

## Role of Cognitive–Emotional Mediators and Individual Differences in the Effects of Media Violence on Aggression

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Two experiments were conducted to test the hypothesis that observation of media violence elicits thoughts and emotional responses related to aggression. In Experiment 1, highly violent videotapes elicited more aggressive cognitions than did a less violent tape. This effect was moderated by the trait of stimulus screening. In Experiment 2, aggressive cognitions increased with the level of violence in the videotape, and physical assaultiveness influenced this effect. Hostility and systolic blood pressure were higher in response to the most violent video than in response to the other two. Hostility was influenced by emotional susceptibility and dissipation–rumination, and systolic blood pressure was influenced by emotional susceptibility and assaultiveness.

The study of violence in the mass media, especially with regard to the effects that viewing such violence may have on behavior, continues to generate interest among psychologists after almost three decades (e.g., Huesmann & Malamuth, 1986). Despite considerable evidence that viewing violence may, under some circumstances, facilitate the emission of aggression, theoretical explanations for such findings have tended to be limited and inconclusive (Geen & Thomas, 1986). For example, the most popular theory at present appears to be based on disinhibitory processes: Observation of stimuli associated with violence somehow reduces inhibitions against the aggression that would otherwise be elicited by other features of the situation, such as interpersonal provocation or conflict. Although this explanation probably accounts for some media-related aggression, it fails to stipulate exactly what constitutes “disinhibition.” At any rate, explaining the effects of media violence in terms of reduced inhibition alone requires ruling out the possibility of any active role played by such stimuli in aggression.

In recent years, two alternative explanations for the effects of observing media violence have been proposed. In both, it is assumed that the stimuli thus observed play an active role in enacting certain cognitive processes that eventuate in aggres-

sion. Huesmann (1986) suggested that, when children observe violence in the mass media, they learn aggressive scripts for social behavior. Once a script has been learned, it may be retrieved at some later time as a guide for behavior, such as in situations of interpersonal conflict that closely resemble conflicts seen in the media presentation. A line of reasoning similar to that of Huesmann was followed by Berkowitz (1984), according to whom “the aggressive ideas suggested by a violent movie can prime other semantically related thoughts, heightening the chances that viewers will have other aggressive ideas in this period” (p. 411). In addition, thoughts are linked, along the same sort of associative lines, to emotional reactions and behavioral tendencies (Bower, 1981; Lang, 1979). Thus, observation of movie violence can engender a complex of associations consisting of aggressive ideas, emotions related to violence, and the impetus for aggressive actions.

To date, only a few studies have been designed as direct tests of the notion of cognitive priming of associative networks related to aggression (Berkowitz & Heimer, 1989; Rule, Taylor, & Dobbs, 1987). Furthermore, even though these studies have reported findings that support the hypothesis, none have involved the use of aggressive presentations of media stimuli. Thus, the idea advanced by Berkowitz (1984) on the role of such stimuli as primes for aggressive thoughts and feelings remains untested.<sup>1</sup> The major purpose of the studies reported in this article was to test that idea.

Our studies were also motivated by a secondary interest. Among the many issues raised by research on the effects of media violence, one that has received relatively little attention is that of the possible moderating role played by individual differences. This lack of emphasis is surprising, not only because of the overall interest in individual differences now current in the

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<sup>1</sup> It should be emphasized that Berkowitz’s theory, and research designed to test it, pertains to what is commonly called *affective* aggression (i.e., aggression that is animated, or accompanied, by an emotional state and that is largely reactive in nature). This theory may not be applicable to instrumental aggression. See Geen (1989) for a discussion of this distinction.

field but also because of the allegation, often made by persons associated with the mass media, that observed violence affects the behavior of only certain persons who are highly aggressive by nature. In the two experiments reported herein, we attempted to find whether certain personality variables served as moderators of the cognitive and affective processes predicted by the cognitive-neoassociationist model.

