AN EXPLORATORY STUDY OF THE EFFECTS OF TELEVISION IMAGE DEFINITION ON AFFECTIVE AND COGNITIVE LEARNING

Dissertation for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY
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ABSTRACT

AN EXPLORATORY STUDY OF THE EFFECTS OF TELEVISION IMAGE DEFINITION ON AFFECTIVE AND COGNITIVE LEARNING

By

Lyle R. Cruickshank

Those who use and those who produce messages and programs for the motion picture media (television, film, and their derivatives) have the choice of many types of media whose level of image resolving power or definition varies greatly.

The purpose of this study was to determine if a difference in affective and cognitive learning is caused by viewing a stimulus motion picture message at varying levels of television definition. The design of the study varied only the visual portion of the message and consequently, any variation in results obtained by the human subjects is attributed to this main independent variable.

An extensive review of the literature indicated a paucity of research in this area. Empirical research has

been conducted primarily by those involved with information display problems. The majority of the studies are concerned with the subjects' ability to recall static alphanumeric information displayed on a television screen. The variables of primary concern which have been studied are viewer location and image legibility. No previous studies were found which had investigated the relationship between reduced image definition of a motion picture stimulus and affective and cognitive learning.

The population for this experiment consisted of 72 grade eight students. The students were randomly chosen and randomly assigned to six experimental groups and to seats. All six groups viewed the two stimulus films preceded by the same taped introduction. The order of presentation was reversed for half the groups to allow for measurement of the presentation order effect. The stimulus films were seen at three levels of video bandwidth, 3.8, 1.5, and .5 megahertz, on black-and-white television, with no group seeing more than one level. Treatments were administered consecutively over a one day period using the same room and equipment for each group.

The criterion semantic differential instrument was derived from several pre-experiment trials and consisted of ten bipolar adjective scales. All ten scales were selected from scales which have been shown by factor analysis to load heavily on the evaluative dimension.

The cognitive measure was composed of ten multiple-choice questions. The questions were designed to measure visually transmitted information available only as a result of viewing the stimulus messages, and were retained from a larger pool of questions based on their suitability following item analysis.

The tests were given as post-tests only to avoid contamination that might have occurred had subjects received a pre-test.

The data were analyzed by repeated measures analysis of variance and the following conclusions are supported:

1. In comparing the difference in evaluative meaning for presentation related concepts, no significant difference was found between subjects who received a televised motion picture message at reduced image

definition and those who received the same message at normal image definition.

2. Similarly, in comparing the difference in cognitive learning for presentation related concepts, no significant difference was found between subjects who received a televised motion picture message at reduced image definition and those who received the same message at normal image definition.

AN EXPLORATORY STUDY OF THE EFFECTS OF TELEVISION IMAGE DEFINITION ON AFFECTIVE AND COGNITIVE LEARNING

By

Lyle Reid Cruickshank

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CHAPTER I

THE PROBLEM

Introduction

Users and producers of recorded motion picture media (television, film, and their derivatives) have a choice of many types of media. Most of them have earned their place in the commercial and educational market and there is usually one which characteristically is more effective in a given situation than others. Thirty-five millimeter (35mm) film is a generally accepted medium for use in large cinemas, while super 8 millimeter is the choice for most home movie hobbyists. Two-inch videotape is used almost exclusively for broadcast television while 1/2-inch or one-inch videotape has specific characteristics of portability and lightness which suit it to other uses.

Each of the media mentioned, and a host of others capable of recording and replaying moving images, have their own unique characteristics. Users and producers

are cognizant of these characteristics and make their choice of media based on this knowledge.

Wilton R. Holm of the Association of Motion Picture and Television Producers Research Center and a past-President of the Society of Motion Picture and Television Engineers (SMPTE) has written an article entitled "The Great Film-Tape Debate," in which he discusses the developing rivalry between two of the media: film and magnetic videotape. Holm believes that the role of technology in the field of motion picture arts is twofold:

> (1) To provide the enormous scope of visual and audio experiences which are possible to the motion picture.
>
> (2) To do this superbly, without ever distracting the viewer, and thereby reminding him that what he is experiencing is only a motion picture.
>
> A flickering or poorly-defined image on the screen or the TV tube, or a hum in the sound is all it takes to destroy the illusion of enhanced reality, and thus prevent the motion picture from satisfying whatever emotional wants and needs it might otherwise have fulfilled.[1]

Holm concludes his discussion by pointing out that the characteristics presently deemed most important by users and producers are "price, quality and service."

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[1]Wilton R. Holm, "The Great Film-Tape Debate," American Cinematographer (October, 1972), pp. 1152-3.

Certainly, few people would argue that the least obstrusive medium is the most desirable from the entertainment point of view. Most viewers will tune to the clearest picture they can receive on their home television receivers, if the choice is presented. Usually the program content dictates the channel, i.e., if the viewer wants to watch the Detroit Tigers' baseball game, he may have to watch it on a "snowy" screen, because the game is being televised on only one channel. Knowing this tendency, producers attempt to provide the clearest signal on television, or on any other medium, that cost will allow.

Image definition is one characteristic or variable which is common to all motion picture media. The level of definition varies tremendously from one medium to another. Slow scan television is perhaps the lowest on the scale with a definition as low as 250 lines while definitions of 1200-1400 lines are possible with 35mm film.

Definition varies within classes of media as well, although any medium can reproduce only the material which it receives. Coarse grained film gives a lower definition than fine grained film; fifth or sixth generation videotape gives a lower definition picture than original material.

Slow scan television provides much lower definition than that used in the closed circuit televising of medical courses, which requires a highly defined image to carry the necessary information.

In addition, there are international differences in television broadcast standards which are the result of tradition and of the standard which gained initial acceptance in a given country. Canada and the United States use a 525-line system, while parts of Europe and the United Kingdom use a higher definition 625-line system. Monaco and parts of France, because they introduced new television standards when the state of the technological art was more highly developed, use the 819-line system. The World Radio-TV Handbook lists four separate line systems ranging from 405 to 819 lines presently in use. There are, as well, five different channel bandwidths ranging from 5 to 14 megahertz. Other characteristics which can affect image definition bring the world total to fourteen different broadcasting systems.[2] Is it possible that viewers in all parts of the world are affected equally by messages

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[2] J. M. Frost, ed., World Radio-TV Handbook (26th edition; New York: 1972), p. 266.

which are broadcast in so many variations of the medium? The theory which is developed later in this chapter indicates that this is highly unlikely.

Purpose and Scope of the Study

The purpose of this study is to establish empirically if any difference in affective and cognitive learning is caused by viewing a stimulus message at varying levels of image clarity or definition.

More specifically the study undertakes to answer the following general question:

> If the same message is viewed through the electronic or projected motion picture medium, will there be a change in affective and cognitive learning when the image is viewed at reduced image definition?

Need for the Study

Given the present state of knowledge about the relationship of clarity or sharpness of the motion picture

image to affective and cognitive learning, users and producers of the motion picture image have presently no objective data on which to base media choice decisions. A wide variety of motion picture recording material is available ranging in image reproduction sharpness from the high level possible with 70 or 35mm film to the much lower level obtainable from 1/2 or 1/4-inch videotape. The possibility that one medium may have more potential for affecting viewers is seldom considered when deciding to distribute the message via television or via film. While producers almost always choose the highest definition medium that circumstances will allow, the possibility that lower definition may account for subtle affective and cognitive changes in the direction of the message is seldom considered.

Users and producers of recorded motion picture media need to know more about the hidden effects of these media on sociological dimensions, such as attitude change and learning, in order to more efficiently match medium to message.

There are practical applications of this theory in all learning environments where motion picture media

(television or film) are used to teach or to inform. It is first noted that some instructional messages carried on motion picture media require a high level of image clarity for comprehension; others, however, require a lesser level of definition. It is with both the affective and cognitive domain that this study is concerned. If through reducing image definition, the viewer can be forced to work harder to decode the message, it is likely that the potential effect, in the direction of the message, will be increased. From this generalization and McLuhan's "hot" and "cool" medium notion, the theory for this experiment is derived. The theory is developed later in this chapter.

Relating this idea to broadcast television, it is conceivable that the potential for attitude change and information gain in the direction of the message contained in a television commercial message may be greater when viewed on a set receiving a marginal or low signal, or on a receiver which is a great distance from the transmitter, than when viewed under conditions which produce high image detail. If this is so, perhaps television advertisers should pay higher rates for messages aimed at major markets on the fringe of their broadcast area than for markets

within easy range! Albeit, the theory may apply only to messages of such high importance to the viewer that he is compelled to attend to the message despite the poor definition of the picture.

Finally, those responsible for setting standards in testing film and videotape viewing equipment and in developing satellite communications technology need empirical evidence on which to base their standards. Is definition a crucial variable, and if so, what level of definition is acceptable under what circumstances? While this study must limit itself to investigating only a portion of that question, the results will give a fair indication of the advisability of further work in this area.

Definitions of Terms Used in the Study

The following key terms are used in this and subsequent chapters of the study. Before proceeding with the theory and hypotheses of the study, the following definitions are noted.

1. Image Definition

The resolution of the motion picture image quantified in lines of horizontal resolution per screen, and varied by controlling video bandwidth with a low-pass filter constructed specifically for this study.

2. Normal Image Definition

The resolution of a monochromatic television image which is correctly adjusted for "crispness"[3] (sharpness of detail), "focus" (sharpness of horizontal scanning lines), "interlace" (even spacing of horizontal scanning lines), "geometric distortion" (warping or flattening of the transmitted image), and whose "resolution" (fineness of detail) is equal to or better than a video bandwidth of 3.8 megahertz.

3. Reduced Image Definition

The resolution of a monochromatic television image correctly adjusted to give normal image definition as defined above but fed by a tape source whose horizontal

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[3]Words in quotation marks indicate the chief criteria for evaluating performance of a TV set used by Consumer's Union of the United States, Inc., e.g. See their report on "19-inch Black-and-White TV," Consumer Reports, March 1973, p. 157.

bandwidth has, by a prior transfer, been electronically filtered or reduced to a level of either 1.5 or .5 megahertz.

4. Affective Learning

Evaluative meaning, or the discriminative judgment made by an experimental subject on a series of seven-point semantic differential scales of bipolar adjectives with respect to a given concept or topic. Direction (positive or negative) and the intensity with which the meaning is held is indicated by the location of the judgment from the neutral, central position.[4]

5. Cognitive Learning

The recall of factual data as measured by scores on a presentation related post-test.

6. Semantic Differential

A measurement and scaling technique developed by Osgood, Suci, and Tannenbaum by which objective measurements of the connotative meaning of a concept to an

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[4]Charles G. Bollmann, "The Effect of Large-Screen, Multi-Image Display on Evaluative Meaning" (Unpublished Ph.D. Thesis, MSU, 1970), p. 6.

individual may be made. Subjects indicate valuative judgments on seven-point scales of bipolar adjectives.[5]

7. Stimulus Message A (Film A)

Film A is a videotaped print of the 16 millimeter film Citizen Harold.

8. Stimulus Message B (Film B)

Film B is a videotaped print of the 16 millimeter film Cold-Rodders.

Theory and Rationale for the Study

This study uses the televised motion picture image at several levels of definition to stimulate affective and cognitive learning of presentation-related concepts. In the design of the experiment, the definition of the television presentation is the independent variable and the two dependent variables are affective and cognitive learning. In this section of the report, the theory and rationale

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[5]Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning (Urbana: University of Illinois Press, 1957), pp. 25-30.

underlying each of these variables and their postulated relationships is discussed in turn.

Television and Motion Picture Media Definition

Anyone who has watched television for long (and that includes most North Americans) knows that the clarity or definition of the picture is not always the same. It varies, based on many reasons, from receiver quality and transmitter quality, to distance from the transmitter, or any of the many environmental situations that may cause signal interference. Consequently, the picture received by home viewers varies from the crystal clear definition that best exemplifies the technological state of the art, to a "snowy," low definition picture that is barely visible. From one extreme to the other, people attend to the television signal when they are interested in decoding the message for purposes of entertainment or information.

The spectrum of motion picture media image definition does not end at the highest quality television, but continues through the higher levels which can be obtained with fine-grain, high-definition motion picture film.

Throughout this study the term "definition" is used to designate what most television engineers refer to as resolution. In discussing image definition McVey says:

> The resolving power of a medium refers to its ability to reproduce details found in the original scene. The finer the detail that this medium is capable of reproducing, the greater is its resolution.
>
> Film based projection systems generally measure resolution in paired lines per millimeter; television specialists generally refer to the number of horizontal scanning lines per picture frame.[6]

McVey points out that, while North American commercial television operates at a standard of 525 lines, some "165 are lost due to vertical sweep, retrace and other factors." So actual broadcast quality is closer to "360 active scan lines at the center of the picture tube."[7]

An abundance of literature testifies to the fact that motion picture media produce changes in affective and cognitive learning. The writer has found no media comparison study which attempted to control for the level of

---

[6] G. F. McVey, "Legibility and TV Display," Educational Television, Vol. II, No. 11 (November, 1970), pp. 22-23.

