DOCUMENT RESUME

ED 147 918 CS 501 953

AUTHOR Metallinos, Nikos
TITLE The Composition of the TV Picture: Suggested Hypotheses to Test the Forces That Operate within the Television Screen.
PUB DATE Dec 77
NOTE 14p.; Paper presented at the Annual Meeting of the Speech Communication Association (63rd, Washington, D.C., December 1-4, 1977)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Audiovisual Communication; Behavioral Science Research; *Design; Mass Media; *Media Technology; *Television; *Television Research; *Video Equipment; Video Tape Recordings

ABSTRACT

This paper suggests specific experimental designs, criteria measures, and testing procedures for the empirical study of various field forces operative in the structure of the television picture. The purpose of the paper is twofold: first, to illustrate, through selected videotapes, the various field forces and, second, to provide specific hypotheses that will test each of these forces, such as (1) asymmetry of the screen, (2) magnetism of the frame, (3) attraction of mass, (4) figure/ground relationship, (5) psychological closure, and (6) vectors. The paper refers to empirical studies, now being conducted in the fields of visual communication and behavioral science, that investigate the visual structure and aesthetic effects of the television image. (Author/MAI)

THE COMPOSITION OF THE TV PICTURE:

SUGGESTED HYPOTHESES TO TEST THE FORCES THAT OPERATE WITHIN THE TELEVISION SCREEN

by

Nikos Metallinos

A Paper Presented at the
Speech Communication Association
Annual Convention, in Washington, D.C.,
December 1-4, 1977

Department of Radio-Television-Film
Temple University

ABSTRACT

This paper, enhanced by visual illustrations, examines the structure of the television picture.

The purpose of this paper is twofold: first, to illustrate (through selected experimental video tapes) the various field forces, and second, to provide specific hypotheses that will test each of these forces such as (1) asymmetry of the screen, (2) magnetism of the frame, (3) attraction of mass, (4) figure-ground relationship, (5) psychological closure, and (6) vectors.

The research literature notes that substantial empirical studies are now being conducted in the fields of visual communication and the behavioral scientists and communicators have joined the neurologists, biologists, and psychologists in their efforts to investigate the visual structure and the aesthetic effects of the television image.

This paper provides specific illustrations and suggests specific experimental designs, criteria measures, and testing procedures for the empirical study of the above field forces.

INTRODUCTION

Investigation of the processes involved in the perception of visual messages has led to the establishment of a visual force theory which deals with the way objects of the "visual world" are perceived when they are reconstructed and presented in the "visual field."

The concentrated space of a theatrical stage, a painting, a photograph, a film or television screen is defined as a visual field. Studies of the structural and perceptual properties that characterize the visual field have led to the establishment of the field forces theory.

FIELD FORCES THEORY

Gibson identifies distinct differences in perception of objects that exist in the "visual world," compared with those that appear within the "visual field." According to Gibson (1950, p 164):

> The visual world . . . differs from the visual field in a number of ways. First, it has depth or distance, and it includes the experience of solid objects which lie behind one another. Second, it is Euclidian in the sense that neither the objects nor the spaces between them appear to change their dimensions in perception when the observer moves about. This is a general way of saying that they tend to remain constant. Third, it is stable and upright; things as seen have constant directions-from-here when the observer tilts his head. Fourth, it is unbounded; our experience of the world does not have any visible margins or limits such as the visual field of a picture has. Finally, it has a characteristic to which we have scarcely referred but which, in a way, is the most important of all; it is composed of phenomenal things which have meaning.

Arnheim (1969, pp 213-391) and Zettl (1973, pp 100-221) have identified internal characteristics or forces that operate within the boundaries of a picture. Both

Arnheim and Zettl divide these field forces into "latent forces" and "active forces." Latent forces are those hidden structural and spatial forces which, like a magnetic field, act upon objects within the frame. Intuitively or otherwise, we detect the existence of these hidden forces when we compose visual elements within the concentrated field. Arnheim (1969, pp 1-31) suggests that the discomfort caused by a disc located off center in a square is due to some hidden structural factors which tell us that the disc is off center. The concentrated field, Arnheim argues, exerts magnetic structural forces which direct us to correct the placement of the disc and place it in the center of the bounded square. Active forces are defined by the concentrated field itself. When no objects exist within the field, it is neutral. Only when objects are placed within the frame do structural forces start operating.

