MESSAGE UNCERTAINTY AS A PREDICTOR OF AROUSAL AND AGGRESSION

> Thesis for the Degree of Ph. D. MICHIGAN STATE UNIVERSITY GERHARD J. HANNEMAN 1970

THESIS



This is to certify that the

thesis entitled

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presented by

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ABSTRACT

MESSAGE UNCERTAINTY AS A PREDICTOR OF AROUSAL AND AGGRESSION

By 5 Gerhard J: Hanneman

This experiment assessed the effect of a structural message variable, uncertainty, and a contextual message variable, violent content, on physiological arousal and aggressive feelings. Prior research using nonmeaningful stimuli indicated: a positive relationship between stimulus uncertainty and arousal; an increase in aggression after exposure to mediated violence; and more arousal when viewing highly uncertain stimuli among high dogmatic subjects but less arousal when viewing low uncertainty stimuli. It was predicted that increased message uncertainty would accentuate arousal and aggressive feelings, but arousal would vary with dogmatism.

Subjects completed a dogmatism scale prior to the experiment. During the experiment, subjects' GSR arousal was measured during exposure to either a high or low uncertainty violent or nonviolent scene projected on a television set. Afterwards, subjects completed a series of aggression scale items. The results were:

- High uncertainty elicited greater arousal than low uncertainty in the violent message context, and not in the nonviolent context;
- (2) High uncertainty in the violent context elicited greater arousal than the same level of uncertainty in the nonviolent context;
- (3) High uncertainty elicited greater arousal than low uncertainty among high dogmatics compared to low dogmatics regardless of context.

MESSAGE UNCERTAINTY AS A PREDICTOR

OF AROUSAL AND AGGRESSION

By Gerhard J. Hanneman

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Thesis Chairman

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The culmination of a graduate career is exciting. The anticipation of new challenges however becomes clouded not only because of imminent departure from good friends, but by the feeling that scholarship is inevitably a struggle across unproven grounds: a struggle, although savory, always frustrating.

Much of this struggle is softened because of the presence of wiser scholars than myself. For the aid of Professor Bradley S. Greenberg, who chaired this thesis, I am grateful; his advice and friendship throughout my stay at M.S.U. was influential and warm. Professor Everett M. Rogers, who introduced me to communication as an undergraduate is a "together" human being who in various professional roles, and as a friend, provided me with counseling and care. I also still feel the kindness of Professor Elaine Donelson who equipped me and extensively tutored me. I thank Professor Nat Katzman for his help and friendship during my long hot summer; Professor John Gullahorn for his guidance throughout my graduate career.

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CHAPTER I

INTRODUCTION

Overview of Problem

Research by Berlyne (1960) and others has indicated that stimulus uncertainty is positively related to an individual's physiological arousal level. While Berlyne used "nonsense" stimuli (e.g., random patterns of geometric shapes), this experiment will attempt to confirm some of his results using "meaningful" stimuli (i.e., television scenes). Thus, Ss viewing highly uncertain violent or nonviolent television scenes should show more arousal than Ss viewing low uncertainty violent or nonviolent television scenes. It is also anticipated that Ss will show more arousal when viewing a highly uncertain violent scene than Ss viewing a highly uncertain nonviolent scene due to the probable arousal eliciting qualities of the context--the violent act--itself. Likewise, the structural properties (i.e., the uncertainty) of the highly uncertain violent scene should combine with contextual properties to produce stronger aggressive feelings from Ss than will be the case when Ss view the low uncertainty violent scene or the high uncertainty nonviolent scene.

The study will also investigate the relationship of a personality characteristic to uncertainty induced arousal:

dogmatism. Rokeach (1960) posited that high dogmatics are less able to cope with uncertainty. Therefore, high dogmatics should show more arousal, and possibly stronger aggressive responses than low dogmatics when viewing highly uncertain violent scenes.

Thus, this experiment will examine: (a) whether uncertainty accentuates arousal and/or aggressive feelings in individuals watching violent scenes; and (b) whether dogmatism is a predictor of individual differences in arousal and aggressive feelings when viewing uncertain violent stimuli.

This chapter will develop the conceptual bases for this experiment, review relevant prior research, and stipulate the hypotheses. The independent variable of uncertainty and its relationship to arousal will be discussed first, followed by an elaboration of a related but secondary independent variable dogmatism. This will be followed by an explication of the variable of violent message content and the dependent variables of arousal and aggressive feelings.

Uncertainty

A conceptual basis for the use of uncertainty originates with Shannon and Weaver (1949). Their promulgation of "information theory" prompted wide investigation of uncertainty in many diverse scientific fields. They stated that uncertainty is greatest in situations where there are the most possible alternative messages and the probabilities of occurrence of

the alternatives are nearly equal. When uncertainty is maximum they said, the freedom of choosing among subsequent alternative events or messages is greatest. Miller and Frick (1949) applied the idea of information measurement based on probable alternatives to behavioral science. Others, such as MacKay (1950), Attneave (1959), Berlyne (1960), Luce (1960), and Garner (1962) also discuss behavioral applications of uncertainty and information theory.

In the literature incorporating information theory concepts, uncertainty is variously defined as freedom of choice, disorganization, randomness, and lack of predictability. Usage here concurs with Schramm's (1955) definition of uncertainty as the degree of predictability of the communication situation. That is, <u>uncertainty is defined as the degree of</u> <u>predictability of a series of events (alternatives) prior to</u> the actual occurrence of a given event.

The predictability of message events plays a major role in human symbolic behavior and provides a rationale for studying uncertainty in communication research (cf. Schramm, 1955). Internal symbolic activity, generating and manipulating signs and cues, consists in part of language behavior, mnemonic activities and perception (cf. Glucksberg, 1966). For example, the individual learns sets and labels to be able to predict and "explain" unfamiliar events and reduce many alternatives under one label; he stores data using mnemonic codes to reduce the number of alternatives he has to process (e.g., creating

an acronym from the first letters of the first words in a long series of statements and memorizing the acronym as a guide to remembering the statements); symbolic control of attention permits ascertaining the relevant and irrelevant features of stimuli for mental processing and it facilitates reduction of perceptual alternatives, hence uncertainty.

Experimental research into uncertainty has traditionally been divided into two areas: <u>stimulus uncertainty</u>--where uncertainty is the number of alternatives in the information theory sense--it is an attribute of the number of alternatives of the stimulus; <u>response uncertainty</u>--where uncertainty is an expression of the individual's conflict in making choices among a given number of alternatives.

Berlyne (1957, 1960, 1963, 1965) has systematically studied stimulus uncertainty and arousal. He has found that when there is heightened arousal due to "collative" stimulus properties (e.g., novelty, surprisingness, complexity, and ambiguity), the individual will engage in subsequent exploration of the stimuli to reduce arousal. Exploratory behavior and arousal decrease when the information in the stimulus patterns has been assimilated and uncertainty falls to a threshold value. Berlyne's stimuli were presented for constant time intervals and no attempt was made to assess information overload (Miller, 1956).

Lovibond (1968) found that GSR incidence to a series of predictable shocks tended to decline, while a series of unpredictable shocks maintained GSR incidence.

Driscoll, Lanzetta and associates (Siebert and Lanzetta, 1964; Driscoll and Lanzetta, 1965; Driscoll, Tognoli, and Lanzetta, 1966) have investigated both stimulus and response uncertainty. They found that individuals will engage in information search behavior until one bit of stimulus/response uncertainty remains; that information search is a monotonic function of uncertainty; the greater the magnitude of the stimulus uncertainty of a decision task, the faster the individual began seeking information; subjective uncertainty (similar to arousal in this experiment) is directly related to stimulus and response uncertainty; and stimulus and response uncertainty are linearly related--limited only by information processing capabilities of the individual.

There are individual differences, of course, in a person's capacity to process information and thereby reduce uncertainty. In addition, personality characteristics may lead to individual differences in their pattern of uncertainty reduction. One such characteristic--dogmatism--has been found to affect an individual's ability to cope with uncertain stimuli.

Dogmatism

Research by Rokeach (1960) into authoritarian personalities produced the construct "dogmatism." He considers his dogmatism scale a measure of learned inability to use novel responses, and dogmatism scores to represent Ss tolerance for ambiguity, novelty and uncertainty.

Mikol (1958); Zagona and Kelly (1966); and Pyron and Kafer (1967) found respectively that high dogmatics preferred more conventional music pieces, were more apt to reject novel films, and recalled significantly fewer irrational and novel sentences than low dogmatics. Clark and Salomon (1970) confirmed formulations by Rokeach (1960) and Long and Ziller (1965) that low dogmatics tend to be bored by low uncertainty stimuli and become aroused to engage in exploratory behavior for stimuli of greater uncertainty; high dogmatics prefer messages of less uncertainty and cannot tolerate high uncertainty. That is, they found an inverse relationship between dogmatism and information search.

The research so far reported leads to a statement of the following relationships: stimulus uncertainty is positively related to arousal; exploratory behavior (information search) is positively related to uncertainty (and thus arousal) and inversely related to dogmatism; and high dogmatism, arousal, and stimulus uncertainty are directly related, but low dogmatism is inversely related to arousal and stimulus uncertainty. Figure 1 partially displays these relationships.