[7] Ibid., p. 22.

definition, although he acknowledges that the definition generally remains constant within each medium. The literature contains many studies which have tested the two dependent variables under consideration when various media were used to present the message. The conclusions usually overlook the possibility of a relationship between image definition and effect. Rather, credit is given to some intrinsic quality of the medium, such as number of cues available.[8] ("Number of cues available" borders on a working definition for what is referred to in this study as image definition.)

The communication theorist, Marshall McLuhan, divides media into "hot" and "cool" categories. He refers to television as a "cool" medium while movies are "hot" because the amount of cues or data extended to a single sense is lower in the electronic medium.

> A hot medium is one that extends one single sense in "high definition."[9]

---

[8] Roger G. Croft, et al., "Comparison of Attitude Changes Elicited by Live and Videotape Classroom Presentation," AVCR, Vol. 17, No. 3 (Fall, 1969), pp. 315-321.

[9] Marshall McLuhan, Understanding Media (New York: McGraw-Hill, 1969), p. 22.

In his now famous remark that the "medium is the message" McLuhan intimated that the hot medium might well have a very different effect with the same message than would a cool medium.

> . . . hot media do not leave so much to be filled in or completed by the audience. Hot media are, therefore, low in participation, and cool media are high in participation or completion by the audience. Naturally, therefore, a hot medium like radio has very different effects on the user from a cool medium like the telephone.[10]

It is likely that McLuhan is right when he guesses that the effect is different. It follows that the effect will also be evident when a medium--either hot or cool--is changed to make it "hotter" or "cooler." Relating this to learning theory, we can further develop the notion that cooler media, because they demand more participation or completion by the audience, are likely to cause greater changes in affective and cognitive learning.

It is a generally accepted educational theory that increased participation in the learning activity enhances effectiveness. However, that increased participation in the learning experience is not necessarily the result of increased realism of representation has been pointed out

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[10] Ibid., p. 23.

by Dwyer.[11] In reviewing the literature pertaining to realism theories Dwyer refers to studies conducted by Morris (1946), Carpenter (1953), and Dale (1946) which suggested that learning is facilitated by increased realism. Further studies by Finn (1953), Gibson (1954), Osgood (1953), and Knowlton (1964) substantiated that the more life-like the stimulus the greater the possibility of learning. Dwyer goes on to show that subsequent studies disagree with this assessment. The studies of Miller et al. (1957), Travers et al. (1964), Broadbent (1958, 1965), Jacobson (1950, 1951), Livingston (1958, 1959, 1962), and Attneave (1954), according to Dwyer,[12] suggest that ". . . excesses of realism may actually interfere with the effectiveness of visual materials."[13] Based on his own extensive research, Dwyer specifically concludes that

> The realism continuum for visual illustrations is not an effective predictor of learning

---

[11]Francis M. Dwyer, A Guide for Improving Visualized Instruction (State College, Pa.: Learning Services, 1972).

[12]Author's name with publication date in parentheses indicates study reviewed by Dwyer.

[13]Ibid., p. 7.

> efficiency for all types of educational objectives when the visualized instruction is presented via television, slides, programmed instruction, and textbook formats. An increase in the amount of realistic detail contained in an illustration will not produce a corresponding increase in the amount of information a student will assimilate from it.[14]

In a similar, but less sophisticated, way, Harry J. Skornia, writing in the NAEB Journal, remarked that a problem worthy of attention is

> how complete and finished to make a given presentation. An old Austrian professor, whom I respect, used to tell us that the best teacher is the one who is best at "leaving out." If nothing is left for him to do, the student's active learning effort is partly frustrated. This is the basis of the philosophy of one of the most original thinkers of our generation, Canadian Marshall McLuhan, who uses the term "high definition" to describe what leaves little for the viewer to do--making for good relaxed entertainment--and "low definition" which challenges the viewer or hearer to complete it. Educators would do well to emphasize low definition even though this . . . [is] counter to the slick and enjoyable commercial TV and Hollywood-type approaches we are inclined to identify with pleasure and excellence.[15]

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[14] Ibid., p. 90.

[15] Harry J. Skornia, "What We Know from New Media Research," NAEB Journal, Vol. 25, No. 2 (March-April, 1966), pp. 26, 31, 37.

That the medium affects the message is generally accepted by, among others, persuasion theorists.

> Channel and setting as factors in the persuasion process affect the results of the persuasion process directly as well as interacting with other elements.[16]

Anderson acknowledges the basic difference between media channels as being one of definition or cues presented.

> A given channel may transmit only a portion of the available stimuli. Radio does not transmit as many stimuli as television or color, sound motion pictures. Even listeners seated at comparatively great distances from a speaker do not receive the same cues as receivers seated in the front row.[17]

The writer emphasizes the following points by Rasnow and Robinson and Lumsdaine.

> There is an inherent weakness in the idea that one entire channel of communication can be compared with another, as for example, radio with television, or newspapers with television.[18]
>
> Conclusions from an evaluative study of a single instrument apply only to that

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[16] Kenneth E. Anderson, Persuasion Theory and Practice (Boston: Allyn and Bacon, Inc., 1971), p. 267.

[17] Ibid., p. 196.

[18] Ralph L. Rasnow and Edward J. Robinson, eds., Experiments in Persuasion (New York: Academic Press, 1967), pp. 372-373.

> particular instrument, and that the generalization of the results to other instruments of the media it represents have, at most, the status of untested hypotheses.[19]

The suggestion in this study is that all motion picture media share common characteristics. One of these characteristics is picture clarity or definition. This variable may be tested in an experimental setting with one medium to establish the possible effect on two arbitrarily selected dependent variables: affective and cognitive learning.

Learning theory, and in some instances, persuasion theory, suggest that the greater the participation of the learner or persuader, the greater the change in the direction of the persuasive message. Low definition visual media allow the individual more possibility for involvement or "participation," as McLuhan terms it.

Personal experience and some of the pilot tests indicate that an increase in affective and cognitive learning is likely to occur with the initial step of image

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[19] A. A. Lumsdaine, "Instruments and Media of Instruction," in M. L. Gage (ed.), Handbook of Research on Teaching (Chicago: Rand McNally and Co., 1963), p. 596.

definition degradation. As the image quality continues to decrease, learning in both domains also decreases.

Affective Learning

Affective learning, one of the dependent variables of this study, was operationally defined earlier in this chapter. It is the discriminative judgment made by the experimental subjects on an evaluation form of the semantic differential. The semantic differential was developed by Osgood, Suci, and Tannenbaum as an objective method for measuring the connotative meaning of a concept or object to an individual.

> Of the many methods of attitude measurement extant, the following three have received the most attention and use: the method of equal appearing intervals (Thurstone and Chave, 1929); the method of summated ratings (Likert, 1932); and the semantic differential technique.[20]

The semantic differential is the only technique of the above mentioned three which permits the testing of attitudes toward several concepts in a comparatively brief

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[20]Phillip Emmert and William D. Brooks, eds., Methods of Research in Communication (Boston: Houghton-Mifflin, 1970), p. 197.

period of time. The present study requires evaluative judgments on four topics. Thurstone and Likert techniques require approximately 20 scales per concept, while the semantic differential can accomplish the same task with 5 or 6 scales.[21] Hence the choice of the semantic differential technique for this study.

Meaning, or affective learning, as measured by the semantic differential, in this study, is derived from the theory presented by Osgood, Suci, and Tannenbaum in The Measurement of Meaning.

Three dimensions or dominant factors of meaning emerge in the studies conducted by Osgood and his associates: evaluation, potency, and activity.[22] Of the three major dimensions, "evaluation" is the most dominant.

> A persuasive evaluative factor in human judgment regularly appears first and accounts for approximately half to three quarters of the extractable variance. Thus the attitudinal variable in human thinking . . . appears to be primary . . . .[23]

---

[21] Interview with Dr. B. Greenberg, Oct. 3/72. Michigan State University, East Lansing, Michigan.

[22] Osgood, Suci, and Tannenbaum, op. cit., p. 72.

[23] Ibid.

> An evaluative factor which we identify as the attitudinal component of meaning, is characterized by scales like good-bad, pleasant-unpleasant and positive-negative; what we call a potency factor, orthogonal to evaluation, is characterized by scales like strong-weak, heavy-light, and hard-soft; what we call the activity factor, independent of both evaluation and potency, is characterized by scales like fast-slow, active-passive, and excitable-calm.[24]

The bipolar adjectives are separated by seven-unit rating scales which border a "semantic space,"

> A region of some unknown dimensionality and Euclidian in character. Each semantic scale . . . is assumed to represent a straight line function that passes through the origin of this space, and a sample of such scales then represents a multi-dimensional space.[25]

In discussing their theory of connotative meaning, Osgood et al. use the three psychological terms which are defined below:[26]

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[24] Charles E. Osgood, "Studies on the Generality of Affective Meaning Systems," in Alfred G. Smith (ed.), Communication and Culture (Chicago: Holt, Rinehart & Winston, 1966), pp. 460-461.

[25] Osgood, Suci, and Tannenbaum, op. cit., p. 25.

[26] Charles G. Bollmann, "The Effect of Large-Screen Multi-Image Display on Evaluative Meaning," Unpublished Ph.D. Thesis (Michigan State University, 1970), p. 13, as paraphrased from pages 5-8, The Measurement of Meaning.

> Significate: any stimulus which, in a given situation, regularly and reliably produces a predictable pattern of behavior.
>
> Sign: a stimulus other than a significate which evokes in an organism the same reactions evoked by a significate.
>
> Assign: a sign whose meaning has been "assigned" via association with other signs rather than via direct association with significates of those signs.

A sign comes to elicit a response formerly elicited by a significate through a process of internal mediation within the organism.

> Whenever some stimulus other than the significate is contiguous with the significate, it will acquire an increment of association with some portion of the total behavior elicited by the significate as a representational mediation process.[27]

"Representational mediation process" refers to the internalized association of a sign with a significate and is thus the individual's learned meaning for that sign. When learning occurs through association between signs without association with significates, meaning is "assigned." Consequently

> Variation in meaning should be particularly characteristic of assigns since their

---

[27] Osgood, Suci, and Tannenbaum, op. cit., p. 6.

> representational processes depend entirely upon the samples of other signs with which they occur.[28]

This theory of meaning would explain the purpose of the present study as an attempt to measure the difference in assigned meaning caused by altering the definition of a visual stimulus. Specifically, the experiment attempts to produce and/or alter the assigned meaning of several concepts held by human subjects, by presenting them with a series of signs--motion picture films, displayed via the electronic medium of television.

Osgood speculates that

> this meaning system is intimately related to the non-specific projection systems from the hypothalamic, reticular, or limbic systems and their cortical connections in the frontal lobes--both are gross, non-discriminative, but highly generalizable systems, and both are associated with the affective, purposive and motivational dynamics of the organism.[29]

Be this as it may, to discuss such neurological implications is beyond the scope of the present study. It is a generally accepted fact that the semantic differential may be used whenever an investigator wishes to

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[28] Ibid., p. 9.

[29] Osgood, op. cit., p. 463.

obtain a measurement of the connotative meaning of an object or concept to an individual or group of human subjects.

> Responses obtained on the Semantic Differential may be used to compare an individual's attitudes toward different concepts, for example, a lecture on history versus a film. Similarly, one may compare two individual's ratings of a given concept. Ratings given by groups of people can be arranged in order to assess differences in attitudes between groups, or toward various concepts within the group.[30]

Cognitive Learning

Learning is generally defined as a

> change in response or behavior (such as innovation, elimination, or modification of responses, involving some degree of permanence), caused partly or wholly by experience, such "experience" being in the main conscious, but sometimes including significant unconscious components.[31]

Over the years learning has been grossly divided into three areas or domains: cognitive, affective, and

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[30] Allen L. Edwards, and Bette C. Porter, "Attitude Measurement," in Barber, William H., et al., The Affective Domain (Washington, D.C.: Gryphon House, 1972), pp. 124-125.

[31] Carter B. Good, ed., Dictionary of Education (New York: McGraw-Hill Book Co., Inc., 1959), p. 313.

psychomotor. With the publication of a Taxonomy of Educational Objectives Handbook 1: Cognitive Domain[32] by Bloom in 1956, the general acceptance of this trichotomy became yet more widespread.