The lack of interest in personality as a variable in media-related aggression can be attributed to several causes. One is lack of agreement on means of assessing aggressiveness. Although this disposition seems to be measurable, none of the scales purported to do so have been widely accepted as valid (Edmunds & Kendrick, 1980). Another reason has been the tendency of social psychologists to place a relatively greater emphasis on situational determinants of aggression than on stable characteristics of persons. Still another has been the absence, until recently, of coherent theories of media-elicited aggression within which personality constructs can be embedded. Although numerous theories have been available (e.g., Bandura, 1973; Berkowitz, 1974; Zillmann, 1979), none have specifically addressed the role of personality, nor have any suggested clearly which personality variables might moderate the situational effects being described.

Some recent developments indicate, however, that the study of personality factors in media-related aggression may now be feasible. Aggressive tendencies over time and situations have been shown to be more stable than was previously believed (e.g., Huesmann, Eron, Lefkowitz, & Walder, 1984; Olweus, 1979). In addition, Caprara and his associates have produced a set of scales that appear to have some power and validity for assessing traits related to aggressive behavior. One such scale measures *irritability*, defined as the "tendency to react impulsively, controversially or rudely at the slightest provocation or disagreement" (Caprara, Cinanni, D'Imperio, Passerini, Renzi, & Travaglia, 1985, p. 667). Irritability has been shown to be a moderator of aggressive reactions to disparaging or insulting remarks from another person (Caprara & Renzi, 1981; Caprara, Renzi, Alcini, D'Imperio, & Travaglia, 1983; Caprara, Renzi, Amolini, D'Imperio, & Travaglia, 1984; Caprara, Renzi, D'Augello, D'Imperio, Rielli, & Travaglia, 1986).

A second trait variable, *emotional susceptibility*, is defined as the tendency to "experience feelings of discomfort, helplessness, inadequacy and vulnerability" (Caprara et al., 1985, p. 667). Persons who score high on this scale have been found to be more aggressive than low scorers, but the variable does not interact with provocation, as does irritability (Caprara, 1982; Caprara et al., 1983, 1986). Emotional susceptibility may reflect a generalized tendency to experience negative affect, which can be an antecedent of aggression in and of itself (Berkowitz, 1983; Berkowitz, Cochran, & Embree, 1981). A third variable, *dissipation-rumination*, describes individual differences in tendencies to "harbor and even to enhance, with the passing of time, feelings and desires of vengeance" (Caprara, 1986, p. 765). Although less research has been conducted on this variable than on the other two, the results from two studies have shown that persons who are low dissipators-high ruminators are more verbally hostile following an insult than are similarly insulted high dissipators-low ruminators (Caprara, 1986).

Berkowitz's (1984) associationist theory is especially suitable

as a scheme into which personality variables can be assimilated. Individual differences in aggressiveness, as measured by self-report inventories, are a reflection of past instances of aggressive acts, thoughts, motives, and emotions as the individual recalls them. They are therefore rooted in the network of associations that provides the basis for the priming function of violent stimuli. We predict, therefore, that individual differences in aggressiveness interact with the presence of violent stimuli in the elicitation of related aggressive thoughts, emotional states, and action tendencies. Highly aggressive people should manifest all of these responses to violent cues more than less aggressive people.

A study reported by Josephson (1987) was designed in part to test the role of individual differences in the priming process. The context of the study was a game of field hockey played by young boys, some of whom, prior to the game, had seen a display of violence on television. Some of the boys were then interviewed by people who carried walkie-talkies, an instrument that had been carried by the aggressors in the program just seen. Josephson predicted that boys who had seen the violent video and who then later saw a walkie-talkie would be more aggressive than those who saw the violent movie but not the walkie-talkie. Josephson reasoned that the walkie-talkie, which had been associated with violence in the video, would serve as a cue to prime other aggressive thoughts and emotions, in the way described by Berkowitz (1984). This prediction was supported, but only among highly aggressive boys. This finding is not surprising if we consider that highly aggressive boys possess a relatively large network of aggressive associations that can be activated by a cue.

