.80	3.63	3.24	3.94	3.66	3.65
	1.73	5.93	5.83	5.65	4.25	4.83	4.17	4.75	4.62	2.59	5.52	3.80	5.22	2.73	6.44	2.84	5.29	5.37
	4.38	4.66	4.44	4.51	4.31	4.08	4.65	4.42	4.27	3.97	4.11	3.39	4.52	4.07	5.07	3.65	4.44	4.58
	1.86	2.68	3.48	3.17	5.01	2.20	4.49	4.15	2.17	2.62	3.66	3.04	3.81	2.29	2.96	2.62	3.97	3.39
	4.17	2.21	3.01	3.51	3.35	3.86	3.63	2.42	3.11	4.21	3.63	4.59	3.30	4.16	2.36	4.91	3.15	2.96

APPENDIX D

1. Congruency and P.O.R. Predictions
2. Congruency and Component Effect
3. Structure and P.O.R. Predictions
4. Structure and Component Effect

CONGRUENCY AND P.O.R. PREDICTIONS

Table 24.--One-way analysis of D^2 between point of resolution predictions and observed scale means by levels of congruency.

Source	D.F.	S.S.	M.S.	F	Probability
Between Groups	2	3.28	1.63	4.95	.008
Within Groups	321	106.15	.33		
TOTAL	323	109.43			

CONGRUENCY AND COMPONENT EFFECT

A. MUSIC

Table 25.--One-way analysis of D^2 between music component scale means and film with music combination scale means by levels of congruency.

Source	D.F.	S.S.	M.S.	F	Probability
Between Groups	2	44.64	22.31	9.15	<.0005
Within Groups	321	782.21	2.43		
TOTAL	323	826.85			

B. FILM

Table 26.--One-way analysis of D^2 between film component scale means and film with music combination scale means by levels of congruency.

Source	D.F.	S.S.	M.S.	F	Probability
Between Groups	2	67.04	33.51	33.3	<.0005
Within Groups	321	323.01	1.00		
TOTAL	323	390.05			

CONGRUENCY AND COMPONENT EFFECT - continued

C. T VALUES

Table 27.--Fisher-Student T-Test values between levels of congruency for film and music components.

Levels	Music	Film
High-Low	3.91	7.45
Medium-Low	2.88	4.62
Medium-High	1.17 (N.S.)	3.71

T 2.88 = $P<.005$
(.01 two tailed)

STRUCTURE AND P.O.R. PREDICTION

A. MUSIC

Table 28.--One-way analysis of D^2 between point of resolution predictions and observed scale means by levels of music structure.

Source	D.F.	S.S.	M.S.	F	Probability
Between Group	2	1.23	.61	1.82	0.16 (N.S.)
Within Group	321	108.20	.34		
TOTAL	323	109.43			

B. FILM

Table 29.--One-way analysis of D^2 between point of resolution predictions and observed scale means by levels of film structure.

Source	D.F.	S.S.	M.S.	F	Probability
Between Group	2	3.35	1.67	5.06	.007
Within Group	321	106.08	.33		
TOTAL	323	109.43			

STRUCTURE AND COMPONENT EFFECT

A. MUSIC

Table 30.--One-way analysis of D^2 between music component scale means and film with music combination scale means by high and low levels of structure.

Source	D.F.	S.S.	M.S.	F	Probability
Between Group	1	9.46	9.46	3.72	.05
Within Group	322	817.39	2.53		
TOTAL	323	826.85			

B. FILM

Table 31.--One-way analysis of D^2 between film component scale means and film with music combination scale means by high and low levels of structure.

Source	D.F.	S.S.	M.S.	F	Probability
Between Group	1	16.10	16.10	13.8	<.0005
Within Group	322	373.95	1.16		
TOTAL	323	390.05			

SUBJECT D^2 SCORES

Table 32.--Subject D^2 scores summed by scales.

		MUSIC EXAMPLES	FILM EXAMPLES
1 Kind	Cruel	22.88	34.87
2 Heavy	Light	29.46	43.66
3 Sad	Happy	24.16	38.19
4 Complex	Simple	44.00	60.95
5 Good	Bad	30.77	45.15
6 Passive	Active	39.88	38.95
7 Ugly	Beautiful	27.38	41.44
8 Excited	Calm	33.24	38.98
9 Worthless	Valuable	32.05	47.74
10 Danger	Safety	23.06	36.12
11 Slow	Fast	21.10	40.28
12 Pleasant	Unpleasant	32.61	41.71
13 Weak	Strong	30.32	36.62
14 Meaningful	Meaningless	35.94	51.72
15 Violent	Peaceful	25.16	26.72
16 Dishonest	Honest	26.55	42.35
17 Serious	Humorous	21.76	37.12
18 Harmonious	Dissonant	37.22	54.32

COMPARATIVE COMPONENT VALUES

Table 33.--Component values summed by combinations.

Film with Music Combination Number	Music Component Example Number	Film Component Example Number	Number of Incongruous Scales Between Components	Music Component Structure, Average D^2 Between Subject Pairs	Film Component Structure, Average D^2 Between Subject Pairs	Music Component Influence, ΣD^2 Between Component Scale Means and Combination Scale Means	Film Component Influence, ΣD^2 Between Component Scale Means and Combination Scale Means	Correlation Between Point of Resolution Predicted Scale Mean and Observed Scale Mean of the Combined Components.	Point of Resolution Accuracy, ΣD^2 Between Predicted and Observed Scale Means	Number of Scale Summations
1	1	1	1	59.43	77.25	23.34	4.13	.95	5.77	11
2	2	2	4	58.33	68.07	18.58	2.16	.91	6.38	10
3	3	3	1	57.81	65.29	17.89	3.11	.90	5.62	9
4	4	4	2	66.50	63.70	14.34	5.24	.89	7.02	13
5	5	5	7	47.64	95.34	21.71	15.76	.91	4.42	5
6	6	6	11	72.84	53.78	30.93	42.67	.75	11.36	2
7	7	7	5	63.17	55.65	6.37	7.99	.98	0.98	2
8	8	8	0	47.87	67.28	5.58	7.20	.96	3.06	8
9	9	9	8	64.66	64.58	13.21	5.44	.95	1.67	4
10	8	1	11	47.87	77.25	57.39	14.43	.72	17.11	6
11	5	2	5	47.64	68.07	37.34	9.93	.79	13.26	10
12	1	3	14	59.43	65.29	26.26	35.66	.13	11.04	4
13	7	4	3	63.17	63.70	9.49	4.38	.95	2.43	10
14	9	5	10	64.66	95.34	16.04	19.70	.81	10.19	10
15	3	6	2	57.81	53.78	7.62	1.86	.98	2.34	9
16	6	7	9	72.84	55.65	19.10	32.49	.68	10.42	5
17	2	8	1	58.33	67.28	5.59	7.58	.94	5.98	17
18	4	9	4	66.50	64.58	9.78	20.49	.86	5.82	6