The Dictionary of Education defines cognition as

> (1) the faculty of knowing, especially as distinguished from feeling and willing;
>
> (2) the act of gaining knowledge or becoming acquainted with an object through personal experience; knowledge that extends beyond mere awareness.[33]

Bloom's book deals with educational objectives which fall in the cognitive domain . . . those which deal with "the recall or recognition of knowledge and the development of intellectual abilities and skills."[34]

The experience being offered in the present study is audio-visual in nature. The stimulus messages contain factual or cognitive information which is measurable. The effect of the messages on the cognitive domain will be verified through an instrument designed to test the

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[32]Benjamin S. Bloom, Taxonomy of Educational Objectives (New York: David McKay Company Inc., 1956).

[33]Good, op. cit., p. 313.

[34]Bloom, op. cit., p. 7.

"recall or recognition of knowledge" contained in the visual channel of the stimulus films.

Theoretical Hypotheses

Based on the theory which has been developed in the previous section of this report, we may now postulate on the relationship between the variables of concern in this study.

Given the same message viewed through the electronic or projected motion picture medium, it is likely that there will be a greater change in affective and cognitive learning in the direction of the message when the image is viewed at a reduced level of image definition.

In order to avoid the effect of variables which operate between media, such as film and television, we shall test the hypothesis in one medium only.

The theoretical statement of the hypothesis then becomes: on television a filmed message will elicit a greater change in affective and cognitive learning in the attempted direction when viewed at reduced image definition than when viewed at normal image definition.

The greater change in affective and cognitive learning is due to the involvement or additional effort which subjects are required to expend to decode or complete the lesser defined message.

Assumptions of the Study

Several assumptions of this study have been discussed in the previous sections: that learning is conveyed, in part, through the visual channel of audio-visual presentations; that the affective and cognitive domains of learning can be measured individually; and that the "temperature" of a medium can be "cooled" by degrading image definition thus reducing visual information.

A fourth assumption of this study is that shifts in affective and cognitive learning can be detected through the use of a paper and pencil test.

Fifthly, it is assumed that evaluative meaning, as explained by Osgood et al. and as tested by the semantic differential technique, is a valid indicator of affective learning.

The final assumption is that the experimental population represents those target populations to which the findings will be generalized.

Limitations of the Study

There are specific limitations to this study imposed by the investigator and by the research methodology.

Only two independent variables are to be examined from the many which may be affected by manipulation of the dependent variable. Other independent variables such as those within the psychomotor domain have been purposefully omitted from this study in order to keep it within the scope and cost of a doctoral dissertation.

In keeping with customary research procedures the results of the study are generalizable to populations other than the target population only to the extent that those populations are similar to the experimental population.

The results of this experiment will provide but one bit of evidence for or against the effect being tested and will apply only to audiences who are motivated, by message content, to attend to the motion picture message, despite a possibly irritating low level of image definition.

CHAPTER II

REVIEW OF THE LITERATURE

In this chapter, studies related to the affective and cognitive learning which results from viewing a television message at varying levels of picture definition are reviewed. As with the preceding chapter, a three-part division will be followed: Learning from Motion Picture Media (films and television); Affective Impact; and Cognitive Learning.

Learning from Motion Picture Media

A great deal of literature testifies to the ability of motion picture media to cause a measurable change in cognitive and affective learning.

> Film research to date has been a feast of investigation in factual learning, in attitude change, and in perceptual-motor learning . . . .[1]

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[1]Charles F. Hoban, "The Useable Residue of Educational Film Research," in New Teaching Aids for the

In summarizing the film research to 1960, Hoban concluded that motion pictures do effectively teach and cause a change in attitudes.[2]

Chu and Schramm reviewed the literature relating to learning from television and concluded ". . . there can no longer be any real doubt that children and adults learn a great amount from instructional television . . . ."[3]

It is clear that ego involved attitudes or those which are particularly salient to the holder are difficult to reverse through television; or through any other means. It is equally clear that television messages have a meaning, an affective learning component, beyond their factual or cognitive content.

Lawson reviewed 50 studies from 1963-67 and from his review of five years of research literature concluded that television has become a "valuable, and for some, an indispensable tool in education."[4]

American Classroom, ed. by Wilbur Schramm (Stanford, California: Institute for Comm. Research, Stanford University, 1960), p. 103.

[2]Ibid., p. 105.

[3]Goodwin C. Chu and Wilbur Schramm, Learning from Television (Washington: NAEB, 1967), p. 1.

[4]Major Billy R. Lawson, "No Significant Difference," Educational Television (January, 1970), p. 33.

Schramm's article in Educational Television--The Next Ten Years[5] provides the largest sampling of results which had been presented up to that time. Again the evidence was overwhelming in its support for the statement that students do learn from television.

Based on extensive research, Dwyer concludes,

> the reduction of realistic detail in an illustration does not necessarily reduce its instructional effectiveness and in many cases improves it.[6]

Dwyer used still pictures of the heart in his experiment and contrasted the "realism theories" of Morris (1946), Dale (1946), Carpenter (1953), and Gibson (1954) with Bruner et al. (1956) and Travers et al. (1964),[7] and others who believe that learning does not necessarily increase as additional realistic cues increase. According to the theories last cited, excesses of realism may interfere with learning.

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[5]Wilbur Schramm, ed., Educational Television: The Next Ten Years (Palo Alto, California: Stanford University, 1962), pp. 52-76.

[6]Francis M. Dwyer, "Adapting Visual Illustrations for Effective Learning," Harvard Educational Review, Vol. 32 (1967), pp. 250-263.

[7]Author's name with date of publication in parentheses indicates study reveiwed by Dwyer.

While the literature pertaining to affective and cognitive learning is reviewed separately in this study in consistency with the two dependent variables of concern, the writer is sympathetic to attempts, such as that of Stevens, to link the two. Stevens points out that

> Without information about both affective and cognitive components of human-environmental behavior one cannot adequately consider "learner characteristics," "media attributes," "product evaluation," or "environmental analysis" all of which existentially involve the two.[8]

Affective Impact

There is a striking paucity of empirical evidence relating image definition to learning in the affective domain. The majority of the writing is speculative in nature and stems largely from the untested suggestions of Marshall McLuhan. Mention has been made earlier in this report of McLuhan's "hot and cool" media theory. McLuhan refers to television as a "cool" medium and suggests that

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[8]Warren D. Stevens, "Affection and Cognition in Transaction and the Mapping of Cultural Space," AVCR (Winter, 1970), p. 441.

viewers are more involved with television than with a "hot" medium such as film.

Many students of the behavioral sciences have taken McLuhan to task and have attempted to prove him wrong on this count. Bringman, Balance, and Krichev[9] submitted four groups of college students to the same film under four different conditions (with and without sound on television and projected in the normal film manner). To control for screen size the projected image was kept equal to the size of the TV screen. The groups did not have significantly different scores on a post-administered Multiple Affect Adjective Check List and thus the experimenters concluded that McLuhan's hypothesis was not supported.

The contrived environment of the Bringmann, Balance and Krichev laboratory setting, in which the 16 mm screen size was reduced to the size of a television screen, certainly does not simulate the environment of the average cinema. Hence, by controlling for extraneous variables, the results of this attempt to disprove McLuhan's theory

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[9]Wolfgang G. Bringmann, William D. G. Balance, and Alan Krichev, "Experimental Investigation of McLuhan's Ideas Concerning Effects of 'Hot' and 'Cool' Communications Media," Psychological Reports, Vol. 25 (1969), pp. 447-451.

are placed in question. In the report on the study which was presented at the Southeastern Psychological Association Meeting in New Orleans in 1969, the writers conclude with this admission:

> In the present experiment the media were operationally defined in a narrow physical sense in accord with McLuhan's definitions. Everyday experience, however, suggests that it may be the environment of the medium that encourages specific behavioral reactions. Thus, it may be the isolated, private experience in the movie theatre which allows for the intense emotional reaction posited by McLuhan.[10]

In another cross media study Croft et al.[11] found that a live presentation elicited greater attitude change than a videotape presentation of the same message. They attribute the difference to the greater number of cues available in a live presentation than in a videotape presentation. It is suggested that Croft et al. overlooked the possibility that interest and involvement were greater with the human presenter than with the electronic communication channel. A methodology using video frequency

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[10] Ibid., p. 451.

[11] Croft, et al., "Comparison of Attitude Changes Elicited by Live and Videotape Classroom Presentation," AVCR, Vol. 17, No. 3, pp. 315-21.

response reduction, such as that used in the present study, would have better suited their research purpose.

Cross media studies which compare the effect on learning of one medium with another, and they are numerous, are generally inconclusive.[12] So many difficult-to-control variables operate in these studies that the results are nearly always insignificant. The logic behind this fact has been simply stated by Dawson.

> . . . if the informational context of the two methods were the same and the only variable was the "medium" then why should one expect any difference.[13]

Another who argues in favor of divorcing medium from message is Gordon.

> Technologies (like alphabets) and technological devices (like typewriters, television sets and movie projectors are not mediums [sic]. They are instruments, devices . . . that distribute the messages employing the mediums above. They may help, hinder or influence the ways these mediums work, but their primary interest to either an artist or student of communications is how they

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[12] Ralph L. Rasnow and Edward J. Robinson, eds., Experiments in Persuasion (New York: Academic Press, 1967), pp. 372-373.

[13] Marvin Dawson, "A Model for Research in Educational Media," Educational Television (February, 1970), p. 34.

> operate as technological instruments, not what they say--simply because they say nothing.[14]

The affective component in the learning situation is important. Educational theorists are split in their reaction to the importance attributed to it by McLuhan. It is regretable that many of the empirical tests of the effect of the affective component are inconclusive, since most have been either cross media comparisons or have neglected to isolate the component parts of the learning process. The current study attempts to avoid both of these pitfalls.

Cognitive Learning

Literature in the area of cognitive learning is more abundant than in the affective domain. Much of the contribution has been made as a result of empirical research performed in the field of information display. Many rigorous studies have been conducted to determine the effect of specific variables on television legibility.

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[14] George N. Gordon, "What Media Am Not" (sic), Educational Technology (July, 1969), p. 33.

Without exception they have dealt with the legibility of still images, and they are, thus, of limited interest to this study. Many of them have dealt with the effect of independent variables similar to the main independent variable (image definition) in the present study.

In reviewing the studies of television legibility which have been conducted using still image stimuli Shurtleff[15] notes that the research has been conducted in three principal areas: 1) commercial broadcasting; 2) visual aids, and 3) electronic systems. Electronic systems refers to operations such as air traffic control, computer information display, and the like, where the electronic screen is used to display static alphanumeric data. It is in this last area that the vast majority of scientific research has been done. A host of variables which affect speed and accuracy of symbol identification have been isolated and tested. Among these are widths of active and inactive elements in the raster, scan-line registration, angular orientation of the scan-lines, equipment quality,

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[15]Donald A. Shurtleff, "Studies in Television Legibility: Review of the Literature," Information Display (January-February, 1967), pp. 40-45.

contrast brightness and direction, background brightness, symbol brightness, viewing angle, vertical resolution, and video bandwidth.

The effect of seating location on image legibility has been investigated by, among others, Seibert et al.,[16] Weiss,[17] Walker,[18] McVey,[19] Bollmann,[20], and Dwyer.[21] They conclude that there are optimum seating locations for specific sizes of screens and images.

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[16]Warren F. Seibert, Duane F. Kasten, and James R. Potter, "Study of Factors Influencing the Legibility of Televised Characters," Journal of the SMPTE (July, 1959), pp. 467-472.

[17]Helmut Weiss, "Capacity and Optimum Configuration of Displays for Group Viewing," Information Display (November-December, 1966), pp. 24-30.

[18]Roger S. Walker, "Simplified Methods for Determining Display Screen Resolution Characteristics," Information Display (January-February, 1968), pp. 28-31.

[19]G. F. McVey, "Where Do We Sit?," Educational Television (December, 1969), pp. 24-27.

[20]Charles G. Bollmann, "The Effect of Large-Screen, Multi-Image Display on Evaluative Meaning," Unpublished Ph.D. Thesis (East Lansing, Michigan: Michigan State University, 1970).

[21]Francis M. Dwyer, A Guide for Improving Visualized Instruction (State College, Pennsylvania: Learning Services, 1972).

Another variable, angle of subtension at the retina, or image size, has been studied by McVey.[22] Significant differences have been shown to depend on this variable.

Seibert[23] investigated the effect on accuracy of symbol identification of varying the bandwidth as in the present study. He varied the bandwidth to five levels: 6 megacycles (mc), 2 mc, 1.5 mc, 1.0 mc, and 750 kilocycles (kc). His results suggest a complex relation between video bandwidth and vertical resolution and image size. The data show little overall difference between bandwidths of 6 mc and 2 mc. It is of interest to the present study to note that the average percentage of correct responses was higher at the reduced image definition of 2 mc than at any other level.