### Experiment 1

A more direct test of Berkowitz's (1984) point of view, as well as of its extension to the study of individual differences in aggressiveness, requires a demonstration of individual differences in cognitive and emotional reactions to observed displays of violence. Included in such a demonstration must be an assessment of the thoughts and emotional reactions that subjects experience while watching violence. The two experiments reported herein represent attempts at such direct assessment. In the first, subjects were shown either a nonviolent videotape or a tape showing one of several predetermined levels of violence. Subjects were then instructed to list the thoughts that they could recall having as they watched the tape and, finally, to rate the scene they had witnessed on a number of dimensions, including a violence dimension. Several personality variables were assessed by means of a self-report questionnaire filled out by each subject during the laboratory session. The questionnaire included scales assessing trait variables related to aggressiveness and stimulus sensitivity. The influence of each of the trait variables on both number of aggressive thoughts and violence ratings of the videotape was tested using multiple regression analysis.

### Method

#### Subjects

Fifty men and 50 women served as subjects; all were undergraduate psychology students who participated to earn class credit. Ten subjects

of each sex were randomly assigned to see one of five videotapes that varied in violent content.

### Videotapes

Five tapes, each approximately 10 min in length, were selected from a number of tapes in the authors' laboratory and scaled for violence level prior to the experiment. Each tape had been recorded from either a commercial or cable television channel. Eighty subjects drawn from the same population as those who would later serve in the experiment acted as judges. Scaling was by the method of paired comparisons (Guilford, 1954). A constant was added to the standardized scale value of each tape so that the one rated most violent attained a scale score of 10.00. The five tapes, with their respective scale scores, were segments of the following movies or programs.

*The Vigilante* (10.00). A group of drug dealers mercilessly kill or maim those who resist or frustrate them, often in a gross and excessive way (e.g., with machine guns).

*48 Hours* (9.21). Several gun battles are shown, some in slow motion, with vivid details of the physical effects of the bullets.

*The French Connection* (8.54). A police officer pursues a murderer in a high-speed chase during which the murderer kills another person. The scene ends with the policeman shooting the killer dead. The shootings are not portrayed in an especially graphic way.

*Soylent Green* (8.18). A man attempts to evade several armed men who are chasing him. Fistfights and struggles involving guns and knives are shown, but the physical aspects of violence are not heavily emphasized.

*"Dallas"* (5.26). In a scene containing no physical violence, several members of a family discuss business and a forthcoming wedding.

### Personality Variables

The personality questionnaire consisted of the following scales:

1. Irritability (Caprara et al., 1985). The scale contains 20 items along with a 6-point Likert-type scale for each item ranging from 5 (*completely true for me*) to 0 (*completely false for me*). The coefficient alpha for the scale is .81, the split-half correlation is .90, and the test-retest correlation is .83.<sup>2</sup>

2. Assault and Verbal Hostility (Buss & Durkee, 1957). Buss (1961) described the Assault and Verbal Hostility subscales as indicators of active direct aggressiveness. Bendig (1962), in a factor-analytic study of the inventory, found a factor of Overt Hostility, which contained primarily Assault and Verbal Hostility items. The Assault scale contains 10 true/false items, and the Verbal Hostility scale contains 13 true/false items. The test-retest correlations for the Assault and Verbal Hostility scales are .78 and .72, respectively.

3. Stimulus Screening (Mehrabian, 1976). This 40-item scale was included to assess any tendencies on the subject's part to defend against stimulation arising from the videotape by engaging in selective attention. High screeners might, by blocking out stimuli, prevent or restrict the activation of associated networks. Each item on the Stimulus Screening scale is rated along a 9-point Likert scale ranging from +4 (*very strong agreement*) to -4 (*very strong disagreement*). The Kuder-Richardson reliability coefficient for the scale is .92.

### Dependent Variables

The main dependent variable in the experiment was the number of aggressive thoughts listed by the subject immediately after observation of the videotape (Cacioppo & Petty, 1981). Each subject was told to "record only those ideas that you were thinking about while watching the television segment." The subject was also instructed to express each idea as briefly as possible and not to bother with grammar or spelling.

Three minutes were allowed for this procedure. A cover sheet explained that the thought-listing questionnaire was part of a study on evaluation of the mass media being conducted jointly with the School of Journalism.

A second dependent variable was the subject's violence rating of the videotape. Immediately after completing the thought-listing procedure, each subject filled out a set of 5-point rating scales indicating the degree to which the videotape had been enjoyable, amusing, realistic, and violent. A number of additional ratings were added as fillers (e.g., whether the subject thought the film should be shown on television). This measure was included because findings of a previous study (Geen, 1985) indicated that ratings of movie violence were affected by personality variables associated with aggressiveness.