To this point, the term "arousal" has been used in a general sense. Arousal can be defined as a state of motivational and emotional activation manifested psychologically, physiologically and/or behaviorally (cf. Berlyne, 1960). However, as Lacey (1967) suggests, the electrocortical, somatic, and behavioral components of arousal may be related but do not necessarily function alike. The next section presents a view of some of the constitutive and empirical connections of "arousal."



Figure 1. Relationship between Stimulus Uncertainty, Dogmatism, and Arousal.

Arousal: An Interpretation Problem

Research dealing with physiological arousal has many labels. Communication researchers speak of fear arousal (not measured physiologically) and stress (as duress). Psychological researchers studying physiological arousal do so under labels including emotion and anxiety. There are two problems involved with the combination of names having what appear to be similar operationalizations: first, what is the constitutive connection between the terms, and second, what is the relationship between psychological stress and its verbal labels and physiological stress (that is, a measure of response of the autonomic nervous system)?

Spielberger (1966) subsumes all conceptual relatives (of arousal) that are like anxiety. He dichotomizes anxiety into

state anxiety that is transitory, and trait anxiety that is a function of an individual's personality. Traditionally such anxiety-arousal has been measured in one of six ways: introspective reports (paper and pencil anxiety scales), physiological signs, "molar" behavior (body posture, speech characteristics, etc.), task performance, clinical intuition, and response to Introspective reports are the most widely accepted stress. basis for inferring transitory anxiety. Krause (1961), in fact, questions the sufficiency of physiological measures as independent criteria for inferring transitory anxiety unless used in conjunction with introspective reports. Spielberger (1966, p. 16) further recommends that a distinction be made between stressor (in the broad sense) stimuli and the anxiety response itself: "there is considerable agreement that anxiety states are characterized by subjective, consciously perceived feelings of apprehension and tension, accompanied by or associated with activation or arousal of the autonomic nervous system."

The differentiation between psychological and physiological stress then, is connected to the problem of determining the constitutive connection between identical terms with different operations. A more subtle distinction is pointed out by Lazarus <u>et al</u>. (1962, p. 1) "In the history of psychological stress research, there has been no clear separation between physical stressors which attack tissue systems and psychological stressors which produce their effects purely because of their psychological significance." Such physical stressors might include any type of noxious stimuli in the experimental setting:

pain, noise, and other features of the environment. In the present experiment (cf. Geen, 1968) no physical stress will be introduced into the setting and hopefully the confounding effect will be nonexistent.

In conclusion, "information search" and "exploratory behavior" are motivational aspects of the individual whereby he attempts to reduce the arousal (or transitory anxiety as an internal stimulus in Spielberger's sense) resulting from external stimuli (or internal, as may be the case). In this study an external stimulus--uncertain message content in the form of televised violence--is designed to induce arousal. Consequent exploratory behavior will not be examined.

The next section of this paper deals with one possible manifestation of behavioral arousal: aggression due to mediated violence.

Violent Message Content, Arousal and Aggression

While most research on uncertainty has used visual stimuli of meaningless patterns, it is probable that parallel research using meaningful stimuli might demonstrate a confounding effect between the contextual and structural (uncertainty) parts of the stimulus. This confounding may be particularly evident in the context of violent message content in television sequences. Himmelweit, Oppenheim and Vince (1958) concluded that when [television] violence follows a conventional pattern, the outcome of which is predictable, very few children are

<u>"disturbed."</u> If "disturbed" is interpreted as indicating arousal, then the research cited demonstrating that unpredictable events cause arousal (up to a limiting plateau) is directly relevant.

Media violence research, as summarized in Tannenbaum and Greenberg (1968), Weiss (1969), and Baker and Ball (1969), has yielded conflicting results. Survey studies summarized by Klapper (1960) found neither harmful nor beneficial effects from consuming mediated violence--except in children with delinquent tendencies. Case studies reported by Wertham (1954) disclose substantial effects to the general psychological makeup of children from prolonged exposure to violent television shows.

Work by the experimentalists in media research has generally demonstrated an excitory effect from watching televised violence, and in one instance a catharsis effect. Feshbach (1962) found that college students vicariously released hostility while watching a fight scene. However, a large body of work by Berkowitz (1968), and Bandura (1963), and others has shown that observed violence predisposes toward more aggressive behavior.

Research by Geen (1968) and Berkowitz (1968) disclosed that attack or frustration produces a general state of physiological arousal which, in turn, increases the probability of aggression resulting from observed aggression. Geen (1968) indicated that aroused individuals, when viewing aggressive scenes, tend to become more aggressive. In both of these

studies however, arousal was an antecedent condition, i.e., induced by the experimenter prior to exposure to the experimental stimulus. In the present experiment, arousal will be evoked by the stimulus.

There also exists a considerable body of research on film-induced stress. Lazarus and his colleagues (Lazarus, 1966) have consistently shown that when Ss are exposed to stressful films, the implied form of threat in the film will give rise to physiological stress in the viewers. Even though Lazarus posits an intervening variable, threat, in his experimental studies there are at least two aspects of his research directly relevant here. First, they have demonstrated that filmed presentations, seemingly out of the realm of experience of the viewer, do contain stimuli that evoke stressful responses--physiological arousal. Second, the major premise of Lazarus' research--and a major point of contention in the controversy concerning the effects of mediated violence--is that stressful filmed presentations are generalizable to real life situations where the individual has other ways to cope with stress he experiences. In both research endeavors (mass media and the study of psychological stress) it remains to be seen what variables are crucial in limiting the analogy between the experimental and real-life settings.

The linkages between stimulus uncertainty and arousal, dogmatism, mediated violence and aggression are presented in the following conceptual paradigm.



Figure 2. Conceptual Paradigm of the Experiment.

With this paradigm in mind, the next section stipulates the particular relationships that will be tested.

Hypotheses

By investigating the effect of a structural stimulus property on arousal and aggressive responses it may ultimately be possible to resolve some confusing results yielded by media violence research. At the very least this study should provide another focus on mediated violence and viewer effects, by examining the linkage of a structural stimulus property to some personality and contextual factors of violent scenes.

Based on the discussion about stimulus uncertainty and the work of Berlyne (1960) it is predicted that:

H1. Violent television scenes of high uncertainty will elicit more arousal than parallel violent television scenes of low uncertainty.

- H2. Nonviolent television scenes of high uncertainty will elicit more arousal than parallel nonviolent television scenes of low uncertainty.
- H3. Violent television scenes of high uncertainty will elicit more arousal than nonviolent television scenes of high uncertainty.

H1 and H2 comprise the main effects prediction for uncertainty and arousal, and H3 is a prediction that the contextual and structural properties of the stimulus will combine.

In this experiment, dogmatism will not be related to information search behavior, but strictly to stimulus uncertainty. From the research of Rokeach (1960) and Clark and Salomon (1970) it is predicted that high dogmatics who view a highly uncertain sequence should show more arousal than low dogmatics viewing the same sequence. The former group prefers less uncertain messages and should be less able to tolerate uncertainty. Conversely, when viewing a low uncertainty sequence, high dogmatics should show less arousal than when viewing a highly uncertain sequence, and less arousal than the low dogmatics. The latter should be more bored by such stimuli and engage in exploratory behavior to alleviate their boredom. The following statements predict that the variable of uncertainty will interact with the variable of dogmatism, such that:

- H4a. High dogmatics will show more arousal in the high uncertainty condition than will low dogmatics.
- H4b. High dogmatics will show less arousal in the low uncertainty condition than will low dogmatics.

The following hypotheses relate aggression to uncertainty and televised violence:

- H5. Violent television scenes will elicit stronger aggressive feelings than nonviolent television scenes.
- H6. Violent television scenes of high uncertainty will elicit stronger aggressive feelings than nonviolent television scenes of high uncertainty.
- H7. Violent television scenes of high uncertainty will elicit stronger aggressive feelings than parallel violent television scenes of low uncertainty.

H5 is based on findings by Berkowitz (1968) and others that a violent scene elicits more aggression than a nonviolent scene. H6 and H7 are predicted on the basis of a possible combination of uncertainty of the stimulus, its aggressive violent content, and the consequent aggressive feelings expected.

CHAPTER II

METHODS AND PROCEDURES

Overview

Subjects completed a dogmatism scale one to two weeks before the experimental session. During the experiment subjects were shown either a violent or nonviolent television scene edited into low and high uncertainty versions. Subjects' arousal from viewing one of the four versions was measured as heart period and galvanic skin response (GSR). Immediately after exposure to the stimuli, subjects completed a paper and pencil aggression scale.

This chapter details the methods and procedures of the experiment. The chapter begins with a description of the sample, design, stimuli and procedures. This is followed by the operationalization of the independent and dependent variables.

Sample

Subjects (N=106) were male, paid volunteers obtained through newspaper advertisements in the Michigan State University "State News." Subjects were randomized to four experimental cells: high uncertainty violent and nonviolent message content, and low uncertainty violent and nonviolent message content (see Figure 3). Of the original 106 subjects,

10 subjects admitted to the debriefing interviewer that they had seen the original television shows from which the scenes were chosen. Since familiarity with the scenes would preclude an uncertainty effect, these subjects were removed from the analysis, resulting in a total N=96. Subjects were run one at a time, over a two week period (July 20, 1970-July 31, 1970), at half hour intervals from 12:30 p.m. until 11:00 p.m.