> The field forces theory can be summarized in the words of Zettl (1973, p 100):
>
> The screen provides us with a new, concentrated living space, a new field for aesthetic expression. It helps us to tame space. We are no longer dealing with the real space we walk through and live in every day, but rather with the screen space. We must now clarify and intensify experience within the context of screen space. Not what we might see, but what the camera sees becomes of primary importance.

FORCES THAT OPERATE WITHIN THE FRAME

Asymmetry of the Screen

The development of the theory known as asymmetry of the screen (as a primary force operating within the screen) is attributed to the works of Millerson (1966), Arnheim (1969), Dondis (1973), and Zettl (1973). It comes as an extension and modification of the asymmetry of the frame theory. It includes the element of motion as found in film and television and states that a picture is asymmetrically structured when the visual elements, sometimes called "graphic elements" (Zettl, 1973) or "basic elements of visual communication" (Dondis, 1973), are unequally distributed within the screen creating a visual imbalance that favors one side of the picture over the other.

Although scholars have agreed that the left side of a visual field is perceived differently than the right (Bartley, 1972, pp 245-249), the argument as to which side is more attractive and preferable to the viewer has not been resolved. This author, in his dissertation study, explored this problem.

Neurological studies have suggested that the right hemisphere of the brain is specialized in "holistic mentation," and determines our orientation in space, artistic endeavor, crafts, body image, recognition of faces; whereas, the left hemisphere of the brain is predominantly involved with analytic, logical thinking, especially in verbal and mathematical functions.

The following questions identified the problem of this study:

1. Does placement of visual elements on the right or left side of the television screen differentially affect viewers' perception of the weight, importance, prominence, attractiveness, and interest value of the visual field?
2. Does placement of visual elements on the right or left side of the television screen differentially affect the retention of verbal content?
3. Does placement of visual elements on the right or left side of the television screen differentially affect the retention of visual content?

One hundred and forty-eight (148) subjects were randomly assigned to four treatment groups. Each treatment group (n=37) independently viewed one of four newscasts where visuals (illustrating the content of twenty news stories) appeared on the right (Treatment No. 1), on the left (Treatment No. 2), on the left and right (Treatment No. 3), or on the right and left (Treatment No. 4). The newscaster appeared on the opposite side of the screen.

Three types of measures were constructed to test treatment effects:

1. Likert-type scales were used to measure viewers' perceptions of the weight, importance, prominence, attractiveness, and interest value of the visual field.
2. A multiple-choice test was used to measure the degree to which the visuals used in the newscast were correctly identified.

The data were analyzed by one-way analyses of variance. Appropriate post hoc analyses were made on data which yielded a significant F-ratio. Tests for significance were made at the .05 level of confidence.

The following conclusions were reached from the results of this study:

1. Perceived weight, importance, prominence, attractiveness, and interest value are not affected by placement of visual elements on the left or right side of the television screen.
2. Retention of verbal content from a newscast is not affected by the placement of visual elements on the left or right side of the television screen as long as these visuals do not illustrate specific factual information such as numbers or dates.
3. In a neswcast where the left and right portions of the television screen are equally shared by newscaster and visuals depicting the content of the news stories, retention of the visuals is somewhat enhanced by their placement on the left side of the television screen. Common factors which may be related

to the asymmetry of the screen theory are relative size, color, form, vectors, and contours of the visual materials.

Magnetism of the Frame

Zettl (1973, p 121) has theorized that:

> The frame of a picture field, the edges of the screen, exert a strong pull on objects near them. Especially the corners (where the forces of the two main directions, height and width coverage) attract near objects with great force.

Although intuitively we tend to frame TV pictures within the borders of the screen, the appropriate distance of visuals from the screen's borders has not been established and the perceptual, compositional, and aesthetic reasons for the magnetism of the frame phenomenon have not been explained scientifically.

A test of this theory is possible through the construction of appropriate visual stimuli that will keep certain conditions constant, and an experimental design that will identify the variables involved.

An important question that would identify the problem of magnetism of the frame is:

> Does placement of visual materials, graphic elements, on the extreme (a) top, (b) bottom, (c) right, (d) left edges of the television screen differentially affect viewers' perception of their visual content?