Neal[24] tested several variables which affect accuracy of symbol identification from a television display.

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[22] McVey, op. cit.

[23] W. F. Seibert, "The Legibility of Television Visuals: A Study of Signal Bandwidth and Other Factors," Mimeographed (Lafayette, Indiana: Purdue University, 1964).

[24] Alan S. Neal, "Legibility Requirements for Educational Television," Information Display (July-August, 1968), pp. 39-44.

"The bandwidth of the video signal was altered with Butterworth seven-pole low pass filters."[25] Neal found that while viewers could often perceive the bandwidth differences, the results showed no significant effect on accuracy. He concludes,

> for group viewing of a large television screen, we can recommend a bandwidth of approximately to 2.5 MHz. From the results of this study and Seibert's work, it appears that there is no improvement in performance above this point, but there is a decrement below this point.[26]

The United States Army's Human Engineering Laboratory has conducted a number of studies on the relationship between image degradation and target detection. These studies by, among others, Johnston,[27] are concerned with the individual's ability to detect a target from a television image. Predictably they have found that detection probability decreases as horizontal resolution decreases. Johnston investigated the effect of two variables, horizontal resolution and shades of gray, on target recognition time with human subjects. Horizontal resolution was

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[25] Ibid., p. 41. [26] Ibid., p. 43.

[27] Dorothy M. Johnston, "Target Recognition on TV as a Function of Horizontal Resolution and Shades of Gray," Human Factors (Santa Monica, California: Vol. 10, No. 3, 1968), pp. 201-209.

varied by electrostatically defocusing the vidicon scanning beam. Johnston found that resolution had a highly significant effect on target recognition time. "An inverse relationship was found between target recognition time and horizontal resolution and shades of gray."[28]

Image degradation or distortion has been used experimentally to modify human behavior in non-learning situations. Greene and Hoats[29] distorted a television image by introducing a flickering and rolling picture with concomitant reduction in the sound volume and clarity, as a negative reinforcement device. They experimented over a two month period with two mildly retarded subjects for the purpose of

> a) accelerating the work rate of a naive, mildly retarded subject on a simulated production-line task involving card sorting, and b) reducing gross hyperactivity of a mildly retarded subject.[30]

The subjects' behavior, without their awareness of it, controlled the level of television distortion. Based on the

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[28] Ibid., p. 208.

[29] Robert J. Greene and David L. Hoats, "Reinforcing Capabilities of Television Distortion," Journal of Applied Behavior Analysis (Summer, 1969), 139-141.

[30] Ibid., p. 139.

results of their experiment Greene and Hoats concluded that television distortion, indeed, does appear to be an effective and practical negative reinforcer for use in modifying human behavior.

The review of the literature supports the generalization that human beings learn from motion picture media; that motion picture media have an affective impact which varies with the "temperature" of the medium, or with the number of cues presented; and, that cognitive learning is affected by the level of definition or image degradation of the medium.

Summary

The review of the literature indicates a paucity of empirical studies on the effect of image definition on affective and cognitive learning. The majority of the studies have been conducted in the field of information display and are concerned, largely, with human ability to recall statically displayed alphanumeric information shown on a television screen. The main variables which have

been tested are viewer location, image size, and image clarity.

Prior studies differ from the present one in two major aspects: they deal with either the effect of image degradation on the legibility of static stimuli, or with the effect of degraded motion picture images on individual subjects. The present study deals with the effect of a degraded (reduced definition) motion picture stimulus on groups of subjects.

No studies were found which explored the relationship between reduced image definition of a motion picture stimulus and affective learning. Although the stimulus material in the related studies differs markedly from the videotaped films which are used as stimuli in the present study, Dwyer's work supports the hypothesis that reduced visual detail can increase cognitive learning. In addition one study by Seibert found that subjects had more correct responses at reduced image definition. Finally, one study was located which showed that television image distortion can be used as a stimulus to modify human behavior.

CHAPTER III

DESIGN OF THE STUDY

Introduction

This study investigated the effect on affective and cognitive learning caused by viewing a stimulus message at three levels of image clarity or definition. In this chapter the overall design and methodology of the study is discussed briefly to provide a general background. This discussion is followed by a detailed explanation of the procedures used in the experiment.

Overall Design and Methodology

The experimental design used to test the general hypothesis that the level of television image definition has an effect on the affective and cognitive learning experienced by the viewer, used six randomly equal groups

of human subjects. The affective learning hypothesis employed a 3 X 2 X 2 X 2 (24 cells) design (definition X order X film X repeated measures). The cognitive learning hypothesis was tested concurrently through a 3 X 2 X 2 (12 cells) design (definition X order X film).

Random assignment of the experimental population to the six groups, and the use of the same factual and semantic differential measuring instruments in all groups made it possible to attribute between-group variance on the dependent variables to the independent variable of image definition. The design of the study is represented in Figure 1.

The Population

The population studied in this experiment was chosen from students in the fourteen eighth grades at John Rennie High School in Pointe Claire, Quebec. The seventy-two subjects for this study were selected on a scientific random basis from the approximately six hundred eighth graders in the school.

Definition	Meas.	Presentation Order			
		Order 1		Order 2	
		Film A	Film B	Film B	Film A
Low (.5 MHz)	Aff. 1	S 1-12	S 1-12	S 13-24	S 13-24
	Aff. 2	S 1-12	S 1-12	S 13-24	S 13-24
	Cog.	S 1-12	S 1-12	S 13-24	S 13-24
Medium (1.5 MHz)	Aff. 1	S 25-36	S 25-36	S 37-48	S 37-48
	Aff. 2	S 25-36	S 25-36	S 37-48	S 37-48
	Cog.	S 25-36	S 25-36	S 37-48	S 37-48
High (3.8 MHz)	Aff. 1	S 49-60	S 49-60	S 61-72	S 61-72
	Aff. 2	S 49-60	S 49-60	S 61-72	S 61-72
	Cog.	S 49-60	S 49-60	S 61-72	S 61-72

Fig. 1.--Schematic Representation of the Study Design

Using the school's grade eight class list, students' names were arranged alphabetically by sex for each of the classes. Since a sample of approximately one hundred, including the overdraw, was desired, a skip interval of six was used with the starting name being randomly picked from the first six names. The procedure was repeated for both sexes, and to assign the subjects to each of the six groups. Additionally, subjects were randomly assigned to seats to avoid any effect that might result from the tendency to sit with friends or at a particular location from the screen.

Stimulus Materials

The stimulus materials used in this experiment are two sixteen millimeter (16 mm) films produced by the National Film Board of Canada. The films were selected according to the following criterion:

a) recent productions released since January 1, 1972;

b) total running time between 8 and 17 minutes;

c) color original;

d) 16 mm prints available and cleared for non-theatrical distribution;

e) judged by the experimenter to have some measurable affective content;

f) judged by the experimenter to have some measurable cognitive content; and

g) films not likely to have been seen by the test population.

The dozen or so films which met these criteria were reviewed, and two films, Citizen Harold and Cold-Rodders, were selected. Citizen Harold, an animation film, has as its theme the difficulty of organizing a citizen's action committee (see Appendix A for description). Cold-Rodders, a "sound-sync." documentary, is a satire on the sport of snowmobiling (see Appendix B).

Presentation Format

All six groups saw both videotaped films preceded by a brief introduction (Appendix C). The films were transferred to videotape and shown in six consecutive presentations to the experimental groups. The order of presentation of the films was reversed for half the groups to allow for a measurement of the presentation order effect.

Equipment and Seating Arrangement

Both films were transferred to black-and-white videotape on a telecine chain composed of a 16 mm Bell and Howell projector for television use, a Sony DXC-5000 B camera and multiplexer and a Sony AV-3650 1/2-inch videotape recorder. The reduction of bandwidth or horizontal definition to .5 and 1.5 megahertz was obtained by making a second generation transfer from the original tape. A specially constructed low pass video filter (see Appendix D for schematic diagram) was inserted between two Sony AV-3650 1/2-inch videotape recorders for this transfer. Unused Scotch 1/2-inch videotape was used throughout the experiment.

Related experimental literature and human engineering guidebooks were consulted for the optimum seating arrangement. The arrangement used was taken from Design for ETV, prepared by Dave Chapman, Inc.[1] A diagram of the seating arrangement is shown in Figure 2.

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[1] _____, Design for ETV (New York: Dave Chapman, Inc., 1960.

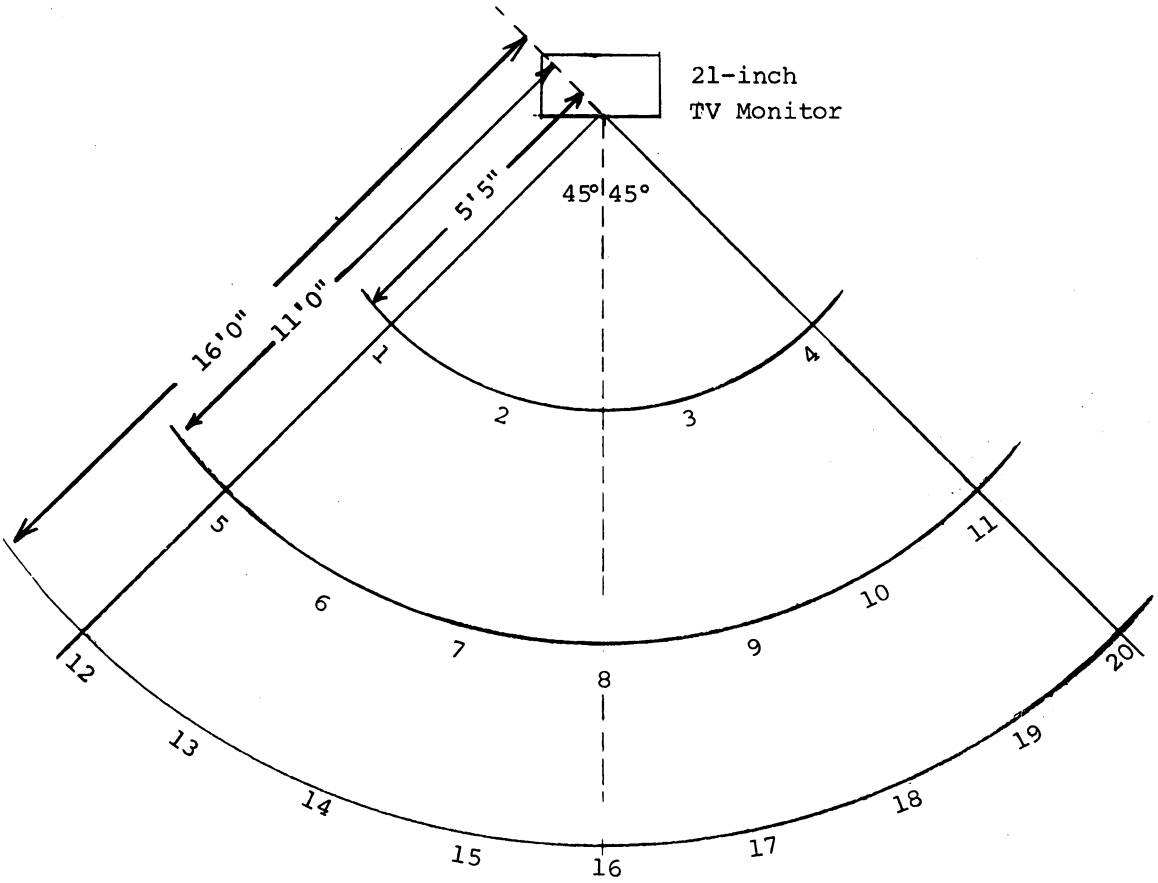

Fig. 2.--Seating Arrangement

The tapes were played for the subjects on a Sony AV-3600 1/2-inch tape deck coupled to a 21-inch Sony Video Monitor, Model CVM.

The equipment and seating arrangement remained constant for each of the six groups.

Instrumentation

Affective Measure

Evaluative meaning was measured with a form of the semantic differential. Fifteen pairs of opposite adjectives were selected from a listing of adjectives which have been shown by Osgood et al. to weigh heavily on the evaluative dimension when subjected to factor analysis. Five pairs which consistently produced neutral results in the pilot tests were discarded. The final ten-item scale, with adjectives and values randomly rotated and reversed was used with all six groups in the experiment. The instrument derives its validity from factor analysis performed on the adjective pairs by Osgood et al.