Contextual Conditions Violent Nonviolent Scene Scene High Uncertainty Structural Conditions

Figure 3. Experimental Conditions

Design and Analysis

Two nested independent variables were included in the design: uncertainty and violent message content. In addition, a secondary independent variable, dogmatism, was included in the analysis. Two different dependent arousal indices--GSR and heart period--were used to: (a) obtain multi-operationalization of the same concept; and (b) to compare the GSR arousal, used in prior uncertainty-arousal research, with the heart period responses.

Dependent arousal measures were assessed at three timepoints in the experiment: prior to presentation of the experimental stimuli (baseline); immediately prior to the violent or resolution segment of the television scene (time 1); and during the violent or resolution segment of the particular television scene (time 2). The baseline arousal was used as a control check on initial arousal among conditions. The time 1 measure was a sampling of arousal (to be discussed) during the uncertain portion of the stimulus (e.g., a discussion between the marshall and villain in the violent sequence which culminates in a shootout). In presenting shots in a scene, it was assumed that uncertainty was greatest immediately prior to resolution of the scene. This assumption was based on the contention that successive temporal and contextual cues demand a conclusion (closure) and should have a cumulative effect on anticipation and uncertainty. The time 1 measure, than, was assumed to reflect the effect of uncertainty only. The time 2 measure was assessed immediately after peak uncertainty and was taken to indicate arousal due to uncertainty plus context, i.e., uncertainty plus violent message content. The differences in mean arousal levels between baseline and time 1, and baseline and time 2, were analyzed within the design shown in Figure 3.

Selected comparisons, analysis of variance and covariance were used to analyze the dependent variables. Dogmatism and arousal were analyzed correlationally and by means of t-tests.

Stimuli and Apparatus

Two television scenes were used for the experimental stimuli. Both scenes were from episodes presented during the 1969-1970 television season. The violent television scene was an episode from <u>Gunsmoke</u> entitled "The Badge." The nonviolent television scene was an episode from <u>Then Came Bronson</u> entitled "Mating Dance for Tender Grass." Each scene was edited into low and high uncertainty versions of equal length. The <u>Gunsmoke</u> scene versions were 2:00 minutes long; the <u>Bronson</u> scene versions were 1:33 minutes long. The shots in both scenes are listed in Appendix A. The shots deleted for the low and high uncertainty versions are as marked.

In the violent scene (<u>Gunsmoke</u>) a shot was deleted if it gave or showed reference to the impending violent resolution (e.g., any shots of gunmen waiting in ambush were deleted. In the nonviolent scene (<u>Bronson</u>) a shot was deleted if it gave or showed reference to the impending nonviolent resolution. Given the ambiguous nature of the nonviolent scene, shots were also deleted for the low uncertainty version if they gave or showed reference to a highly uncertain resolution (that is, a shot was deleted if it signalled danger or violence which was not actually carried through). The edited versions were shown to two groups of judges.

All scenes were recorded off-the-air and edited on 1-inch magnetic tape. Editing was done on an Ampex 7800 video tape recorder (VTR). Playback during the experimental sessions

was on an Ampex 5100 VTR, and shown on a regular Motorola black and white 21-inch portable television. The VTR was set up in the equipment room with the polygraph. Only the television monitor, an easy chair, table and bookcase were located in the experimental room. Audio was played back through the television speaker. All scenes were on one tape; the tape was preset to the proper scene of the condition to which a subject was assigned before the subject was allowed to enter the experimental room. During the 5-minute adaptation period the TV was on, but blank; it was also on, but blank, during the 2-minute waiting period after presentation of the stimulus.

The polygraph equipment was a Grass Instrument Model 7. The driver amplifiers were Grass Model 7DA D.C. driver amplifiers. Heart rate recording was made through a Model 7P4 Tachograph preamplifier (the tachograph was not used). GSR was recorded through a Model 7P1 low-level D.C. preamplifier, set in the "P.G.R." position. Both preamplifiers and amplifiers were calibrated before each subject was run. For the GSR measurement, balance voltage controls and sensitivity were set during the five-minute adaptation period. Heart rate electrodes were Sanborn Adult Limb EKG electrodes, while GSR was recorded using Beckman Biopotential Skin electrodes (miniature).

Procedures

Prior to the experiment a questionnaire assessed dogmatism scores, average television viewing times then and in high school, and other demographic information. During the experiment, subjects viewed one of the four experimental scenes while GSR and heart period were monitored. After viewing the stimuli, subjects completed an aggression scale and were debriefed.

<u>Pre-experimental Procedures</u>. Subjects answered a newspaper ad requesting male undergraduates to participate in a Communication Experiment for \$2. Subjects came to an office to complete the questionnaire shown in Appendix B. The second part of that questionnaire is the Troldahl-Powell (1965) short form of Rokeach's (1960) dogmatism scale. After completing the questionnaire, subjects made an appointment with an assistant E (who also was the debriefing interviewer) to view the stimuli. Time between completion of the initial questionnaire and the experimental session varied from a few days to two weeks. Subjects were told they would be paid after the experimental session.

Experimental Procedures. Subjects (N=96) were randomly assigned to one of four experimental conditions. Upon arriving for the experiment, the subject was greeted and checked off the appointment list by the assistant E. The subject was asked to go into the experimental room. In the experimental room a second assistant E asked the subject to be seated. The assistant E avoided answering questions

pertaining to the purpose of the experiment. The S was told his physiological responses would be measured, and he was told the purpose of the electrodes while they were being fastened. The heart electrodes were attached to the lower right calf and left forearm of the subject; the GSR electrodes were attached to the first and third fingers of the right hand. After the electrodes were fastened the assistant E read the instructions in Appendix C detailing the coming events in the experiment, left the room and closed the door. During the five-minute adaptation period baseline GSR and heart period readings were obtained. After the five-minute adaptation period, the VTR was turned on to play the respective scene version of the condition to which the subject was assigned. At the conclusion of the scene, the VTR was stopped and the assistant E waited two minutes before reentering the experimental room.

Upon reentering the experimental room, the assistant E detached the electrodes and handed the subject the questionnaire shown in Appendix D. The first page of this questionnaire is the aggression scale. The assistant E was again instructed not to answer any questions about the experiment.

<u>Post-experimental Procedures</u>. When the subject completed the questionnaire, he was asked to go out of the experimental room to the debriefing interviewer who checked that the subject had completed all questions on the questionnaire and asked the subject four questions: whether he had seen the television scene shown, whether he was physically and mentally comfortable

during the experiment, and what the purpose of the experiment was. Subjects were told their attitudes would be related to active and passive television scenes and physiological arousal. No other description of the experiment was furnished. Subjects were asked not to describe the experiment or the purpose given to anyone else. Then they were thanked and paid \$2. Neither assistant E was familiar with any of the hypotheses of the study.

The next section of this chapter describes how the independent and dependent variables were operationalized, and specifies the control variables and manipulation checks.

Independent Variables

Violent Message Content. A television scene was chosen for presentation as a violent scene if it met Katzman's (1970) definition of aggressive violence: behavior (killing, fighting, shooting, yelling, etc.) that is intended to cause physical harm. The nonviolent scene was chosen if it neither met the definition above, nor Katzman's (1970) definition of aggression: an overt expression of intent to do any type of harm; nor the definition of violence as activity which normally results in physical harm. In addition to the <u>a priori</u> determination of violent and nonviolent content, the two scenes were operationally considered to be violent or nonviolent if they were judged (a) the most significantly polarized on a 7-interval anchored rating scale of violence ("violent"--"nonviolent")

and aggression ("aggressive"--"nonaggressive"); (b) the scenes were ranked significantly apart in a forced order ranking of five tentative experimental scenes. In addition to these criteria, the ratings and rankings for the two criteria could not be significantly different between the low and high uncertainty versions of the same scene.

A group of 11 judges evaluated the five low uncertainty scenes; another group of 11 judges evaluated the high uncertainty versions. The <u>Gunsmoke</u> and <u>Bronson</u> scenes met all the criteria, and were chosen as the violent and nonviolent scenes respectively.

Uncertainty

In the time 1 analysis, uncertainty operated as an independent variable. For the time 2 analysis (violence or nonviolence plus uncertainty) uncertainty operated as a level variable (in a treatment by levels design). Uncertainty has been defined as the degree of predictability of a series of alternative events prior to the actual occurrence of a given event. Using this definition, the two television scenes were edited into versions in which the subsequent acts were predictable (low uncertainty) and one in which the subsequent acts were not predictable (high uncertainty). To operationalize stimulus uncertainty, the scenes were stopped immediately prior to the impact or resolution (1:30 into the <u>Gunsmoke</u> segment and 0:55 seconds into the <u>Bronson</u> scene), and the judges described above were asked to predict

what the next series of events would be in the scene being evaluated.