### Procedure

Subjects participated in groups of 5 persons or fewer. The size of the group did not influence either the number of aggressive thoughts listed or the violence ratings. Participants were seated in cubicles constructed so that no subject could have verbal or visual contact with the others. Each subject could see the television monitor clearly from his or her cubicle. As already noted, the study was described as one on media evaluation. After consent was obtained, half of the subjects filled out the personality questionnaire, watched the videotape, and completed the thought-listing and rating questionnaires in that order. The other half saw the videotape first, then filled out the thought-listing, rating, and personality questionnaires in that order. In this way, the personality assessment and observation of the videotape were counterbalanced for order of presentation. All subjects were debriefed following the end of the session.

## Results

### Assumptions and Manipulation Checks

*Reliability of thought-listing ratings.* Two independent raters, who were blind to experimental conditions and to the hypotheses of the study, tabulated the number of aggressive thoughts listed by each subject. A violent thought was operationally defined as any word having aggressive connotations (e.g., kill, stab, hit, wound). Each rater was trained in recognition of violent or aggressive words. The coefficient of reliability between raters was highly significant,  $r(98) = .87, p < .0001$ , and ratings for each subject were accordingly averaged.

*Nonviolent thoughts.* The incidence of nonviolent thoughts elicited by each video was analyzed in order to discover possible effects of the videos on generalized arousal. It was assumed that if the effects of the videos was merely to produce differing levels of excitement or arousal, then this should have led to differential energization of both violent and nonviolent thoughts. An analysis of variance (ANOVA) revealed no significant difference in the number of nonviolent thoughts listed across the five videotape conditions,  $F = 0.50$ . In addition, none of the personality variables significantly influenced nonviolent thoughts.

*Violent thought transformation.* Because subjects who viewed the segment from "Dallas" rarely listed any aggressive thoughts, the constant variance assumption was violated. A

<sup>2</sup> The Irritability subscale of the Hostility Inventory of Buss & Durkee (1957) was also used in Experiment 1. The results from this scale are similar to, but weaker than, the results from the Irritability scale of Caprara et al. (1985).

cube-root transformation was therefore used to stabilize the variances. The transformation was fairly successful as determined by Hartley's (1950) test for homogeneity of variances,  $F_{\max}(5, 19) = 4.5, p > .01$ . All analyses of violent thoughts were based on the transformed data.

*Order of presentation.* An ANOVA was used to determine whether the order in which observation of the video and response to the personality questionnaire influenced the emission of aggressive thoughts and ratings of violence. No significant effects for order of presentation were found, and the data for the two orders were combined for subsequent analyses.

*Influence of Videotape Content and Individual Differences on Violent Cognitions*

Both ratings of violence and violent thoughts were conceptually designed to measure a common construct, violent cognitions. These measures were also highly correlated,  $r(98) = .82, p < .0001$ . Therefore, multivariate multiple regression analysis was performed to assess the effects of video content, gender, and personality on both measures simultaneously. The Pillai-Bartlett trace statistic was used to test the individual terms in the multivariate regression model (cf. Olson, 1976). Separate univariate regression models were then fitted for aggressive thoughts and violence ratings. Although no single practice is generally accepted for examining interaction terms in multiple regression analysis, some researchers advocate the use of the deviation of a raw score from its mean rather than the raw score itself (e.g., Cronbach, 1987; Kenny, 1985). This was the procedure used in the present analysis. Initially, all predictor variables were included in the model. Also included were two- and three-way interactions between individual differences and videotapes. Variance inflation factors were used to determine the influence of multicollinearity on the least squares estimates (see Neter, Wasserman, & Kutner, 1983). Partial sums of squares were used to eliminate sequentially from the model those terms making nonsignificant unique contributions.