The semantic differential has been shown to be a reliable measure with children as young as eight years of age by Oles and Bolvin.[2] Divesta and Dick established the reliability of the semantic differential for elementary students. They found the correlation between test-retest evaluation factors to be .87 for children aged eleven years.[3]

A Hoyt[4] reliability test showed that the reliability coefficients for the four affective measures (semantic differential scales) were: Citizen Harold (title) .74; Cold-Rodders (title) .80; Citizen Harold (theme) .81; Cold-Rodders (theme) .85.

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[2]Henry J. Oles and John Bolvin, "The Reliability and Useability of a Semantic Differential Attitude Scale with Third Through Fifth Grade Students," Paper read at National Council on Measurement in Education Convention, Chicago, 1972.

[3]Francis I. Divesta and Walter Dick, "The Test-Retest Reliability of Childrens' Ratings on the Semantic Differential," Educational and Psychological Measurement, XXVI (1966), 605-16.

[4]Cyril J. Hoyt, "Test Reliability Estimated by Analysis of Variance," Psychometrika, Vol. 6 (1941), pp. 153-160.

Cognitive Measure

Cognitive learning was measured by two ten-item multiple-choice tests based on the visually presented information from the stimulus tapes. The twenty test items were selected from longer forms of the tests which were used in two pilot tests. The final instruments were composed of questions which were retained on the basis of an item analysis performed with existing computer routines at the Office of Evaluation Services at Michigan State University. Questions which did not discriminate or whose index of difficulty was low were discarded.

All questions on the cognitive instruments were designed to measure detailed central information available only as a result of having seen the stimulus films. The possibility that only peripheral or incidental learning would be measured was obviated by the task introduction (Appendix C) which cued the subjects to attend to details.

A Hoyt reliability test performed on the cognitive item scores showed that the Citizen Harold measure had a reliability of .63, while the Cold-Rodders measure had a reliability of .56. These low reliability coefficients are

due to random error as was expected from an experimenter constructed instrument which had not received extensive empirical validation.[5]

Form of the Questionnaire

The questionnaires used to test the two dependent variables for each of the stimulus messages are included in Appendix E. In the questionnaires, the affective and cognitive measures are followed by nine personal and opinion-related questions. Question 7 in this section was used as an indicator of positive or negative perception of the film's treatment of its main theme. This was essential in order to determine the subjects' perception of the direction of the message. This indicator was subsequently used in scoring the semantic differential scales. The cover page of each questionnaire gives an explanation for the exercise and was added as a result of apprehension expressed by some of the subjects following the first pilot test.

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[5]Claire Selltiz, et al., Research Methods in Social Relations (New York: Holt, Rinehart and Winston, 1962), pp. 166 and 179.

Procedure

Subjects were randomly selected from a class list which was divided by sex to give an equal number of each sex in each group. Subjects were also randomly assigned to groups. On the day prior to the experiment each subject received a written reminder through his class teacher (Appendix G). Each group was assigned a specific time to go to the room where the experiment, which was publicized as a film evaluation session, was being held. On arrival the participants were randomly assigned to pre-numbered seats by picking a number from a hat. A brief explanation of the procedure had been pre-recorded on videotape and was presented to the subjects before each film (Appendix C). Following the presentation of each film the appropriate questionnaire was distributed, completed by the subjects, and collected. The students were then thanked for their cooperation and dismissed to return to their regular class activity. The school is large and there was little opportunity for contamination of subjects through post-test discussion. In addition the students were not privy to the correct responses on the cognitive instruments.

Hypotheses

The theoretical hypotheses from Chapter I are here restated in the form of two null and two alternative hypotheses.

Null Hypothesis I

There will be no significant difference in evaluative meaning for presentation related concepts between subjects who receive a motion picture message on television at reduced image definition and those who receive the message at normal image definition.

Alternate Hypothesis I

Subjects viewing a motion picture message on television will have a significantly higher score on a measure of evaluative meaning for presentation related concepts when the message is viewed at reduced image definition.

Null Hypothesis II

There will be no significant difference in cognitive learning for presentation related concepts between subjects who receive a motion picture message on

television at reduced image definition and those who receive the message at normal image definition.

Alternate Hypothesis II

Subjects viewing a motion picture message on television will have a significantly higher score on a measure of cognitive learning for presentation related concepts when the message is viewed at reduced image definition.

Scoring and Analysis

The semantic differential scales were hand scored. The polarity of the scale for the theme and title of each film was based on the majority responses to Questions 7 and 8.

"In the presentation which you have just seen, how is the idea of (insert theme) treated?
( ) positively ( ) negatively

"Did you like or dislike the film (insert title)?
( ) like ( ) dislike"

These questions were asked in the last section of each questionnaire to determine the subjects' perception of the direction of the stimulus messages. This procedure was necessitated by the nature of the film Cold-Rodders

which is a satire on the sport of snowmobiling. In the pilot tests it was obvious that those who were favorable toward snowmobiling as a recreational sport were much more favorable in their reaction to the film than those who disliked the sport. Consequently it was deemed prudent to take an overall reading of the groups' rating of this concept. As a result the scales which measured reaction to the topic "snowmobiling" were reversed. The other three semantic differential scales were scored in the normal manner with scores ranging from 7 for "very" positive, to 1 for "very" negative.

The raw data, in the form of item scores from the questionnaires was transferred to computer cards and verified by trained operators at the National Film Board's Data Processing Center. Random spot checks comparing the data on the cards with the original questionnaires showed that the error rate was low or non-existent.

Existing computer routines were used to perform four-way repeated measures analysis of variance and three-way analysis of variance on the data.

A confidence level of .05 was selected as the point at which the null hypotheses could be rejected. The statistical analyses were performed on the Burroughs 6500 computer at Michigan State University.

CHAPTER IV

FINDINGS

Introduction

In this chapter the findings generated by the experiment are presented and discussed as they relate to the main two-part hypothesis.

Theoretical Hypothesis

The hypothesis of concern in this study is that a televised motion picture message will elicit a greater change in affective and cognitive learning, in the direction of the message, when viewed at reduced image definition than when viewed at normal image definition.

Affective Learning

Null Hypothesis

There will be no significant difference in evaluative meaning for presentation related concepts between subjects who receive a motion picture message on

television at reduced image definition and those who receive the message at normal image definition.

Alternate Hypothesis
Subjects viewing a motion picture message on television will have a significantly higher score on a measure of evaluative meaning for presentation related concepts when the message is viewed at reduced image definition.

The hypothesis was tested by a four-way (definition X order X film X measures) repeated measures analysis of variance which is shown in Table 1.

The analysis of subjects' affective scores yielded an F-ratio for definition of 1.0198 which is not significant at the .05 level of confidence. The null hypothesis was, therefore, not rejected. Other findings relating to variables which gave significant results are discussed later in this chapter.

Cognitive Learning

Null Hypothesis
There will be no significant difference in cognitive learning for presentation related concepts between subjects who receive a motion picture message on television at reduced image definition and those who receive the message at normal image definition.

TABLE 1.--Repeated Measures Analysis of Variance of Affective Scores from the 72 Subjects.

Source of Variance	df	Mean Squares	F-ratio	Significance
Definition (D)	2	202.711806	1.0198	NSD
Order (O)	1	615.420139	3.0960	NSD
D X O	2	378.128472	1.9023	NSD
S:D X O*	66	198.774937		
Film (F)	1	1517.086806	19.8263	≤ .05
D X F	2	1.378472	--	NSD
O X F	1	3.781250	--	NSD
D X O X F	2	2.947917	--	NSD
SF:DO*	66	76.518624		
Measure (M)	1	837.086806	7.5196	≤ .05
D X M	2	94.586806	--	NSD
O X M	1	30.031250	--	NSD
D X O X M	2	4.156250	--	NSD
SM:DO*	66	111.320391		
F X M	1	1805.003472	18.323792	≤ .05
D X F X M	2	142.336806	1.444955	NSD
O X F X M	1	389.670139	5.400756	≤ .05
D X O X F X M	2	8.503472	--	NSD
SMF:DO*	66	98.505997		

*Error term.

Alternate Hypothesis

Subjects viewing a motion picture message on television will have a significantly higher score on a measure of cognitive learning for presentation related concepts when the message is viewed at reduced image definition.

The hypothesis was tested by a three-way analysis of variance (definition X order X film) the results of which are shown in Table 2.

TABLE 2.--Analysis of Variance of Cognitive Scores from the 72 Subjects.

Source of Variance	df	Mean Squares	F-ratio	Significance
Definition (D)	2	4.395833	1.256632	NSD
Order (O)	1	5.840278	1.669554	NSD
DO	2	1.215278	--	NSD
S:DO*	66	3.498106		
Film (F)	1	119.173611	57.816549	$\leq$ .05
DF	2	1.465278	--	NSD
OF	1	.062500	--	NSD
DOF	2	1.645833	--	NSD
SF:DO*	66	2.061237		

*Error term

Table 2 contains the results of the analysis of variance performed on the subjects' cognitive scores.

As can be seen, the comparison yielded an F-ratio for definition which is not significant at the .05 level of confidence. Consequently, it is not possible, on the basis of this data, to reject the null hypothesis. As could be anticipated, the statistical procedure showed a significant difference between films. This has no significance for the study, since no attempt was made to use films which would be equal in their cognitive content. Neither were the cognitive measures designed to measure cognitive learning equally.

Additional Findings

Visual Acuity

To determine the possible effect of visual acuity on the results of this experiment, three questions were asked of each subject:

1. Did you have any difficulty seeing the film (insert title)? ( ) Yes ( ) No

2. Do you normally wear glasses or contact lenses? ( ) Yes ( ) No

3. Were you wearing your glasses or contact lenses while you were watching this presentation? ( ) Yes ( ) No

A total of 9 subjects or 12.5% reported difficulty seeing Film A, while 7 subjects (9.7%) reported difficulty seeing Film B. Fourteen of these 16 subjects fall, predictably, in the groups which received the message at reduced image definition.

TABLE 3.--Subjects who Reported Difficulty Seeing the Videotaped Films.

Groups	Film A (Citizen Harold)	Film B (Cold-Rodders)
1,2 (Low def.)	5	3
3,4 (Med. def.)	3	3
5,6 (High def.)	1	1

Of the 19 subjects who normally wear glasses or contact lenses, only two were not wearing corrective lenses during the experiment. Of these two subjects, both in group 1, only one reported difficulty seeing the presentation. This subject was seated in Row 3 and reported difficulty in seeing Film A only. The other subject was seated in Row 2.

Seat Location

Affective and cognitive test score means were calculated by seat row to see if any trend related to seat location was discernible. The means were graphed but examination of them showed no systematic distribution of scores. It was, therefore, concluded that seat location had no effect on the results of this experiment.

Reactions to the Stimulus Material

None of the 72 subjects had seen either of the stimulus films prior to the experimental presentation. In addition to measuring their reactions to the films by the use of the two main affective measures, all subjects were asked the following questions:

7. In the presentation which you have just seen, how is the idea of (insert theme) treated?
   ( ) positively ( ) negatively
8. Did you like or dislike the film (insert title)?
   ( ) like ( ) dislike

The findings for these questions are presented in Table 4.

TABLE 4.--Number of Subjects in each Group who Replied "Positively" or "Liked" to Questions on Theme and Title of the Videotaped Films.

Group	Def.	Film A		Film B	
		Theme	Title	Theme	Title
1	Low	5	11	8	11
2		7	11	2	11
3	Med.	5	10	2	10
4		9	11	3	11
5	High	6	11	6	9
6		7	9	1	10
Total		39	63	22	62
% of S		54.17	87.5	30.56	86.11

Discussion

The design of the present study is such that any statistically significant shift in mean scores is attributable to the independent variable of image definition.

The instruments used to register shift in affective learning were two ten-item forms of the semantic differential chosen from adjectives which have been shown in previous research to have a high loading on the evaluative dimension.[1] The adjective pairs were rotated and their

[1]Osgood, Suci, and Tannenbaum, The Measurement of Meaning, pp. 53-55.

polarities were randomly alternated to avoid any subject tendencies toward response patterning. Five adjective pairs which, in the pilot tests, consistently yielded neutral results, were discarded. A test of reliability showed the instruments to have reasonably high reliability. The average age of the subjects in this experiment was approximately fourteen. The semantic differential technique has, in previous research, been shown to be a reliable measure with chidren as young as eight years of age.

The cognitive tests contained ten presentation related multiple-choice questions for each film. The twenty questions used were retained from a larger pool of questions which was reduced by means of an item analysis performed by a computer program at the Office of Evaluation Services at Michigan State University. Tests of reliability on these unrefined instruments showed low internal consistency.

The fact that no significant difference was found between treatments in the present study indicates that the level of definition was not varied sufficiently to cause measurable reactions in human subjects. Some reported difficulty seeing the image but their scores are not

significantly different to affect group means. Nor did seat location seem to have any systematic effect on the results.