In order to be operationalized as being low uncertainty, a scene had to have more right guesses than wrong guesses about the outcome. For a scene to be operationalized as high uncertainty, the scene had to have more wrong than right guesses. In both cases the difference between versions of the same scene had to be significantly different in the right directions: a greater proportion of wrong guesses about the outcome for the high uncertainty versions, and a greater proportion of right guesses about the outcome for the low uncertainty versions. The <u>Gunsmoke</u> and <u>Bronson</u> scenes were the only scenes to meet the operational criteria for uncertainty and the criteria for violence and nonviolence.

Dogmatism

This variable was operationalized as the subjects' total score on the 20 item Troldahl-Powell (1965) dogmatism short form (Appendix B). Since this variable was not nested into the design, only descriptive relationships were examined.

Dependent Variables

<u>Arousal</u>. In this experiment arousal is operationally the response of the autonomic nervous system. The two physiological indices used were galvanic skin response (changes in skin conductance) and heart period (i.e., interbeat interval).
Physiological arousal was chosen primarily because physiological measures can be more easily monitored continuously over time. GSR is the index of primary interest only because the research alluded to in this paper generally measured GSR arousal. As already discussed, heart period changes are observed as an alternate way of operationalizing arousal. A subject's baseline arousal was considered his mean GSR level and/or his mean heart period during the 10 seconds immediately preceding start of the VTR. Time 1 arousal was measured during the 10 seconds immediately prior to the impact or resolution scene. GSR level was averaged from GSR scores at the 1, 5 and 10 second marks during these periods. Heart period was computed by averaging the interbeat intervals (in millimeters) of the 10 beats closest to the 10 second mark in the periods indicated above.

For the time 2 measures, the same method of scoring was used, except a 10 second period around the lowest GSR point (greatest arousal) was chosen for averaging. Similarly, the 10 heartbeats around the lowest GSR point were scored.

Arousal was operationally specified for each time period as the <u>difference</u> between mean baseline arousal and time 1 mean arousal, and mean baseline arousal and time 2 mean arousal respectively. All charts were "blind-coded" by the same coder, who was unfamiliar with the hypotheses or purpose of the study.

Aggressive Feeling. Aggression has been defined as the overt expression to do any type of harm. "Overt expression"

was interpreted as verbal expression for the purposes of this study. Appendix D shows the aggression form (the first page of the questionnaire) which all subjects completed. Items 1, 2, and 4 are from Sears (1961) anti-social aggression scales; items 3, 6, 8, and 9 are from the Buss-Durkee (1957) inventory; all other items are from Dominick (1970). Items 1, 4, and 6 were reversed prior to coding (i.e., a "1" was coded a "5," etc.). The items and the total were intercorrelated and a factor analysis performed. On the basis of this analysis,* items 3, 7-11 were summed into an aggression index with a range of 6-30: a subject's aggressive feeling was operationalized as his total score on the constructed index.

This chapter concludes with a discussion of the control variables and manipulation checks.

Control Variables

<u>Sex</u>. All subjects were male undergraduates enrolled at Michigan State University.

Length of Scene. The time length of the scenes was held equal within violent and nonviolent versions for overall time and for time to impact or resolution.

^{*}The items chosen for the index had the highest inter- and item-total correlations of all 11 items. When submitted to a Varimax factor analysis, the items chosen loaded highest as one factor with loadings ranging from .44 to .73. Another factor was yielded by the varimax rotation, but it consisted of only two clean loadings of items 1 and 4. The first factor accounted for 24% of the proportion of overall variance; the second factor accounted for 13% of the proportion of variance.

<u>Content</u>. The content of the scenes was held constant within violent and nonviolent conditions.

Initial Arousal. Mean group baseline arousal was checked for nonsignificant differences among all conditions.

Manipulation Checks

<u>Violent Message Content</u>. The perceived violence and aggressiveness of the scenes presented were evaluated by each subject on the 7-interval scales listed in Appendix D. The two scales yielded a highly significant product moment correlation of r=.68 and were therefore summed into a single index.

<u>Uncertainty</u>. Subjects were also asked to rate the predictability of the scene shown. This evaluation enabled a comparison with the pretest ratings of uncertainty of the scenes.

<u>Self-report of Arousal</u>. This was obtained for heuristic purposes (in accordance with Krause's 1961 suggestion) and not specifically as a manipulation check, given the controversy concerning the relationship between physiological and verbal indicators of arousal and the short duration of the experimental stimuli.

CHAPTER III

RESULTS

Overview

The results are presented in this chapter in terms of three independent variables: uncertainty; dogmatism; and violent message content. For both uncertainty and dogmatism two indices of arousal--GSR and heart period were assessed as the dependent variable. For violent message content, the aggression scale was the dependent variable. Reference will be made to the three (baseline, time 1, and time 2) measures of the arousal indicators.

Overall Arousal

The first step in the data analysis was an examination of whether change in arousal occurred overall for the entire sample. Inspection of the means of the difference scores showed no opposing trends. A correlated t test was performed for changes in GSR and heart period from baseline to time 1 and from baseline to time 2. Subjects showed highly significant increases in GSR arousal from baseline to time 1 (t=3.73, p <.001) and from baseline to time 2 (t=4.03, p<.0001). Subjects showed nonsignificant changes in heart period from baseline to time 1 or to time 2, and therefore the heart period data were excluded from further analysis.

Uncertainty and Arousal

It was hypothesized that stimulus uncertainty and physiological arousal were related such that:

- H1. Violent television scenes of high uncertainty will elicit more arousal than parallel violent television scenes of low uncertainty.
- H2. Nonviolent television scenes of high uncertainty will elicit more arousal than parallel nonviolent television scenes of low uncertainty.
- H3. Violent television scenes of high uncertainty will elicit more arousal than nonviolent television scenes of high uncertainty.

Before the hypotheses were tested, a two-way analysis of variance was computed on baseline GSR to test for any significant baseline arousal differences among treatment groups. Table 1 presents the absolute cell means for the three measurements of GSR. The analysis of variance on baseline GSR indicated no significant mean arousal differences among treatment groups.

Therefore, a t-test for independent samples was performed on the GSR measures to test the hypotheses. Results of the GSR analysis relevant for Hl and H2, both for time 1 (effect of uncertainty alone) and time 2 (effect of uncertainty buildup plus violent message content), are in Table 2.

Hypothesis 1 was supported by the GSR data for time 1 at p <.10 and for time 2 at p <.025. Hypothesis 2 was not supported at either measurement time. Hypothesis 3 was not supported at time 1, but was supported for time 2 (t=1.87, p <.05).

	Baseline Cell Mea	ans
	Violent Scene	Nonviolent Scene
High Uncertainty	15.30 (n=27)	12.02 (n=23)
Low Uncertainty	11.87 (n=24)	13.24 (n=22)
(The lower	the score, the grea	ater the arousal.)
	Time 1 Cell Mear	ıs
	Violent Scene	Nonviolent Scene
High Uncertainty	13.45 (n=27)	10.55 (n=23)
Low Uncertainty	11.43 (n=24)	11.75 (n=22)
(The lower	the score, the grea	ater the arousal.)
	Time 2 Cell Mean	າຮ
	Violent Scene	Nonviolent Scene
High Uncertainty	12.36 (n=27)	10.73 (n=23)
Low Uncertainty	11.21 (n=24)	11.95 (n=22)
(The lower	the score, the grea	ater the arousal.)

Table 1. Absolute GSR Arousal: Baseline, Time 1, and Time 2 Data.

	Time 1 Da	ita		<u></u>
Condition	High Uncertainty	Low Uncertainty	t	p
Violent Message Content	1.85 (n=27)	0.44 (n=24)	1.51	∢. 10
Nonviolent Message Content	1.47 (n=23)	1.49 (n=22)	< 1	n.s.
(The higher th	e score, the g	reater the arc	ousal.)	
	Time 2 Da	ita		
Condition	High Uncert a inty	Low Uncertainty	t	P

0.66

(n=24)

1.28

(n=22)

2.12

<1

<.025

n.s.

2.94

1.29

(n=23)

(The higher the score, the greater the arousal.)

(n=27)

Violent

Nonviolent

Message Content

Message Content

Table 2. T-tests of GSR Arousal Differences from Baseline.

Dogmatism and Arousal

It was predicted that the variable of uncertainty would interact with the variable of dogmatism, such that:

- H4a. High dogmatics will show more arousal in the high uncertainty condition than will low dogmatics.
- H4b. High dogmatics will show less arousal in the low uncertainty condition than will low dogmatics.

Because dogmatism was not nested in the experimental design, the principal analysis was correlational, although t-tests were also performed. Dogmatism scores (range = 31-85) were split at the median (49) into high and low groupings and correlated with arousal within each scene. The significance of the difference between r's was determined using Fisher's z. Table 3 presents the results of the correlational and t-test analysis.

Hypothesis 4a was supported by the correlational GSR data, and partially by t-tests. Hypothesis 4b was not supported. Among high dogmatics, dogmatism accounted for 14% of the variability at time 1 and 9% at time 2 in increasing GSR arousal when viewing highly uncertain stimuli. For low dogmatics, dogmatism accounts for 4% and 14% of the proportion of variance of decreasing GSR arousal. It should be noted, that although no predictions were made regarding differential rates of change for the two groups, it is as much the decreasing arousal (especially for time 2) among the low dogmatics as it is the increasing arousal among high dogmatics that makes for the support of H4a.