Attraction of Mass

It is a law in physics that mass attracts mass. Zettl (1973, p 121) theorizes that such a law is also applicable to screen images which are called graphic mass, and it is very important to the study of the structure of television images.

Arnheim (1972, pp54-79) discusses this principle in terms of dependency of objects appearing in the visual field, and Duncker (1960, pp 161-172) points out that, in the visual field, objects are seen in a hierarchical relationship of dependence. The houses are attached to the hill, not the hill to the houses. The large objects within the screen serve as the independent units while the small ones are the dependent ones.

As in the case of magnetism of the frame discussed previously, the phenomenon of attraction of mass is an empirical observation which needs to be tested and measured because of its perceptual, compositional, and aesthetic implications.

Careful construction of visual stimuli that will control the variables involved, and an appropriate experimental design that will consider measuring a series of independent

variables simultaneously are warranted.

A possible question that would identify the problem of the attraction of mass theory in television images reads:

> Does placement of extremely unequal (in size and mass only) visual elements within the television screen differentially affect the viewers' perception of their interdependency?

Figure-Ground

According to Murch (1973, p 65):

> That some potential stimuli become effective while others remain ineffective is easily observed. The task of identifying the attributes of the former proves more difficult. Nevertheless, one rather obvious attribute is that effective stimuli appear to stand out against the background of potential stimuli. Such stimuli become figures, whereas the other stimuli provide a background.

Within the concentrated field, the television screen, we perceive the figures, the images, in front of a continuous background, the screen, as though they belong to the ground created by the screen. In order for a stimulus, an image, to convey information about the environment, it has to be clearly differentiated from it. Often, such differentiation is neglected and information, through images, becomes ambiguous.

For the study of the structure of TV images, the figure-ground differentiation and segregation as a phenomenon that occurs within the visual field is exteremly important.

The problem and the hypothesis concerning the measuring and testing of the figure-ground segregation theory could be stated as follows:

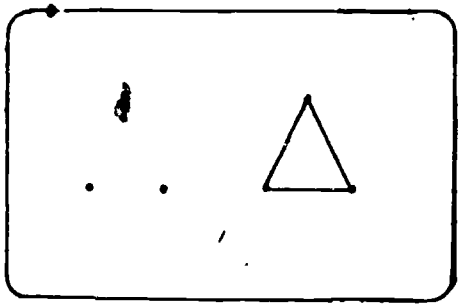
> Does orderly placement of visual materials within the television screen differentially affect viewers' perception of figure-ground relationships?

Psychological Closure–Gestalt

A crucial factor in the structure of television and film pictures and one of the most important forces which operate within the visual field is the principle of psychological colsure.

The perceptual process by which we take a minimum amount of visual or auditory cues and mentally fill in non-existing information in order to arrive at an easily-manageable pattern is known as psychological closure (Zettl, 1973, p 135). The new structure created through this process, this mental organization of closure, is called gestalt (Murch, 1973, pp 130-137; Zettl, 1973, p 135).

In the picture below, for example, the three dots are perceptually organized to form the geometric figure of the triangle.



According to Zettl (1973, pp 135-138), "A gestalt is not simply the sum of its elements, but more so, it consumes its elements into a larger whole." In the case of the triangle above, each dot fulfills a vital gestalt function. Should any one of the three dots be missing, we would not be able to "organize" the triangle, the gestalt. We need a minimum amount of information, visual or auditory, in order to be able to arrive at a figure, a pattern, a shape, etc.

Arnheim (1969, p 44) points out that it is through perceptual organization that we try to see any stimulus pattern in such a way that the resulted structures which we have organized into meaningful patterns are as simple and stable as possible.

Zettl (1973, p 137) theorizes that:

> The low-density (possessing relatively small amount of visual information due to limited number of scanning lines) television picture relies quite heavily on our facility for psychological closure. Although our persistence of vision ("seeing" something for a short period after it has already been removed from our vision) helps us to perceive the scanning dot of the TV image as a complete image, we need to apply psychological closure to relate the low-information patterns on the screen into meaningful visual images.