In view of these findings, it is interesting to note that during a pilot test conducted with adults at a level of definition much below that used in this test, .1 megahertz, subjects refused to watch the message and walked out of the experiment.

It is also noteworthy that when subjects are shown material at different levels of definition, thus giving a baseline for comparison, their reactions are much more pronounced. In the present study subjects adjusted to the lower definition levels easily because they had no other image definition level with which to make a comparison.

Interactions

Repeated measures analysis of variance on the affective measures showed a significant interaction between film and measure as well as between order, film, and measure. The interactions are not of great importance to the study and can be explained as follows.

It was stated earlier that the scoring was reversed for one of the semantic differential scales. This was done on the authority of the majority responses to a question which asked if the film's treatment of the message was positive or negative. The result of this question was 69.4 percent who believed that the film's treatment of the concept "snowmobiling" was negative. It is suggested, here, that children of 14 years of age may not have acquired a mature understanding of the negative ecological implications of the snowmobile which were alluded to in the film. Cold-Rodders is remarkably subtle in its negativism toward snowmobiling. Experience with the film has shown that those with a favorable pre-disposition toward the recreational use of snowmobiles repeatedly find the film amusing, acceptable, and favorable toward their sport. Those who are opposed to the noisy machines find the film to be a delightful satire and are pleased that the National Film Board has so clearly expressed its opposition to snowmobiling. In retrospect the film may have been a poor choice for a stimulus message for the present experiment. It is not difficult to understand why the subjects of this study, when asked if the film was positive or negative in

its treatment of snowmobiling, replied that it was negative. However, when tested with the more sophisticated semantic differential, they remained generally favorable towards the concept "snowmobiling" and were largely unaffected by the film's message. Consequently, a graph of the group means for the two affective measures on each film shows that the concept "snowmobiling" was actually rated similarly to the other concepts, but appears to be lower because of the reversed scoring. This caused interactions which otherwise would be attributed to sampling error to seem significant. In fact, they are not significant to the results of this experiment.

Summary

Analysis of variance used to test each of the hypotheses of this study at the .05 level of confidence showed no statistically significant difference in affective and cognitive learning when a motion picture message was presented on television at reduced levels of definition.

Analysis of the results categorized by seating distance from the television monitor showed no trend in relation to the levels of image definition which were used in the experiment.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

Purpose of the Study

The purpose of this study was to determine if a difference in affective and cognitive learning could be brought about by viewing the stimulus motion picture message at varying levels of television image definition. Since the design of the study varied only the visual portion of the message, any variation in results obtained by the human subjects is attributed to this main independent variable.

Review of the Literature

An extensive search of the literature indicated a paucity of research in this area. Empirical research has been conducted by those involved with information display

problems. The majority of the studies are concerned with the effect on subjects' ability to recall and/or reproduce static alphanumeric information displayed on a television screen. The variables of primary concern which have been studied are viewer location and image legibility. One study showed that subjects had more correct responses at a reduced definition than at normal definition. One study used motion picture image distortion as a negative reinforcer to modify behavior. No studies were located which explored the relationship between reduced image definition of a motion picture stimulus and affective and cognitive learning.

Design and Procedures

The population of this experiment consisted of 72 high school students. The students were randomly chosen and randomly assigned to six experimental groups. All six groups saw two films preceded by the same brief introduction. The order of the presentation was reversed for half the groups to allow for measurement of presentation order effect. The stimulus films were seen at three levels of

television image definition with no group seeing more than one definition level. All subjects were randomly assigned to seats to avoid any tendency to sit in a particular location. Treatments were administered consecutively over a one day period using the same room and equipment.

The criterion semantic differential instrument was derived from several pre-experiment trials and consisted of ten bipolar adjective scales of seven positions. All ten scales were selected from scales which have been shown by factor analysis to load heavily on the evaluative dimension.

The cognitive measure was composed of ten multiple-choice questions. The questions were retained from the pilot-tests based on their suitability following an item analysis performed by Michigan State University's Office of Evaluation Services. The questions were designed to measure information available only as a result of viewing the stimulus messages.

The tests were given as post-tests only to avoid any contamination that might have occurred were subjects submitted to a pre-test.

Conclusions

Analysis of Results

Data analysis supports the following conclusions:

1. In comparing the difference in evaluative meaning for presentation related concepts, no significant difference was found between subjects who received a televised motion picture message at reduced image definition and those who received the same message at normal image definition.

2. Similarly, in comparing the difference in cognitive learning for presentation related concepts, no significant difference was found between subjects who received a televised motion picture message at reduced image definition and those who received the same message at normal image definition.

Discussion of the Results

The demands placed on the creativity of those who conduct quantitative research in the behavioral sciences are very great. The present study was inspired by the writing of one, who, during the 1960's, became famous by making very complex human reactions to communications media sound simple and plausible. To create a laboratory situation which would fairly test one of Marshall McLuhan's

adages, "that cool media are high in participation or completion by the audience," and therefore, one would assume, more likely to affect learning, was the test attempted in this study.

Many previous researchers have attempted to empirically test McLuhan's notions. One attempt which failed due to a lack of creativity in its design was the Bringmann, Balance, Krichev study. Bringmann et al. concluded that McLuhan was wrong and that "hot" media are, in fact, as effective in the affective domain as "cool" media. In their research report they admitted some misgivings about the fact that their laboratory experiment had unfairly sacrificed the environment which surrounds any communication situation. In effect they left a loophole through which McLuhan emerged unscathed.

Two main criteria of a fair test of the effect of "cool" media were important to the present study:

1) retention of the normality of the communication environment, and

2) avoidance of cross media comparisons.

Television is defined by McLuhan as a "cool" medium. Human beings in North America spend an average of approximately six hours per day attending to their television receivers. The level of definition, or "coolness" may vary tremendously from one receiver or program to the next. Does this variation have any effect on the information retention and attitude change potential of the medium? From this study's attempt to "cool" the television image in a laboratory setting, we must conclude that it does not.

In organizing this experiment, a great deal of time and energy was spent experimenting with various devices to systematically and measurably reduce the information available to the viewer of a moving television image. Finally a video engineer was successful in building an electronic filter which can reduce image definition by controlling video bandwidth from the normal level of approximately 4 megahertz, to 1.5, .5, and .1 megahertz. The customized low pass filter which resulted controls the "coolness" of the medium by simply turning a switch.

Several pilot tests were subsequently conducted with adult and teen-aged audiences. In one test,

experimental groups saw four films at four levels of definition; in another, they saw three films at three levels of definition.

The four-film test was carefully designed and subjects were randomly assigned. It was intended to provide the data for this report. Unfortunately for this writer the results were so dramatic that the laboratory setting was totally lost! Large 23-inch monitors had been installed in four identical rooms and all subjects received the presentation simultaneously. A modified Greco-Latin Square design was used, which meant that one group started the experiment by viewing the stimulus message at the lowest definition of .1 megahertz. Due to the large-screen monitors and the very low bandwidth, the image was too "cool" for the subjects' toleration--half of them walked out of the room and the experiment. The absence of data from this group ruined the experimental design and made statistical analysis of the data from the other groups meaningless.

Following several other pilot tests, it was decided to change the experimental design, since several important interactions were unmeasurable without enlarging the total number of groups in the experiment to eighty-one, or more.

This was judged to be too unweildy, given the complexity of the treatment and the limited fiscal and time resources available to the study.

The experience with the pilot-tests is discussed in detail here because it leads to an informal conclusion based on this exploratory study. That conclusion is that there are very definite limits beyond which human subjects will not attend to a televised motion picture. A twenty-three inch black-and-white monitor with bandwidth filtered to .1 megahertz would seem to fall beyond those limits.

The present study showed no significant difference in affective and cognitive learning from a televised motion picture message on a 21-inch screen at levels of video bandwidth reduced as low as .5 megahertz. Recognizing that this was an exploratory study it now seems evident that the results could be attributed to any or all of the following three factors:

1. It is possible that humans do have a tolerance for "cool" media which is greater than the parameters which were tested.

2. It is possible that human tolerance for "cool" media narrows significantly, within the parameters tested, only when there is a higher definition message available to the subject for comparison. During the pilot tests, for example, the study design allowed all subjects to view all levels of definition during the experimental treatment. This resulted in a more pronounced difference between groups than was evident in the main study where subjects viewed only one level of definition per group. It is suggested that this difference occurred because the subjects had a more highly defined image with which to compare the reduced image definition treatments.

3. The stimulus messages, as with most films, were open to a greater degree of interpretation than is usual with static stimuli. Extremely sensitive measurement instruments were required to detect between-group differences. While the validity of the instruments has been established, it is possible that they were not adequately sensitive to discriminate between the subtle but important

differences in affective and cognitive learning which may have been present.

Future research should seek to establish the veracity of these three suppositions. In addition, the final section of this report is used to suggest implications for future research arising from this experiment.

Implications for Future Research

The results of this study imply that the fear expressed by Holm,[1] that a "flickering or poorly-defined image . . . is all it takes to destroy the illusion of enhanced reality, and thus prevent the motion picture from satisfying whatever emotional wants and needs it might otherwise have fulfilled," is not a concern within the parameters which were tested in this study. This study showed no ill or good effects from watching a poorly-defined image for the half-hour duration of the treatment. Future research should seek to establish the results of longer exposure to this kind of stimuli. Is it possible

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[1]Wilton R. Holm, "The Great Film-Tape Debate," American Cinematographer (October, 1972), p. 1152.

that over a longer period of exposure to this kind of stimuli the human system reacts in some subconscious way, perhaps by a build-up of frustration? Or is it possible that the result of long-term exposure to a poorly-defined image has some positive effect?

The methods used to measure results in this study indicate that image definition is not a crucial variable in its effect on the audience for motion picture presentations. The study should be replicated using a battery of complementary measures to evaluate the effect. The complementary measures should include electroencephalographic (EEG) records of brain waves and unobtrusive behavioral measures, as well as written tests.

This study should also be replicated with subjects receiving the treatment in an environment other than the classroom. How, for example, would subjects in a living-room environment react to various levels of television image definition? As part of a replication of the study a change in the high definition image should be attempted. The present study used 1/2-inch videotape equipment which has a maximum horizontal bandwidth of approximately 3.8 MHz. Would results differ if the high definition treatment

consisted of a more crisp image such as is possible with 2-inch videotape equipment?

Satellite communication is becoming increasingly important and educational and communications researchers should concern themselves with the possible effects on viewers caused by physical changes in the image. For example, what effect will television display variables, such as definition, which may be more pronounced due to satellite transmission, have on human viewers? Research on the effect on humans of motion picture display variables is necessary to determine acceptable standards for the satellite distribution of television messages in all areas, including specialized fields such as education.

Cross-cultural research should be conducted to see if cultural differences are enhanced by national television systems whose levels of definition may vary from channel bandwidths of 5 to 14 MHz,[2] and who use lines per screen which vary from 525 in North America to 819 in parts of France. The results of the present study would indicate that North Americans are not missing much by

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[2] J. M. Frost, ed., World Radio-TV Handbook (26th edition, 1972), p. 266.

retaining the 525-line system. But are there differences over time which future research could expose?

Finally, users and producers of motion picture media should promote and conduct further research which, when considered with the present study, would definitively release them from guessing about the effect of the physical differences between media.

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APPENDICES

APPENDIX A

CITIZEN HAROLD

INFORMATION SHEET

CITIZEN HAROLD 93

35mm and 16mm Color Screening Time: 8 minutes 37 seconds
Distributed by the National Film Board of Canada

Produced by
The National Film Board of Canada
for the program

challenge for change
société nouvelle

in cooperation with departments and agencies of the Government of Canada

laybe heroes are born, but citizens like Harold re made the hard way, in the lonely struggle etween the aroused individual and the ntrenched inertia of the way things are.

What aroused Harold was his wife. There he vas, cushioned from the world in the womb of is television chair when his wife, yelled, "Harold, what's that funny noise out there?" The noise came from chain saws whining their vay through his neighborhood trees. Harold had o do something about that.

What he did and how he did it is the subject of this animated cartoon film, and it is a story hat any citizen might well ponder once the fun of the film wears off.

Possibly Harold knew less about the ways of city hall than most taxpayers should be expected o know. Perhaps neighbors are not so slow to rally round as Harold found them. But the truth is that many of the systems society sets up can be as inflexible as steel when the time comes to make a change or an exception.

Harold's trees stood in the way of development, the one thing that everyone is believed to favor. Had the trees stood on another street or in another part of town Harold would never have heard the saws or missed his television program. As it was, progress was running wild, right on his doorstep. That is what made citizen Harold a changed man. By day he struggled against the system; by night he dreamed of his next move while his wife sighed herself to sleep.