11 (GSR).*			p=n.s.	p <. 02			. p=n.s.		
l Arousa	2 :tainty		t=1.05	z=2.08	2 cainty		t=0.9 5	z=n.s.	
ymatism and	Time High Uncer	Low Dogmatics (n=35)	1.86	r=-0.38	Time Low Uncert	Low Dogmatics (n=14)	0.19	r=-0.41	
Analysis of Dog		H ig h Dog ma tics (n=15)	2.91	r=0.29		High Dogmatics (n=32)	1.39	r=-0.15	
T-test			p < .10	p <. 04			p=n.s.		
al and	l tainty		t=1.5 0	z=1.7 5	ainty		t=1.16	z=n.s.	
Correlation	Time High Uncer	Low Dogmatics (n=35)	1.28	r=-0.20	Time 1 Low Uncert	Low Dogmatics (n=14)	02	r=-0.38	
Table 3.		High Dogmatics (n=15)	2.59	r=0.37		High Dogmatics (n=32)	1.36	r=-0.07	

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Violent Message Content and Aggressive Feelings

The following hypotheses predicted the relationship between aggression, uncertainty and violent message content:

- H5. Violent television scenes will elicit stronger aggressive feelings than nonviolent television scenes.
- H6. Violent television scenes of high uncertainty will elicit stronger aggressive feelings than nonviolent television scenes of high uncertainty.
- H7. Violent television scenes of high uncertainty will elicit stronger aggressive feelings than parallel violent television scenes of low uncertainty.

These hypotheses were analyzed using the aggression index already described. H5 was analyzed by a two-way analysis of variance. The results in Table 4 indicate the hypothesis is rejected. For H6 and H7, the mean aggression scores in the violent and nonviolent scenes did not differ significantly by t-test, in either the low uncertainty or high uncertainty treatments, and the hypotheses were not accepted.

Manipulation Checks

<u>Violence and Aggression</u>. Subjects were asked to rate the perceived violent and aggressive message content of the scenes they viewed. The separate scales were combined into a single index. A two-way analysis of variance was performed on the ratings of each scene. Results of the analysis are in Table 5.

Table 4. Two-way Analysis of Variance of Aggression.

	Cell Me	ans			
	Violent Scene	:	No	nviolent Scene	
High Uncertainty	12.37 (n=27)	1		11.83 (n=23)	
Low Uncertainty	12.13 (n=24)	I		12.68 (n=22)	
(The higher the sc	ore, the	e grea	ater the	aggressi	on.)
Source of Variance	SS	df	MS	F	р
Uncertainty	0.00	1	0.00	0.18	n.s.
Violence	2.25	1	2.25	0.00	n.s.
Uncertainty x Violence	7.15	1	7.15	0.58	n.s.
Error		92	12.42		

	Cell M	eans			<u> </u>
	Violen Scene	t	N	onviolent Scene	
High Uncertainty	11.22 (n=27))		6.17 (n=23)	
Low Uncertainty	10.88 (n=24))		6.77 (n=22)	
(The higher the score,	the gro	eater	the per	ceived vi	olence.)
Source of Variance	SS	df	MS	F	р
Uncertainty	0.02	1	0.02	0.08	n.s.
Violence	20.98	1	20.98	110.40	<.001
Uncertainty x Violence	0.22	1	0.22	1.15	n.s.
Error		92	0.19		

Table 5. Two-way Analysis of Variance of Perceived Violence Index.

The data confirm the pretest ratings that the <u>Gunsmoke</u> violent scene was perceived significantly more violent than the Bronson nonviolent scene.

Uncertainty. After viewing the scenes, subjects were asked to rate the predictability of the scenes. Cell means and the results of a two-way analysis of variance of the data are in Table 6. The data indicate the high uncertainty scenes were perceived significantly less predictable than the low uncertainty scenes; the violent scene was perceived significantly more predictable than the nonviolent scene. A significant interaction between violent message content and uncertainty showed that the violent scene was perceived more predictable than the nonviolent scene and the low uncertainty violent scene was perceived more predictable than the high uncertainty scene.

T-tests between the violent scene versions indicate the low uncertainty violent scene was perceived significantly more predictable than the high uncertainty violent scene (t=3.79, p < .001). There was no significant difference in perceived predictability between the nonviolent scene versions.

<u>Self-report of Arousal</u>. Subjects were asked to indicate the extent to which they felt anxious, and how much they were aroused. Responses on the two 7-interval scales were summed to yield a self report score. The self report for all subjects correlated 0.00 and -0.04 with time 1 and time 2 GSR arousal. Table 7 lists the results of a two-way analysis of

Table 6. Perceived Scene Predictability.

	Cell Me	ans			
	Violent Scene	:	No	nviolent Scene	
High Uncertainty	4.59 (n=27)			2.78 (n=23)	
Low Uncertainty	6.17 (n=24)	i		2.68 (n=22)	
(The higher the so	ore, the	e more	e predict	able the	scene.)
Source of Variance	SS	df	MS	F	р
Uncertainty	0.55	1	0.55	6.91	<.001
Violence	7.05	1	7.05	89.07	<.001
Uncertainty x Violence	0.67	1	0.67	8.50	<.001
Error		92	0.08		

	Cell Me	ans			
	Violent Scene	:	No	nviolent Scene	
High Uncertainty	6.78 (n=27)			6.70 (n=23)	
Low Uncertainty	8.08 (n=24)			8.36 (n=22)	
(The higher the sc	ore, the	e grea	ter the	arousal.)
Source of Variance	SS	df	MS	F	р
Uncertainty	2.21	1	2.21	6.81	<.001
Violence	0.02	1	0.02	0.06	n.s.
Uncertainty x Violence	0.02	1	0.02	0.07	n.s.
Error		92	0.32		

Table 7. Two-way Analysis of Variance of Self-report of Arousal.

variance on the self report scores for each condition. The data indicate the low uncertainty scenes were reported to arouse significantly more than the high uncertainty scenes.

Supplemental Analyses

<u>Arousal and Aggression</u>. Subjects were median split on each of the four arousal measurements. Mean aggressive response scores were calculated for each group and are presented in Table 8. None of the differences between means was significant.

<u>Correlational Analysis.</u> A product moment correlational analysis was performed among most of the variables in this study (the uncertainty and violent message content dichotomies were excluded). Table 9 presents the resulting correlation matrix. The data indicate the following significant relationships (no causality is imputed to the stated relationships):

- (a) the greater the number of hours of TV viewed per day, the less violent and aggressive a TV scene was perceived;
- (b) perceived violent message content and perceived predictability are related;
- (c) the higher the self reported arousal, the higher the dogmatism score;
- (d) the greater the dogmatism, the more intense the aggressive feelings;
- (e) time 1 GSR differences are positively related to time 2 GSR differences.

Table 8. T-tests of Mean Aggressive Responses for High and Low Arousal.

Condition	High Arousal	Low Arousal	t	p
Time 1 GSR Aggressive Responses	12.70 (n=47)	12.08 (n=49)	<1	n.s.
Time 2 GSR Aggressive Responses	12.10 (n=48)	12.13 (n=48)	4 1	n.s.
(The higher the score response.)	, the stro	onger the ag	gressive	

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Correlational Analysis of Demographic, Independent, and Dependent Variables. Table 9.

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н.	X hours TV viewing/day	1.00						
2.	Perceived violence index	-0.32°	1.00					
°.	Perceived Predictability	-0.12	0.45°	1.00				
4.	Self-report of arousal	-0.01	0.12	0.05	1.00			
ы. С	Dogmatism score	0.15	-0.02	-0.12	0.18*	1.00		
.9	Aggression score	0.09	0.02	-0.10	0.08	0.42°	1.00	
7.	Time 1 GSR differences	0.10	-0.01	-0.05	0.00	0.10	0.13	1.00
œ	Time 2 GSR differences	0.07	0.04	0.03	-0.04	-0.01	0.12	.06.0
		T	7	m	4	IJ	9	7
	* p <. 05							
	° p <. 005							

(96=N)

CHAPTER IV

DISCUSSION

Overview

In addition to summarizing the experiment, this chapter will discuss:

- (a) general methodological considerations in this laboratory experiment;
- (b) the relationship between physiological indices and self reported arousal;
 - (c) methodological and theoretical issues pertinent to the predicted relationships.

The chapter concludes with a consideration of the study's research implications.

Summary

This experiment attempted to assess the effects of two levels of stimulus uncertainty in televised scenes of violent content on arousal and aggressive responses. Hypotheses were based on prior research indicating a positive relationship between stimulus uncertainty and viewer arousal. This relationship had been investigated for nonmeaningful stimulus patterns and found to vary with the personality variable of dogmatism. In this study, it was generally predicted that highly uncertain violent television scenes would elicit more arousal and aggressive verbal responses than low uncertainty violent scenes or nonviolent scenes.

Subjects completed a dogmatism scale before the experiment. During the experiment, subjects viewed one of four television scene versions: high or low uncertainty violent scenes; or, high or low uncertainty nonviolent scenes. Changes in GSR level and heart period were measured as arousal, but heart period was excluded from the data analysis because overall subjects failed to show a heart period effect from baseline to time 1 and to time 2. After viewing the scenes, all subjects completed an aggression scale and rated the perceived violence, aggression, and predictability of the stimuli. Subjects also filled out a self-report of arousal.