The multivariate regression model for violent cognitions included videotape,  $F(2, 93) = 248.55, p < .0001$ ; irritability,  $F(2, 93) = 3.32, p = .04$ ; Videotape  $\times$  Stimulus Screening,  $F(2, 93) = 3.46, p = .036$ ; and Videotape  $\times$  Gender  $\times$  Stimulus Screening,  $F(2, 93) = 4.44, p = .01$ . Predetermined video scale scores and irritability scores were positively correlated with violent cognitions. The interaction between videotape content and stimulus screening showed that violent cognitions decreased as the tendency to screen out stimuli increased, especially in the moderately violent videotape conditions. The Videotape  $\times$  Stimulus Screening interaction was moderated by gender such that the negative relationship between stimulus screening and violent cognitions was stronger for men than for women.

In the univariate regression model for aggressive thoughts, the best linear combination of terms was as follows: videotape,  $t(95) = 17.38, p < .0001$ ; irritability,  $t(95) = 2.42, p = .017$ ; and Videotape  $\times$  Stimulus Screening,  $t(95) = -2.34, p = .021$ . This model explained 80% of the variability in aggressive thoughts. Predetermined video scale scores were positively correlated with the number of violent thoughts listed (see Table 1). In addition, violent thoughts increased as the degree of irritability increased. Finally, videotape content and differences in the ten-

Table 1  
*Influence of Videotape Content on Mean Number of Aggressive Thoughts and Mean Violence Ratings in Experiment 1*

Videotape	Aggressive thoughts	Violence ratings
<i>The Vigilante</i>	1.60	4.95
<i>48 Hours</i>	1.33	4.85
<i>The French Connection</i>	1.22	4.40
<i>Soylent Green</i>	1.33	4.70
"Dallas"	0.05	1.45

*Note.* Aggressive thoughts have been transformed by means of a cube-root transformation. Violence ratings were made on a 5-point scale, where 1 = not at all and 5 = very much.

dency to defend against stimulation jointly influenced violent thoughts. This interaction can be largely attributed to the negative relationship between stimulus screening scores and aggressive thoughts in the *48 Hours* videotape condition,  $t(18) = -3.28, p < .005$ .

Videotape content was also a significant factor in the univariate regression model for violence ratings,  $t(96) = 18.80, p < .0001$ . As expected, video scale scores and ratings of violence were positively correlated (see Table 1). Violence ratings decreased as the tendency to screen out stimuli increased,  $t(96) = -2.65, p < .009$ . Finally, there was a three-way interaction between videotape content, gender, and stimulus screening,  $t(96) = 2.55, p = .013$ . For men who saw the moderately violent videotapes, the tendency to screen out stimuli was negatively correlated with violence ratings. For women, individual level of screening did not influence ratings of violence. A linear combination of these terms accounted for 79% of the variability in violence ratings.

*Discussion*

Experiment 1 represented an initial attempt to learn whether people who have been exposed to televised violence are more likely to form cognitions related to aggression than people who are not so exposed and, furthermore, whether this tendency to form violent cognitions is moderated by personality variables. The results of the experiment provide some support for both ideas. Aggressive thoughts and violence ratings both increased with the level of violence in the videotape. These findings are consistent with Berkowitz's hypothesis that observation of violence elicits thoughts related to aggression.

The personality variable that played the most important moderating role in the elicitation of aggressive cognitions was stimulus screening. The observation of an aggressive scene elicited fewer violent cognitions in high screeners than in low screeners. It is possible that high screeners prevent or restrict the activation of aggressive associated networks by blocking out violent stimuli. It is also worth noting that individual differences in the tendency to screen out stimuli had their strongest impact in the moderately violent videotape conditions.

Experiment 2

The model being tested in this study predicts that observation of media violence primes the observer for aggressive behavior

by eliciting both aggression-related cognitions and emotions or mood states that are associatively linked to those cognitions. Experiment 2 was designed to include indicators of aggressive emotionality: self-reported hostility, blood pressure, and pulse rate. In addition, Experiment 2 allowed a test of the replicability of the findings of Experiment 1 by including ratings of videotape violence and listing of thoughts following observation of the tapes.