Nowadays when all men have reason to treasure what bit of nature survives where they happen to live, this tale of citizen Harold and his defense of his environment has a lesson for all. It is a film for any audience to smile over, since Harold is the familiar non-hero that everyone knows. His victory was in rising in high dudgeon from that television chair. It is an example that many a viewer of this film may have reason to follow, sooner or later.

Director: Hugh Foulds
Animation: Hugh Foulds, Wayne Morris
Assistants: Zulema Safa, Chardon Labrie, Jean Compton, Howard C. Pedlar
Animation Camera:
Ken Klassen, Raymond Dumas, Simon Leblan
Story Consultant: Don Arioli
Editing: Luke Bennett
Sound Editing: Karl du Plessis
Voices: George Geertsen, Dorothy Courtois
Music: High Street Band
Re-recording:
Ron Alexander, Michel Descombes
Executive Producer: Robert Verrall

National Film Board of Canada
P.O. Box 6100, Montreal 101, Quebec
Printed in Canada
16mm: 106C 0171 096 (35mm: 105C 0171 096)

APPENDIX B

COLD-RODDERS

INFORMATION SHEET

cold-rodders

35mm and 16mm Color
Screening Time: 15 minutes 6 seconds

Produced by
The National Film Board of Canada

Distributed by
The National Film Board of Canada

ere is a film with a resonant answer to
hat can be done with a Canadian winter –
nd no mention of such slow-poke, no-noise
ports such as snowshoeing, skiing, tobogganing. This film introduces a sport without strain – except on the pocket and the ears.

's a film about motor-sledding, snowmobiling, he new sit-down winter sport that impassions uburbia. As is seen in this film, the machines ome in all sizes, colors, prices. But the rinciple is the same – all fly over the snow on cleated rubber band, driven at thrilling speed y eag[illegible]fled motors. What the motor oat is [illegible]mmer lake, the snowmobile to th[illegible] woods.

'here [illegible] at the dealer's, the place here [illegible]ins and ends. It is a family port– [illegible]facturers picture. No mily [illegible]out one, two [illegible]
efore [illegible]
edit [illegible]

clothing for the trail. Mother even receives the prize of a free hand-warmer. At this sport only the motor gets hot, and at 30 miles an hour the winter wind tingles the uninsulated foot or ear.

But on a winding, wooded trail, with snow nodding on the sheltering pine boughs and sun glinting from new paint and chrome, the scene is enticing enough for any man, woman or child. For those who like speed, there are raceways well organized and equipped, even to the ambulance.

It is all in this film – the pull of the sport, the eager will of the trade to keep it booming, the daring rivalry of the racing crowd, and the bemused pleasure of the family outing, with motors popping down the quieter trails. Snowmobiling has put a new face on winter and, if you wear the approved headgear, perhaps you won't notice the noise.

Direction and Photography:
Claude Larue
Film Editing: Pierre Lemelin
Location Sound: Jean-Guy Normandin
Assistant Cameraman: Martial Filion
Sound Editing: Gilles Quintal
Re-recording: Roger Lamoureux
Producer: Marc Beaudet

Made with the participation of:
Maurice de Ernsted
Denis André
Marcel Beaulac

and the collaboration of:
Bombardier Limited and the
Canadian Snowmobile Association

National Film Board of Canada
P.O. Box 6100, Montreal
Printed in Canada
106C 0170 113 (35)

APPENDIX C

SCRIPT OF

TASK ORIENTATION

(Directions to reader: This will be filmed as a prolonged close-up; script should be memorized and constant eye-contact should be maintained.)

You are about to see a film produced by the National Film Board of Canada. The film is new and you will probably not have seen it before.

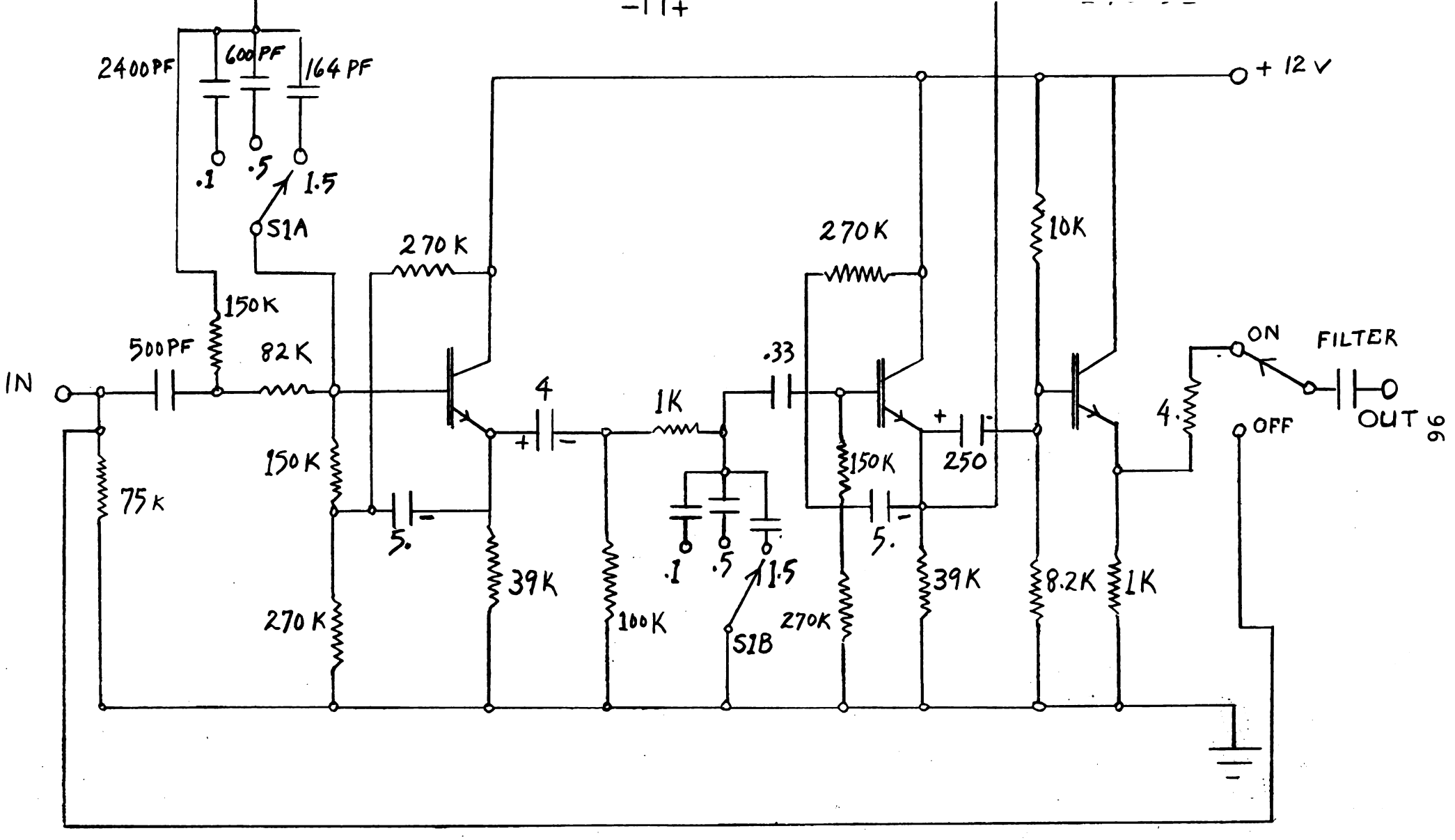
When the film ends you will be given a pencil and a short questionnaire on which to register your reactions to it.

We are particularly interested in knowing how well the film communicates detailed information when viewed on a home TV screen which may be in average or below average repair. Consequently, this TV picture may seem somewhat blurred to you. Nevertheless, please pay as much attention to detail as you can, since the questionnaire asks detailed questions. Now here is the film. (LOOK LEFT)

APPENDIX D

SCHEMATIC DIAGRAM FOR

LOW PASS FILTER



VIDEO LOW PASS FILTER G. Matsell 22-1-73 (Traced by L. R. Cruickshank)

APPENDIX E

QUESTIONNAIRES

CITIZEN HAROLD

_____ Student No. _____

_____ Seat No._____

urpose of this instrument is to register your reactions to the taped film which you have just seen.

dition, we are interested in knowing how well the film communi- detailed information when viewed on a home TV set which may be erage, or below average repair.

e follow the instructions for completing the questionnaire by g one answer on each question or scale. Please respond to all ions, even though the choice of answers may seem limited.

ne following questions refer to the film CITIZEN HAROLD. Please nswer all questions by placing a check mark (√) in the appropriate ircle. Do not omit any questions. If you can't quite recall the nswer, make a guess.

1. What flag flies outside the tavern where Harold went for a drink?

(1) Stars and Stripes (2) Canada (3) Ontario (4) France
(5) none of these

2. How many friends did Harold sit with at the tavern?

(1) one (2) two (3) three (4) four (5) five

3. Where did the man with the bomb first speak to Harold?

(1) in the shower (2) under a street lamp (3) at home
(4) in the tavern (5) at City Hall

4. How many visits to City Hall did Harold make?

(1) one (2) two (3) three (4) four (5) five

5. What method did Harold first use to get action?

(1) appeal to a higher authority (2) reasoning with his tormenter
(3) recourse to violence (4) community organizing
(5) ignoring the situation

'he foot of Harold's bed was decorated with a

(1) stripe (2) carving (3) cartoon (4) flower (5) bow

Vhat design decorated the bar ceiling?

(1) checkers (2) polka dots (3) a circular pattern
(4) white lines (5) none of these

Vhat was inside the big bomb?

(1) Harold's real friends (2) TNT (3) gelignite
(4) Harold's imaginary friends (5) nothing

Vhat words most closely describe the man with the bomb?

(1) athletic (2) shark-faced (3) tall and slim
(4) clean cut (5) unshaven

What sound did the big bomb make?

(1) WHAM (2) BAM (3) BANG (4) BOOM (5) WHOOM

INSTRUCTIONS FOR COMPLETING THE SCALES ON THE FOLLOWING PAGES

the following pages, a topic is shown and it is followed by several rs of adjectives which are opposite in meaning. Each pair of adjec- es is separated by seven blank spaces. You are requested to place ingle check mark (√) on one of the blanks separating each pair of ectives to show your personal reaction to the stated topic. Please e your judgments on the basis of what your personal feeling is, at s moment, toward the topic.

Example:

GARDENING

good _____ : _____ : _____ : _____ : _____ : _____ : _____ bad

e more "good" you feel this topic is, the closer to the word "good" u would place your check mark. The more "bad" you feel the topic is, e closer to the word "bad" you would place your check mark.

nce each scale is divided into seven categories, a check mark at the id-point on the scale indicates a feeling of complete neutrality towards he topic. The other categories represent successive steps from slightly o quite, to very--toward either adjective. For your guidance the fol- owing example is repeated at the top of each page:

good _____:_____:_____:_____:_____:_____:_____bad
(very) (quite) (slightly) (neutral) (slightly) (quite) (very)

Your task is to indicate your personal feeling toward the topic, at this moment, by placing a single check mark (√) on each of the adjective scales. Although the adjectives may not express your feeling exactly, you should work fairly quickly and give your first impression on each scale.

ample:

good _____:_____:_____:_____:_____:_____:_____ bad
(very) (quite) (slightly) (neutral) (slightly) (quite) (very)

.ease place a single check mark (√) between each pair of adjectives to
ıow your personal feeling, at this moment, toward the following topic:

ORGANIZING A CITIZENS' ACTION COMMITTEE

valuable _____:_____:_____:_____:_____:_____:_____ worthless

ugly _____:_____:_____:_____:_____:_____:_____ beautiful

good _____:_____:_____:_____:_____:_____:_____ bad

sad _____:_____:_____:_____:_____:_____:_____ happy

honest _____:_____:_____:_____:_____:_____:_____ dishonest

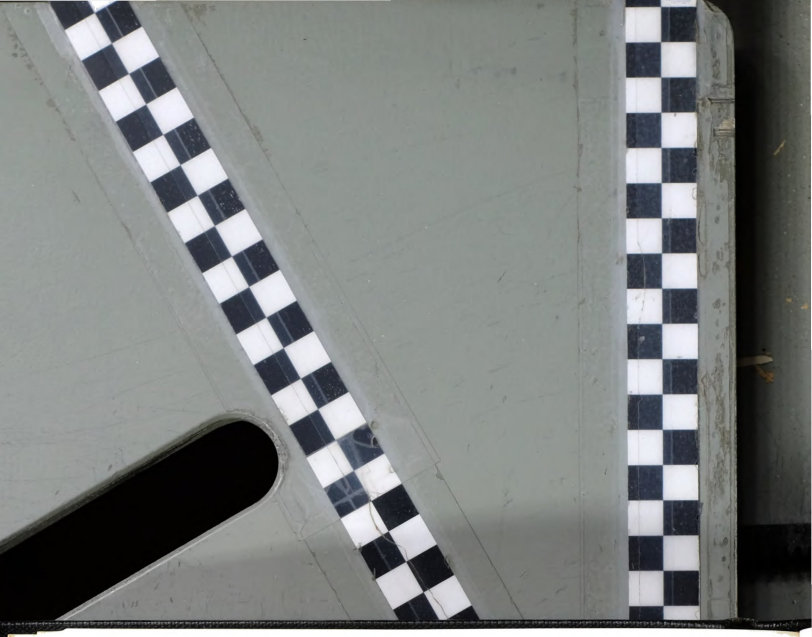
unpleasant _____:_____:_____:_____:_____:_____:_____ pleasant

successful _____:_____:_____:_____:_____:_____:_____ unsuccessful

important _____:_____:_____:_____:_____:_____:_____ unimportant

false _____:_____:_____:_____:_____:_____:_____ true

wise _____:_____:_____:_____:_____:_____:_____ foolish



Example:

good _____:_____:_____:_____:_____:_____:_____bad
(very) (quite) (slightly) (neutral) (slightly) (quite) (very)

Please place a single check mark (√) between each pair of adjectives to show how you would describe, at this moment, the videotaped film

CITIZEN HAROLD

successful _____:_____:_____:_____:_____:_____:_____ unsuccessful

dishonest _____:_____:_____:_____:_____:_____:_____ honest

true _____:_____:_____:_____:_____:_____:_____ false

sad _____:_____:_____:_____:_____:_____:_____ happy

important _____:_____:_____:_____:_____:_____:_____ unimportant

unpleasant _____:_____:_____:_____:_____:_____:_____ pleasant

worthless _____:_____:_____:_____:_____:_____:_____ valuable

bad _____:_____:_____:_____:_____:_____:_____ good

ugly _____:_____:_____:_____:_____:_____:_____ beautiful

wise _____:_____:_____:_____:_____:_____:_____ foolish

Your responses will be much more useful if you will provide us with the information requested below.

CHECK (√) OR WRITE YOUR ANSWERS DIRECTLY ON THIS PAGE

1. Did you have any difficulty seeing the film CITIZEN HAROLD?

   ( ) Yes ( ) No

2. Do you normally wear glasses or contact lenses? ( ) Yes ( ) No

3. Were you wearing your glasses or contact lenses while you were watching this presentation? ( ) Yes ( ) No

4. Had you ever seen the film CITIZEN HAROLD before?

   ( ) Yes ( ) No

5. How many years old are you? _____

6. What is your occupation, profession, or academic major? (If undecided give most likely choice)_____

7. In the presentation which you have just seen, how is the idea of "organising a citizens' action committee" treated?

   ( ) positively ( ) negatively

8. Did you like or dislike the film CITIZEN HAROLD?

   ( ) like ( ) dislike

9. Please use the remaining space to list any comments about this activity which you may wish to express.

COLD-RODDERS

Name: _____ Student No. _____

Date: _____ Seat No. _____

The purpose of this instrument is to register your reactions to the videotaped film which you have just seen.

In addition, we are interested in knowing how well the film communicates detailed information when viewed on a home TV set which may be in average, or below average repair.

Please follow the instructions for completing the questionnaire by giving one answer on each question or scale. Please respond to all questions, even though the choice of answers may seem limited.

The following questions refer to the film COLD-RODDERS. Please answer all questions by placing a check mark (√) in the appropriate circle. Do not omit any questions. If you can't quite recall the answer, make a guess.

1. Which of the following trade marks is not mentioned in COLD-RODDERS?

   (1) Ski Doo (2) Arctic Cat (3) Ariens (4) Evinrude
   (5) Sno-Jet

2. Who said "You are the children of the Universe . . ."?

   (1) Salesman (2) store owner (3) deacon (4) snowmobiler
   (5) priest

3. The film COLD-RODDERS was made in cooperation with which company?

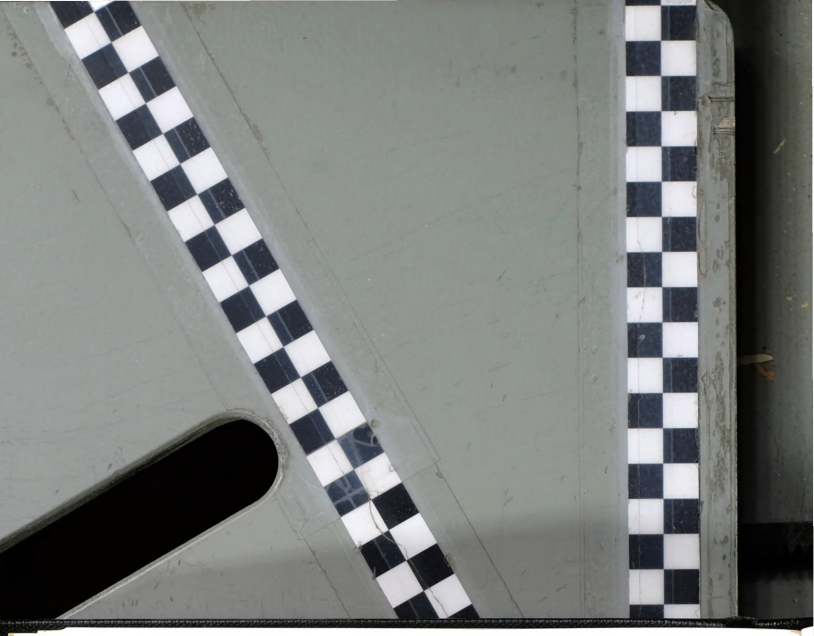
   (1) Bombardier Limited (2) Ariens Inc. (3) Evinrude Co.
   (4) Ski Doo Inc. (5) Robert Morse Corp.

4. In this film the horsedriver also plays the part of the

   (1) fisherman (2) salesman (3) client (4) racer
   (5) racing fan

5. Which of the following sports were not shown in COLD-RODDERS?

   (1) snow shoeing (2) fishing (3) horse driving
   (4) hunting (5) racing



6. What is the name of the snowmobile shop?

(1) Marine Centre (2) Centre Marin (3) Ski Doo Centre
(4) Centre de Moto Ski (5) Centre Marin et Ski

7. On which model of snowmobile is the mobile pulpit modelled?

(1) Sno-Jet (2) Arctic Cat (3) Evinrude (4) Skidoo
(5) Ariens

8. Who used the blasphemous expression "tabarnac"?

(1) wife (2) horse driver (3) racer (4) salesman
(5) priest

9. Mr. Beaulac has

(1) a beard (2) a moustache (3) no beard or moustache
(4) a fu man chu (5) a beard and moustache

10. The COLD-RODDERS was filmed in

(1) Ontario (2) Quebec (3) New Brunswick (4) Alberta
(5) Yukon

INSTRUCTIONS FOR COMPLETING THE SCALES ON THE FOLLOWING PAGES

On the following pages, a topic is shown and it is followed by several pairs of adjectives which are opposite in meaning. Each pair of adjectives is separated by seven blank spaces. You are requested to place a single check mark (√) on one of the blanks separating each pair of adjectives to show your personal reaction to the stated topic. Please make your judgments on the basis of what your personal feeling is, at this moment, toward the topic.

Example:

GARDENING

good _____ : _____ : _____ : _____ : _____ : _____ : _____ bad

The more "good" you feel this topic is, the closer to the word "good" you would place your check mark. The more "bad" you feel the topic is, the closer to the word "bad" you would place your check mark.

Since each scale is divided into seven categories, a check mark at the mid-point on the scale indicates a feeling of complete neutrality towards the topic. The other categories represent successive steps from slightly, to quite, to very--toward either adjective. For your guidance the following example is repeated at the top of each page:

good _____:_____:_____:_____:_____:_____:_____bad
(very) (quite) (slightly) (neutral) (slightly) (quite) (very)

Your task is to indicate your personal feeling toward the topic, at this moment, by placing a single check mark (√) on each of the adjective scales. Although the adjectives may not express your feeling exactly, you should work fairly quickly and give your first impression on each scale.

Example:

good _____:_____:_____:_____:_____:_____:_____bad
(very) (quite) (slightly) (neutral) (slightly) (quite) (very)

Please place a single check mark (√) between each pair of adjectives to show your personal feeling, at this moment, toward the following topic:

SNOWMOBILING

important _____:_____:_____:_____:_____:_____:_____ unimportant

foolish _____:_____:_____:_____:_____:_____:_____ wise

unpleasant _____:_____:_____:_____:_____:_____:_____ pleasant

successful _____:_____:_____:_____:_____:_____:_____ unsuccessful

honest _____:_____:_____:_____:_____:_____:_____ dishonest

beautiful _____:_____:_____:_____:_____:_____:_____ ugly

sad _____:_____:_____:_____:_____:_____:_____ happy

false _____:_____:_____:_____:_____:_____:_____ true

valuable _____:_____:_____:_____:_____:_____:_____ worthless

good _____:_____:_____:_____:_____:_____:_____ bad

Example:

good	_____	_____	_____	_____	_____	_____	_____	bad
	(very)	(quite)	(slightly)	(neutral)	(slightly)	(quite)	(very)	

Please place a single check mark (√) between each pair of adjectives to show how you would describe, at this moment, the videotaped film

COLD-RODDERS

dishonest	_____	_____	_____	_____	_____	_____	_____	honest
worthless	_____	_____	_____	_____	_____	_____	_____	valuable
sad	_____	_____	_____	_____	_____	_____	_____	happy
true	_____	_____	_____	_____	_____	_____	_____	false
successful	_____	_____	_____	_____	_____	_____	_____	unsuccessful
important	_____	_____	_____	_____	_____	_____	_____	unimportant
bad	_____	_____	_____	_____	_____	_____	_____	good
wise	_____	_____	_____	_____	_____	_____	_____	foolish
unpleasant	_____	_____	_____	_____	_____	_____	_____	pleasant
ugly	_____	_____	_____	_____	_____	_____	_____	beautiful

Your responses will be much more useful if you will provide us with the information requested below.

CHECK (√) OR WRITE YOUR ANSWERS DIRECTLY ON THIS PAGE

1. Did you have any difficulty seeing the film COLD-RODDERS?

   ( ) Yes ( ) No

2. Do you normally wear glasses or contact lenses? ( ) Yes ( ) No

3. Were you wearing your glasses or contact lenses while you were watching this presentation? ( ) Yes ( ) No

4. Had you ever seen the film COLD-RODDERS before? ( ) Yes ( ) No

5. How many years old are you? _____

6. What is your occupation, profession, or academic major? (If undecided, give most likely choice) _____

7. In the presentation which you have just seen, how is the idea of "snomobiling" treated? ( ) positively ( ) negatively

8. Did you like or dislike the film COLD-RODDERS?

   ( ) like ( ) dislike

9. Please use the remaining space to list any comments about this activity which you may wish to express.

APPENDIX F

LETTER FROM PRINCIPAL TO TEACHERS ADVISING THEM OF AUDIENCE REACTION EXPERIMENT

John Rennie High School
Pointe Claire
April 4, 1973

To: Grade 8 Teachers

On Wednesday, April 11th, the following students have been selected to participate in a brief audience reaction experiment organized by Mr. Lyle Cruickshank of the National Film Board.

The students will be shown two films and asked to complete a short multiple-choice questionnaire based on the films. The total required time should be about 40-50 minutes per group.

If you are free to accompany the students as an observer you are welcome to do so, although this is not required.

It is important that the students named on the attached sheets be in Room 102 at the scheduled time. The students have been assigned to groups on a probability basis so there must be no transferring, e.g., from group 1 to group 4 because the time is more convenient.

Please advise each student of this activity and return a completed confirmation copy to my office by Monday, April 9th. Please also make any necessary corrections in the spelling of the students' names.

Thank You

_____
Walter Scott
Principal - Cycle 1

APPENDIX G

STUDENT REMINDER TO

ATTEND EVALUATION SESSION

April 10, 1973

THIS IS A REMINDER! PLEASE REMEMBER TO GO TO ROOM 102 PROMPLY
AT TOMORROW (WEDNESDAY, APRIL 11th)

A sample of people from all 14 grade eights is helping Mr. Cruickshank to evaluate two National Film Board films which will be shown to you on television.

After you see each film, you will be asked to complete a short questionnaire. The total time required to see the films and complete the questionnaires is about 50 minutes. It is important to arrive on time as there are 6 groups scheduled to use room 102 on Wednesday.

Thank you for your interest. We think you will enjoy the films.

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