The data demonstrated the following relationships.

Predictions about Arousal:

Obtained Result:

H1. Violent television scenes of high Supported for uncertainty will elicit more arousal time 1 and time than parallel violent television 2. scenes of low uncertainty.
The GSR data indicated weak, but significant support for

the first time period, the uncertainty effect alone, and highly significant support for the second time period, the effect of uncertainty and violent message content.

H2. Nonviolent television scenes of high Not supported. uncertainty will elicit more arousal than parallel nonviolent television scenes of low uncertainty.

НЗ. Violent television scenes of high Supported for uncertainty will elicit more arousal time 2. than nonviolent television scenes of high uncertainty. Predictions about Dogmatism: Obtained Results: H4a. High dogmatics will show more arousal Supported for than low dogmatics when viewing time 1 and time highly uncertain violent or non-2. violent televised stimuli. This hypothesis was supported correlationally for changes in GSR. H4b. High dogmatics will show less Not supported. arousal in the low uncertainty condition than will low dogmatics. Obtained Results: Predictions about Aggression: H5. Violent television scenes will Not supported. elicit stronger aggressive feelings than nonviolent television scenes. An analysis of variance indicated no significant differences in aggressive feelings between subjects who viewed violent stimuli and those who viewed nonviolent stimuli, regardless of uncertainty level. Н6. Violent television scenes of high Not supported. uncertainty will elicit stronger aggressive feelings than nonviolent television scenes of high uncertainty. Violent television scenes of high H7. Not supported. uncertainty will elicit stronger

uncertainty. For the latter two hypotheses, while the data rejected the predictions, the means were in the direction

aggressive feelings than parallel violent television scenes of low

expected, i.e., high uncertainty and violent message content combined to intensify aggressive feelings.

Discussion

A complete discussion of the results of this experiment will be preceded by some general considerations. First will be a discussion of some factors affecting a laboratory experiment.

Campbell and Stanley (1963) discuss certain factors affecting the validity of an experiment. Factors of internal validity generally need not jeopardize a laboratory experiment-extraneous variables confounding the experimental stimuli are controlled--but laboratory experiments often suffer from a lack of external validity--a lack of generalizability of the sample, settings, and variables. Two factors of external validity which may have impact on the results in this study are (a) the interaction effects of selection biases and experimental variables, and (b) reactive effects of experimental arrangements.

Subjects in this experiment were college students who responded to a newspaper ad offering financial reward for participation. They were run at various times of day (from 12:30 p.m. until 11:00 p.m.), although mean participation times did not differ significantly among conditions. Nevertheless, failure to obtain predicted dependent behaviors may be caused in part by a sample which self-selected itself and hence may have had somewhat biased antecedent attributes.

Factor b, the reactive effects of the experimental arrangements precludes complete generalizability to nonexperimental settings. That is, subjects were aware they were guinea-pigs, an awareness probably heightened by the placement of electrodes on the arms and legs. Such an awareness would not be evident in a typical home situation. Also, the sterility of the laboratory setting, while affording control of extraneous influences and allowing a clearer pinpointing of cause and effect, is not comparable to the average living room.

<u>The Relationship Between Physiological and Self-reported</u> <u>Arousal</u>. The next section explores the low intercorrelation of the autonomic measure with the self-report, and the bearing of this on the results.

The correlation of the self-report and physiological measures ranged from -0.04 to 0.07. In terms of shared variance of magnitude of relationship, these correlations are minimal. Lacey (1967, p. 15) states: "I think the evidence shows that electrocortical arousal, autonomic arousal, and behavioral arousal may be considered to be <u>different</u> forms of arousal, each complex in itself...the evidence also shows that one cannot easily use one form of arousal as a highly valid index of another." Lacey concludes there is little support for communcal or unidimensional arousal--and that arousal theory incorporating such a viewpoint needs revision. He also cites evidence to point out that arousal is closely

connected to the variable studied, and other variables such as age.

The phenomenon of multidimensional arousal is also supported by evidence cited by Shapiro and Crider (1969). The data they present provide support for Lacey's (1967) formulations and suggest that heart rate decreases due to reaction to external stimuli while GSR increases for similar stimuli, but both GSR and heart arousal increase for purely cognitive (problem-solving) stimuli.

As the data and other research suggest, the arousal measures must be studied separately and with special attention given to the sample characteristics and variables. It is entirely possible that physiological arousal has little relationship to behavioral arousal preliminary to verbal aggression. Or, in a natural setting, an individual's attention to environmental conditions may confound the directionality and strength of any <u>physiological arousal</u> index. What needs yet to be determined is which measure (EKG, EEG, GSR, etc.) is a valid operationalization of arousal as response to mediated violence.

Earlier it was suggested that, given the short duration of the stimuli, a paper and pencil test of arousal might be too insensitive to pick up temporary variations in arousal level. This could be one reason for the lack of correlation between self reported arousal and the physiological index. Also, many subjects could have been physiologically aroused

but unable to report the related sensation. The significant correlation between self reported arousal and dogmatism suggests that a dogmatic individual, given his rigid prior attitudes, may feel he <u>has to be</u> aroused from viewing violent stimuli if he believes mediated violence is "bad" and/or has affect.

The next section examines the predictions concerning viewer effects due to uncertain stimuli.

Uncertainty and Arousal

The failure to obtain uncertainty effects from televised nonviolent stimuli may be due to a combination of the following factors:

- (a) difficulty in operationalizing uncertainty in the nonviolent scene;
- (b) conventionality of the scenes;
- (c) absolute differences in uncertainty between scenes; and
- (d) uncertainty in meaningful stimuli.

A review of nearly twenty shows yielded only three scenes suitable for editing into low and high uncertainty nonviolent versions. Even the scene chosen had to be edited in a manner reverse from the violent scenes: in the <u>Gunsmoke</u> scene "cue" shots were edited out to make the resolution or impact uncertain, in the <u>Bronson</u> scene "cue" shots were edited out to make the scene certain, since as it stood it seemed <u>a priori</u> uncertain. Pretest evaluations confirmed that the editing had been successful. Nevertheless, such reversed procedures may have contributed to cinematic effects which differentially affected the violent and nonviolent conditions.

The nonviolent scene was ostensibly a violent scene with a nonviolent resolution. In fact, prior to time 2, the <u>Bronson</u> scene might have been the violent stimulus. The fact that the low uncertainty nonviolent scene elicited greater arousal than the low uncertainty violent scene, and that the arousal levels for the two versions of the nonviolent scene were nearly equal, indicates subjects probably <u>expected</u> something to occur-reacting to standard violence cues--throughout the entire scenes.

Himmelweit, Oppenheim, and Vince (1958) mention that the conventionality of a scene, in addition to the predictability of it, has bearing on reaction. That is, how recognizable or familiar the behavior in a scene appears to a viewer may also affect arousal. While conventionality could be a component of uncertainty, it can be argued that the action in a scene might be familiar to a viewer during the acts themselves, but the sequence of those acts could still be unpredictable. The nonviolent scene depicted a motorcycle gang and some modern Indian youths in a series of verbal encounters. The juxtaposition of these two elements is less frequently portrayed on TV than Marshal-gunfight scenes, probably causing the nonviolent scene to appear less conventional than the violent The lack of conventionality of the nonviolent versions, scene. may have increased the response of uncertainty of the subjects to the point that both edited versions were equally arousing.

lent obta con vic und co tw 01 đ S ¢ Differences in absolute uncertainty levels of the violent and nonviolent scenes also added to the difficulty in obtaining differences in arousal between the nonviolent conditions. In a pretest of scenes, both violent and nonviolent scenes were rated most unpredictable in the high uncertainty versions. However, the manipulation check data confirm that there are the desired relative differences between scene versions, but the nonviolent scene was rated overall much less predictable than the violent scene. The data also indicated that the more violent and aggressive the scene was rated, the more predictable it was rated, and conversely.

Probably the major operational stumbling block, was the choice of a very active, potentially violent-looking scene for the nonviolent versions. Had the violent and nonviolent treatments been more dissimilar, the dependent measures should have indicated distinct differences between scene types. Unfortunately, it is difficult to exactly specify the ideal type of "nonviolent" scene. It was reasoned that a very pastoral nonviolent scene would be so different from the violent scene, that any differences in dependent behaviors would be attributable to level of activity ("dynamism") the scenes exhibited rather than the presence of violent message content.

The problem of determining the uncertainty in "meaningful" stimuli remains. It is one thing to have subjects view

random patterns and measure arousal, but it is quite another to have subjects view a television scene where at least the concomitant variables of learning, recognition and conventionality are present. Indeed, this experiment points up how difficult the task of specifying stimulus uncertainty in meaningful stimuli can be.