The present experiment differed from Experiment 1 in some additional respects. Only three videotapes were used: *48 Hours*, *Soylent Green*, and "Dallas." The same personality variables assessed in Experiment 1 were again measured along with two additional ones: emotional susceptibility (Caprara et al., 1985) and dissipation-rumination (Caprara, 1986).<sup>3</sup> These two scales were included because of their theoretical relevance to aggressive emotionality. The personality measures were administered to several introductory psychology classes prior to the experiment. Subjects were blocked into high versus low scorers on the Emotional Susceptibility scale (highest 25% vs. lowest 25%) but sampled at random on all other measures. Finally, subjects were asked to indicate how much time in each week they spent watching television and what percentage of this time was spent viewing situation comedies, game shows, news, soap operas, sporting events, and violent drama. The percentage of time spent watching violent drama was included to provide a means of assessing possible desensitization to violence among habitual viewers of televised aggression (e.g., Cline, Croft, & Courier, 1973; Thomas, Horton, Lippincott, & Drabman, 1977).

### Method

#### Subjects and Design

From a pool of 586 students who completed the personality scales in mass-testing sessions, 60 persons (30 men and 30 women) who scored above the 75th percentile on the Emotional Susceptibility scale and 60 who scored below the 25th percentile were contacted and scheduled as experimental subjects. The design of the study was factorial, with variables of gender, emotional susceptibility (high vs. low), videotape (*48 Hours*, *Soylent Green*, "Dallas"), and measurement time (i.e., physiological measures taken before, during, and after the showing of the videotape). The latter involved repeated measures.

#### Materials and Apparatus

An adjective checklist was administered both before and after the showing of the videotape. This consisted of the Hostility subscale of the revised Multiple Affect Adjective Checklist (Zuckerman & Lubin, 1985), with two other items from each of the other four subscales added as fillers, along with one adjective ("aggressive") from the Sensation Seeking subscale. The state version of the checklist was used. The subject's level of hostility was defined as the number of hostile adjectives, including "aggressive," that were endorsed as self-descriptors.

Blood pressure and pulse rate were measured by means of a *Marshall Medical Astropulse 90* automatic digital sphygmomanometer. This instrument was fitted with long tubes for cuff inflation and transmission of Korotkov sounds to the recorder, thereby allowing the experimenter to remain out of sight of the subject.

#### Procedure

Each subject was tested individually in a small cubicle. The procedure was essentially the same as that used in Experiment 1 except for the

following additions. Just prior to observing a videotape, the subject was given the adjective checklist, and baseline blood pressure and pulse rate were measured. During the showing of the tape, blood pressure and pulse rate were measured three times, at 2-min intervals. The mean of these three readings constituted the average level of physiological indicators during observation of the videotape. After viewing the videotape, the subject listed his or her thoughts, rated the video, provided information about television viewing habits, and completed a second adjective checklist. Finally, a posttreatment blood pressure and pulse rate assessment was made, after which the subject was debriefed and dismissed.

### Results

#### Assumptions and Manipulation Checks

*Random assignment check.* An ANOVA was performed to determine whether subjects who differed in levels of emotional susceptibility were evenly distributed across the three videotape conditions. This analysis revealed that the random assignment of emotionally susceptible and nonsusceptible subjects to experimental conditions was successful,  $F = 0.02$ .

*Reliability of thought-listing ratings.* Two independent raters counted the number of violent thoughts listed by each subject. Interrater reliability was highly significant,  $r(118) = .82$ . Results were therefore averaged across the two raters.

*Nonviolent thoughts.* As in Experiment 1, an ANOVA was used to determine whether videotape content influenced the number of nonaggressive thoughts listed. This analysis showed no difference across tapes in the number of nonviolent thoughts,  $F = 0.82$ .

*Violent thought transformation.* Because subjects rarely listed aggressive thoughts after viewing the segment from "Dallas," the variance in this condition was much smaller than the variances in the other videotape conditions. A cube-root transformation was therefore used to educe homogeneity. The transformation was fairly successful as determined by Hartley's statistic,  $F_{\max}(3, 39) = 2.7, p > .01$ . All analyses of violent thoughts were based on the transformed data.