The gestalt factors of perceptual organization listed by Murch (1973, pp 132-137) are: (a) the factor of similarity, (b) the factor of proximity, (c) the factor of common fate, (d) the factor of objective set, (e) the factor of inclusiveness, (f) the factor of good continuation, (g) the factor of closure, (h) the factor of fixation, (i) the factor of contour, and (j) the factor of interdependence. All these factors occur at one time or another when we structure images in the visual field. Their study, control, and measure is warranted.

Collectively, the problems and the hypotheses dealing with the testing of the theory of psychological closure and gestalt can be stated as follows:

> Does placement of minimal graphic elements within the television screen differentially affect the viewers' perception of organizational patterns given the factors of similarity, proximity, common fate, objective set, inclusiveness, good

continuation, closure, fixation, contour and interdependence?

A multi-dimensional design which will consider all these factors simultaneously is more appropriate in this case, and a suitable multi-variance statistic is warranted.

Vectors

The strongest force operating within the screen which is indispensable to the structure of visual images is the force caused by directional lines that lead the viewers' eyes from one point to another. Such directional lines are called vectors. Zettl (1973, p 140) defines vectors as "a force with a direction and a magnitude," and relates Andrew Paul Ushenko's (1953, pp 60-119) theory of physical vectors to perceptual vectors created by moving elements within the TV screen.

Since there are numerous vectors which interact to compose the moving image, Zettl (1973, p 140) calls the television screen a "vector's field." In film and television, where we deal with actual motion of images within the screen, the concept of vectors is probably the single most important aesthetic factor.

Depending upon their ability to direct the eye from one point to another, Zettl (1973, p 140) recognizes three types of vectors: (a) graphic vectors are created by stationary visual elements such as buildings, telephone poles, etc., arranged so that they lead the eye into a particular direction: (b) index vectors are defined as the directional forces created by an object which points unquestionably towards a specific direction such as a finger pointing, a sign, etc.; (c) motion vectors are created by someone or something actually moving in a particular direction such as a person walking, a car moving, a skier coming down the slopes, etc.

Distinguishing the vector's strength and magnitude, Zettl (1973, p 142) states that the graphic vectors are less strong than the index ones, which, in turn, are weaker than the motion vectors. The magnitude of a vector of high magnitude exerts a strong directional force; it leads our eyes unquestionably into a specific direction, and you have the feeling that it does so with considerable force. Examples are a train racing along a straight track, a rocket going up, a football player racing across the field. All produce strong motion vectors.

Although motion vectors have a higher magnitude than the index vectors, and index vectors are stronger than the graphic vectors, the magnitude of a motion vector depends on the speed of the object. Thus, a slowly moving object produces a vector of a lower magnitude than a fast moving object. Insofar as their main direction is concerned, vectors are either continuing (succeeding one another), or converging (one going against the other).

The knowledge of the vector field and the interaction of the vectors is helpful and a necessary tool for the television director. The scientific measurement of the theory of vectors is complicated since each and every one needs to be measured simultaneously and/or separately.

Collectively, the problem and the hypotheses concerning the verification of the vectors theory could be stated as follows:

> Does placement of visual elements within the television screen differentially affect viewers' perception of (a) graphic, (b) index, (c) motion, (d) continuing, and (e) converging vectors?

Again, a multi-dimensional design and a multi-variance statistic are required for the testing of the hypotheses referring to the phenomenon of vectors.

Generalizations

What I have tried to suggest here is the study of the structure of television images based on the field forces theories that have been developed by scholars in (a) perceptual psychology, (b) visual composition, and (c) aesthetics of the moving image.

Although individual efforts have been made towards this direction, and the forces operating within the visual field have been theorized, experimental studies which will test these theories are scarce.

I am suggesting that such studies will not only enhance our knowledge of staging for television, but also will set forth the scientific approach to the study of the television medium.

So far, we have made observations and we have theorized extensively about the major components of the medium. We have dealt with light, color, and have theorized about the various lighting techniques. We have discussed and experimented with television staging and space manipulation on a practical, learning-by-doing basis. We have observed and theorized about the use of motion, timing, and editing for television. Lastly, we developed various theories about the role of sound in television.

Few, if any at all, of these theories have been tested or verified scientifically. We must start measuring th[illegible] theories qualitatively, if we are to establish solid ground upon which the study of the structure of television pictures should be built.

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