Berlyne (1960, p. 184) discusses the mechanism of anticipatory arousal in coping with impending uncertainty. According to Berlyne, an individual's anticipatory arousal derives from the presence of a pattern of cues in the stimulus indicating how arousing the experiences of the next few moments are going to be. Anticipatory arousal (indicated, for example, by a slow but constant increase in GSR arousal until the impending event occurs) actually reflects the individual's uncertainty about the impending events, and it also reflects how important the individual perceives the impending event to be. Berlyne specifies that anticipatory arousal will increase gradually until the event occurs, and once the event occurs, arousal will not rise unnecessarily high since the individual is already somewhat aroused for it. Berlyne (1960, p. 186) states, "time of anticipatory arousal will be times when exploratory behavior, serving to accelerate and maximize the receipt of information about the impending event, will be strongly reinforced by arousal reduction and thus strongly evoked."

Anticipatory arousal then, may explain the equivalent arousal levels in the nonviolent scene conditions. It can be

argued that the unconventional, overall more uncertain (as rated on the posttest of predictability) nonviolent scene prompted equally intense exploratory behavior (attempts to reduce uncertainty), and increased anticipatory arousal, in the low and high uncertainty conditions. However, the conventional and overall less uncertain violent scene, prompted greater exploratory behavior only in the high uncertainty condition.

Dogmatism and Arousal

Hypothesis 4a predicted that high dogmatics will show more arousal than low dogmatics when viewing highly uncertain violent or nonviolent television scenes. Prior research indicated high dogmatics when compared to low dogmatics are less able to cope with uncertain music, and prefer less novel movies. In problem solving tasks it was found (Clark and Salomon, 1970) that high dogmatics prefer messages of lesser uncertainty. It was reasoned that high dogmatics would become more aroused when viewing highly uncertain televised messages, regardless of content. The correlational data and pattern of means supported the prediction.

It was also reasoned, based on the formulations of Rokeach (1960) that low dogmatics would prefer stimuli of higher uncertainty and would thus be more aroused than high dogmatics by low uncertainty messages to seek more uncertain stimuli. The prediction incorporating such reasoning was rejected by the data. The means in Table 3 indicates that

high dogmatic subjects were more aroused than low dogmatics regardless of the uncertainty level of the stimuli.

It is possible that in the low uncertainty conditions the relative uncertainty level was so low that subjects were "bored" by the presentations. And, since they knew ahead of time that the stimuli were of short duration, they made little effort to engage in exploratory behavior to overcome their boredom.

It is interesting to note the differential rates of change (slopes) of the correlations in Table 3. Although no predictions were made regarding rates of change, in the time 2 high uncertainty condition low dogmatics tended to adapt faster than high dogmatics become aroused. In the low uncertainty condition, low dogmatics tended to adapt faster than high dogmatics for GSR.

Violence and Aggression

Hypothesis 5 was a main effects prediction that subjects watching violent television scenes would elicit stronger aggressive feelings than subjects watching nonviolent televisions scenes. The data rejected this hypothesis and the selected comparisons of H6 and H7.

Berkowitz (1968) and Geen (1968) have shown physiological arousal resulting from <u>stress or frustration</u> predisposes the individual toward aggression from observed aggression. [However, Berkowitz and others studying manifested aggression

usually structure the experiment so as to elicit aggressive behavior from subjects--e.g., administering electric shocks: in this experiment the setting was not structured to elicit aggressive behavior.] It was reasoned that the stimulus itself could create the physiological arousal due to the uncertainty, and this arousal would increase the strength of aggressive responses resulting from watching an aggressiveviolent scene. For both the violent and nonviolent scenes, where changes in physiological (GSR) arousal were highest, mean aggression scores were also highest. For the self-report, arousal was also greatest in the nonviolent scene where aggressive responses were strongest, but was smallest in the violent scene where aggressive responses were strongest. Thus, although the data were not significant for the hypotheses, the patterns of means tentatively indicate that arousal due to stimulus uncertainty tends to be positively related to aggressive responses. Nevertheless, a conclusion that regardless of preconditions, a stimulus can elicit its own arousal from the structure (uncertainty), and the created arousal consequently intensifies aggressive feelings from the context (violent message content) remains to be confirmed by further work.

The correlational analysis also provided a highly significant correlation between dogmatism and aggressive verbal responses. This relationship needs to be tested in an experimental design so more conclusive statements may be made about

causality. For example, the relationship provides support for the notion that high dogmatics tend to be less tolerant (of villains or "wrongs," for example) than low dogmatics. This intolerance is possibly manifested in stronger aggressive feelings. The correlation also provides additional support for the idea (c.f. Klapper, 1960) that personality differences brought to the media setting determine certain responses to violent messages.

It is of course possible that the aggression scales used, since they tap <u>attitudes</u> toward aggression, may be unrelated to the propensity to aggression. Such attitudes are long in forming during the period a child matures and could be more immune to change from short exposure to violent stimuli. At least such exposure did not change the attitudes for these male college students. What effect it has on younger children remains to be investigated.

Research Implications

It is not a clear-cut task to recommend additional research when the variables discussed are relatively untested and interacting. An established research tradition for stimulus uncertainty using recognizable stimuli does not exist; dissociation between arousal indices makes the task of finding suitable physiological indices--related to behavioral arousal--difficult.

A number of studies concerning stimulus uncertainty, including a variety of operationalizations must be completed

before results will become clearer. First, different ways of specifying stimulus uncertainty might be incorporated: rating scales instead of predictions about the outcomes could be used; subjects could be asked to predict from one shot to the next and uncertainty calculated in bits. Second, scenic variations could be shown without musical sound tracks. Third, other media effects might be systematically varied and observed.

In addition, other contextual variations of the violent scene could be studied: the significance of recognition (and learning) of behaviors, the conventionality of the scene-already alluded to as a possible major variable of influence.

This study might be replicated using the edited experimental scenes embedded into the entire length of the show and including younger children. Additional ways of obtaining indices of aggressive intent must be devised. An attitudinal survey of feelings about violence and aggression may be too insensitive to pick up small variations due to stimulus uncertainty.

The items just specified are methodological refinements necessary in adjusting the usual social scientific balance scale: tradeoff between experimentation with many variables (all possibly related) and investigating methodological tools of greater sensitivity. The concept of varying levels of stimulus uncertainty evoking arousal appears to have face validity for meaningful stimuli. However, more refined dependent measures of stimulus uncertainty effect are needed.

The research described here has lent some support to prior reports about the influence of dogmatism on the differential reaction to stimulus uncertainty. The next step is to test dogmatism in an experimental design and make more powerful conclusions about the relationship of meaningful stimulus uncertainty in communication events to dogmatism.

On a theoretical level, the relationships between perception (and possibly understanding) of communication events and stimulus/response uncertainty seems worth investigating and defining. Correlational data indicated that when perceived predictability was judged high, violence and aggression of the stimulus were also perceived high (r=.45). This relationship, whatever its ultimate causal direction, might indicate a "list" of attributes (like an information processing list) connected to stimulus uncertainty that are rated in the same manner stimulus uncertainty is perceived. For example, if stimulus uncertainty is perceived high, then the communication event is complex, or ambiguous, or channel overlead is taking place, but is the communication source consequently perceived more intelligent, informed, or more credible? In the case of human communication, what is the threshold uncertainty level that dictates approach or avoidance of the communication transaction?

Finally, do the correlational indications of perceptual relationships suggest that when predictability is low, and thus the violent act is unpredictable, that it will be rated

less violent (regardless of its violent content) because individuals consider it implausible and thus unrealistic?

The implications of a combining of differential component effects from messages provide far reaching research paths for communication researchers. Research by Driscoll, Lanzetta and associates (1964; 1965; 1966) is one possible direction: they have studied information search behavior and found it to be a monotonic function of uncertainty. This suggests that an optimum communication strategy calls for structuring a message with a specified amount of uncertainty for the effects desired. The degree of that uncertainty needs yet to be The interaction effects of structure and content determined. need to be ascertained. For example, in some instances it could be desirable to increase message uncertainty to the point that consequent arousal becomes so high as to inhibit rather than facilitate any contextual effect. In cases where arousal is pleasing to the individual the uncertainty effect may not interact with contextual cues. Or, if reduction of uncertainty--information processing--is related to intelligence then why not determine the uncertainty level that would give a message greatest impact, regardless of content, on the less intelligent, the urban poor, or even peasants?

The idea that the structure of a message has affect in terms of arousal and information search provides theoretical and methodological support for a communication research approach that is content free. It will be interesting to observe whether message strategies based on structural components are culturally bound.
Additional research on information processing and somatic arousal, when coupled to television viewing behavior, may yield important findings not only for social scientists studying mass communication, but also for those investigating psychophysiology and information processing.

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APPENDICES

APPENDIX A

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SEQUENCE OF SHOTS IN EXPERIMENTAL STIMULI

Description of shots in Gunsmoke scene.