#### Influence of Videotape Content and Individual Differences on Violent Cognitions

Multivariate regression analysis was used to examine simultaneously the effects of videotape content, gender, personality, and habitual exposure to televised violence on the number of aggressive thoughts listed and ratings of videotape violence. The correlation between aggressive thoughts and violence ratings was highly significant,  $r(118) = .77, p < .0001$ . The multivariate regression model for violent cognitions included videotape,  $F(2, 115) = 335.36, p < .0001$ ; emotional susceptibility,  $F(2, 115) = 3.49, p = .034$ ; and gender,  $F(2, 115) = 3.25, p = .042$ . Predetermined video scale scores and emotional susceptibility

<sup>3</sup> The Emotional Susceptibility scale contains 30 items that are scored using a 6-point Likert-type scale. The coefficient alpha for the scale is .88, the split-half correlation is .94, and the test-retest correlation is .84. The Dissipation-Rumination scale contains 15 items that are also scored using a 6-point Likert-type scale. The coefficient alpha for the scale is .87, the split-half correlation is .91, and the test-retest correlation is .81.

Table 2  
*Influence of Videotape Content on Mean Number of Aggressive Thoughts and Mean Violence Ratings in Experiment 2*

Videotape	Aggressive thoughts	Violence ratings
48 Hours	1.21	8.73
Soylent Green	1.04	7.28
"Dallas"	0.17	1.50

Note. Aggressive thoughts have been transformed by means of a cube-root transformation. Violence ratings were made on a 9-point scale, where 1 = not at all and 9 = very much.

scores were positively correlated with violent cognitions. In addition, violent cognitions were higher for women than for men in all three videotape conditions.

The univariate regression analysis for aggressive thoughts found a main effect for videotape,  $t(117) = 9.04, p < .0001$ . Video scale scores and aggressive thoughts were positively correlated (see Table 2). The analysis also found a significant Videotape  $\times$  Gender  $\times$  Assault interaction,  $t(117) = -2.12, p = .036$ . There was a positive relationship between physical assaultiveness and aggressive thoughts in the *Soylent Green* videotape condition for men but not for women. The regression model accounted for 55% of the variability in the number of aggressive thoughts listed.

In the univariate regression model for violence ratings, videotape,  $t(114) = 26.35, p < .0001$ ; emotional susceptibility,  $t(114) = 3.05, p = .0028$ ; gender,  $t(114) = 3.00, p = .0033$ ; assault,  $t(114) = 2.09, p = .039$ ; and irritability,  $t(114) = -2.03, p = .045$ , were significant predictor variables. Predetermined scale values for video violence were positively related to obtained violence ratings for the same tapes (see Table 2). In addition, both those who were emotionally susceptible and those who were physically assaultive gave higher ratings of violence than did their counterparts who scored low on these dimensions. Surprisingly, the Caprara et al. (1985) measure of irritability was negatively related to judgments of violence. A linear combination of these terms explained 86% of the variability in violence ratings.

*Influence of Videotape Content and Individual Differences on Aggressive Emotionality*

*Self-reported hostility.* Univariate multiple regression analysis was used to analyze the number of hostile adjectives endorsed after the showing of the videotape. To control for baseline differences, the number of hostile adjectives endorsed before the showing of the videotape was included in the regression model. The analysis found a reliable effect for stimulus screening,  $t(116) = -2.61, p = .01$ , and a trend for Videotape  $\times$  Emotional Susceptibility  $\times$  Dissipation-Rumination,  $t(116) = 1.69, p = .094$ . There was a negative relationship between tendencies to screen out stimuli and amount of hostility reported after the viewing of the videotape. The three-way interaction showed that the 48 Hours videotape elicited more hostile feelings from subjects than the *Soylent Green* and "Dallas" videotapes. In the 48 Hours videotape condition, the subjects who reported feeling

most hostile were those who had high scores on the emotional susceptibility and rumination scales.

*Blood pressure and pulse rate.* Recall that repeated cardiovascular measurements were taken on subjects in Experiment 2. Vasey and Thayer (1987) recently noted that Type I errors are more probable when repeated measures analyses are conducted due to the correlated nature of the data. Repeated measures designs carry an additional assumption known as *sphericity*, which is said to exist "if and only if the variance of all pairwise differences between repeated measures is constant" (p. 479). Vasey and Thayer advocate the use of multivariate procedures to analyze repeated measures data because such procedures do not assume sphericity. Because the sphericity assumption was violated in the present study, the cardiovascular data were analyzed by means of multivariate regression analysis.