- T1 1. Matt nods his head to Kitty and walks of out door.
 - 2. Marshal (Matt Dillon) walks out of saloon.
 - 3. Pan to villain standing at opposite end of the street.
 - *4. Villain signals gunman on a balcony.
 - *5. Sheriff in his office with 2nd gunman (at window with rifle) discussing Sheriff's dead father.
 - 6. Villain shouts: "Marshal!"
 - 7. Marshal walks toward villain, villain greets him.
 - 8. Villain states he wants to talk to Marshal about grazing fees and water rights; shot of Marshall's face.
 - 9. Villain states "I've always operated on pure reason" while camera is on Kitty coming out of saloon, looking around.
 - *10. Sheriff to 2nd gunman: "Ambush doesn't bother you Lok?" Second gunman: "No, but you're beginning to." During last line Marshal comes into view of Sheriff's office window.
 - 11. Marshal asks villain what point he's trying to make.
 - 12. Villain answers he always tries to make everybody happy.
 - 13. Close-up of Marshal: "You're a fraud, Steiffer!"
 - *14. Second gunman in Sheriff's office lowers rifle at Marshal.
 - 15. Villain: "I don't know how you can say that Marshal."
 - *16. Villain lifts his hat in signal to 1st gunman on balcony.
 - 17. Shot of Kitty looking suspicious; barmaid comes into view behind her.
 - *18. Balcony gunman stands up.
- T2 19. Kitty shouts: "Matt, behind you on the balcony."
 - 20. Marshal turns around, shoots balcony gunman.
 - 21. Sheriff clubs 2nd gunman on head from behind before he can fire.
 - 22. Sheriff walks out to Marshal.
 - 23. Marshal stares at Sheriff; villain looks frightened.
 - 24. Sheriff says "Do me a favor Marshal, let me take care of him."

^{*}Deleted in high uncertainty version.

- 25. Marshal nods; barmaid smiles.
- 26. Villain says: "You'll be sorry for this, John."
- 27. Sheriff: "Oh no, I won't" and leads villain into the jail.

Description of shots in Then Came Bronson scene.

<u>T1</u> 1.	Two Indians with motorcycle parts strapped around shoulders ride into shot on motorcycles; in the background Bronson is surrounded by a motorcycle gang.
2.	First Indian gets off cycle, walks toward gang.
#3.	First Indian stops half way; backs up with frightened look on face.
#4.	Pan of 5 "tough-looking" faces of motorcycle gang.
#5.	First Indian to 2nd Indian: "I guess he told them."
# 6.	Shot of gang and Bronson with gang member standing at Bronson's motorcycle.
#7.	Second Indian to 1st Indian: "I think we've had it."
*8.	Indian chief sitting near gang laughing in reaction to firght of two other Indians.
*9.	First and 2nd Indian wave to Bronson.
*10.	Bronson motions to the two Indians to come over.
11.	The two Indians walk toward Bronson apprehensively.
12.	Bronson: "I just want you guys to know you do good work."
13.	Shot of Indians' faces: slight apprehensive grimace.
14.	Gang member standing next to Bronson: "Aren't those your parts?" Bronson: "You bet."
15.	Shot of all four standing around motorcycle. Hold shot.
<u>T2</u> 16.	First Indian beckons Bronson away from cycle and others.
17.	Bronson to the others: "Excuse me a moment."
18.	Bronson walks toward lst Indian; they both crouch. First Indian: "We'll put them back, honest."
19.	Bronson: "Oh no, not a chance."
20.	Bronson walks back to cycle: "No, I'm gonna race it just the way it is." Hold shot.
21.	Indians look at each other, pause, drop their parts.
22.	Indians walk back to their cycles, begin to tinker with rear wheels.

#Deleted in low uncertainty version.

*Deleted in high uncertainty version.

APPENDIX B

PRE-EXPERIMENTAL QUESTIONNAIRE

UIV STUDY DATA SHEET

The following items are questions about yourself and your television viewing behavior. Please fill out the information as accurately as possible.

1. Name:

2. Phone:

- 3. Age: 4. Class: (circle one) Freshman Sophomore Junior Senior
 - 5. Do you live: (circle one) in a dormitory off-campus

- 6. When you were in high school approximately how many hours per day did you watch television? Ans._____
- 7. Approximately how many hours per day do you now watch television during an average week? Ans._____

Please continue on to the next page.

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The following statements have been offered by people as their opinion on several topics. You may find yourself agreeing strongly with some of the statements...disagreeing just as strongly with others...and perhaps uncertain about others. Whether you agree or disagree with any statement, you can be sure many others feel the same as you do.

We want your <u>personal</u> opinion on each statement. For the statements below--

write in the answer blank a "l" if you <u>disagree very much</u> "2" if you <u>disagree on the whole</u> "3" if you <u>disagree a little</u> "4" if you <u>agree a little</u> "5" if you <u>agree on the whole</u> "6" if you <u>agree very much</u> "0" if you <u>don't know the answer</u>

1.	In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.	Ans
2.	My blood boils whenever a person stubbornly refuses to admit he's wrong.	Ans
3.	There are two kinds of people in this world; those who are for the truth and those who are against the truth.	Ans
4.	Most people just don't know what's good for them.	Ans
5.	Of all the different philosophies which exist in this world there is probably one which is correct.	Ans
6.	The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.	Ans
7.	The main thing in life is for a person to want to do something important.	Ans
8.	I'd like it if I could find someone who would tell me how to solve my personal problems.	Ans
9.	Most of the ideas which get printed nowadays aren't worth the paper they are printed on.	Ans.

page 3/UIV

10.	Man on his own is a helpless and miserable creature.	Ans
11.	It is only when a person devotes himself to an ideal or cause that life becomes meaningful.	Ans
12.	Most people just don't give a damn for others.	Ans
13	To compromise with our political opponents is dangerous because it usually leadstto the betrayal of our own side.	Ans
14.	It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.	Ans
15.	The present is all too often full of unhappiness. It is only the future that counts.	Ans.
16.	The United States and Russia have just about nothing in common.	Ans
17.	In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.	Ans
18.	While I don't like to admit this even to myself, my secret ambition is to become a great man, like Einstein, or Beethoven, or Shakespeare.	Ans
19.	Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict freedom of certain political groups.	Ans
20.	It is better to be a dead here than to be a live coward.	Ans

Thank you.

APPENDIX C

25

INSTRUCTIONS READ TO SUBJECTS

Before I begin reading the instructions I want to assure you that at no time will you receive electric shock.

We are interested in measuring your physiological response to a television scene. The pickups on your right hand measure the galvanic skin response which is basically a reaction of your sweat glands; the pickups on your arms measure changes in your heart-rate. Because the accurate recording of these various measures involves very small signals, it is important for you to remain as still as possible--especially your arms and hands--so please try to get comfortable before the experiment begins.

Shortly after I return to the equipment room you will be presented with the television scene. However, before playing the first scene it will take 5 minutes to adjust the equipment; also after showing you the television scene there will be a 2-minute pause before I come back into the room to unhook you. In other words, before and after the scene you are going to see, there will be 5 and 2 minutes of "waiting time." It is very important to remain as still as possible during the entire procedure---especially your arms, hands, and leg.

Any questions before we begin? Remember to remain as still as possible.

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APPENDIX D

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AGGRESSION SCALE AND POST-EXPERIMENTAL QUESTIONNAIRE

Here are a number of statements. Some people agree; others disagree with them. We are interested in the extent to which you agree or disagree with each of them. For these statements please mark in the box provided a:

"1" if you strongly disagree
"2" if you disagree
"3" if you neither agree or disagree
"4" if you agree
"5" if you strongly agree

We are interested in your first response--do not dwell too long on any one item.

- 1. Football would be a better game if you could be sure that nobody would get tough and mean.
- 2. You have to stand up for your rights--even to the extent of fighting---if you want to get along in the world.
- 3. I often do things which I regret afterward.
- 4. There is too much fighting and arguing shown on TV.
- 5. It's perfectly natural to want to fight sometimes.
- 6. I never say mean things to hurt other people.
- 7. I don't see anything especially wrong about a fight between two gangs of teenagers.
- 8. I lose my temper easily.
- 9. Whoever insults me or my family is asking for a fight.
- 10. The best way to deal with someone who keeps bothering you is to rough him up a little.
- 11. It's okay with me if two of my friends get into a fight.

You were shown one television scene. The next set of items are scales which you are being asked to fill out to indicate how you personally feel about the scene just shown. The following example should help you in marking these scales. A typical scale looks like this:

Fair			·	د ۱		:	Unfair
very	fair	somewhat	half &	somewhat	unfair	very	
fair		f air	half	unfair		unfair	

You would place a mark (X) above the words that <u>MOST CLOSELY</u> represented your feelings.

The scene you just saw was:

Dynamic		:	::		:	:	:	Passive
	very dynamic	dynamic	somewhat dynamic	half & half	somewhat passive	passive	very passive	-
Non-		:	::		:	I	:	Aggres-
Agg ressive	very non-ag- gressive	non-ag- gressive	somewhat non-ag- gressive	half & half	somewhat aggres- sive	aggres- sive	very aggres- sive	sive
Violent		:	::		:		:	_Non-
	very violent	violent	somewhat violent	half & half	somewhat non- violent	non- violent	very non- violent	violent

The sequence of events in the scene was:

 Predictable
 :
 :
 :
 Unpre

 very
 predict- somewhat
 half & somewhat
 unpre very
 dictable

 predict- able
 predict- half
 unpre dictable
 unpre

 able
 able
 dictable
 dictable

While watching the scene how did you feel:

Anxiou	S	:	::		::		:	Calm
	very anxious	anxious	somewhat anxious	half & half	somewhat calm	calm	very calm	_
Relaxe	very relaxed	: relaxed	:: somewhat relaxed	half & half	:: somewhat aroused	aroused	very aroused	Aroused