The multivariate regression model for systolic blood pressure included gender,  $F(1, 117) = 59.52, p < .0001$ ; measurement time,  $F(2, 116) = 7.22, p = .0011$ ; and Measurement Time  $\times$  Videotape  $\times$  Emotional Susceptibility  $\times$  Assault,  $F(2, 116) = 3.61, p = .03$ . Overall, men had higher systolic blood pressures than did women. The measurement time effect is best understood in terms of the interaction. Subjects who viewed "Dallas" showed a decrease in systolic blood pressure from baseline to the during-tape measures, whereas those who saw 48 Hours showed an increase. *Soylent Green* had little effect on systolic blood pressure. Videotape content had a greater impact on emotionally susceptible subjects than on nonsusceptible subjects, especially if the former were also assaultive. There was a strong positive relationship between assaultiveness and systolic blood pressure for highly emotional subjects who watched the segment from 48 Hours,  $F(1, 18) = 8.39, p = .0096$ . The predictor variables did not significantly influence diastolic blood pressure or pulse rate.

*Relationship Between Violent Cognitions and Aggressive Emotions*

According to cognitive neoassociation theory, aggression-related thoughts and aggression-related feelings are associatively linked together in the same network. The general linear test (see Neter et al., 1983) was used to determine if aggressive emotions contributed to the prediction of violent cognitions, and vice versa. The general linear test indicates whether a full or unrestricted model explains significantly more of the variance than a reduced or restricted model. The analyses showed one trend for the aggressive thought model. The full model included the reliable stimulus effects for aggressive thoughts (i.e., Videotape, Videotape  $\times$  Gender  $\times$  Assault) and hostile mood change. Hostile mood change was calculated by subtracting the number of hostile adjectives endorsed at baseline from the number checked after the viewing of the videotape. The reduced model included only the reliable stimulus effects for aggressive thoughts. The general linear test between the full and reduced models was nearly significant,  $t(116) = 1.88, p = .063$ . Subjects who reported more hostility after viewing the videotape than before also tended to list a greater number of aggressive thoughts after viewing the video.

### Discussion

Overall, the results of Experiment 2 tend to support those of Experiment 1. Both aggressive thoughts and violence ratings increased as the violent content of the videotape increased. Furthermore, personality variables related to aggression were shown to play a moderating role in aggressive cognitions. Men who were physically assaultive had more aggressive thoughts in the *Soylent Green* condition than men who were low on this variable. An anecdotal observation made in the course of a secondary analysis suggests further the possible role of individual assaultiveness in aggression-related thoughts for men. In this analysis, statements in which subjects made self-references about enjoying the violence in the video segment were retrieved from the thought-listing data. Two of the 80 subjects who watched violent videotapes made such statements. The statements were: "At the end I would have emptied my pistol on the guy"; and "I enjoyed the violence, it made me smile. I wondered why I was in such a bad mood and this cheered me up. I thought about the fight I almost got into this weekend." These two subjects were both men who were in the upper 9% of all subjects on the Assault scale.

With regard to aggressive emotionality, the most violent of the three videos increased self-reported hostility and systolic blood pressure. Individual differences related to aggression also moderated emotional responses to the most violent video. The subjects who reported feeling most hostile after viewing this videotape were those who were emotionally susceptible and who were inclined to ruminate about past offenses. In addition, systolic blood pressure was elevated for highly emotional, assaultive persons who watched this tape.

### General Discussion

The two experiments reported in this article offer direct support for the theoretical model proposed by Berkowitz. In both experiments, violent media elicited violent cognitions. In the second experiment, violent media also evoked emotional responses related to aggression.

The findings also suggest that certain individual differences moderate cognitive and emotional responses to violent media. It is of some interest to note that in both studies, individual differences had strongest effects when videotapes of moderate violence were shown. It is possible that the moderately violent videotapes did not present either a clearly violent or clearly nonviolent message to viewers, so that individual differences were not overpowered by situational cues. This finding is similar to one reported by Dodge (1980) that individual differences in trait aggressiveness among boys were predictors of differential aggressive behavior in responses to provocation only when the circumstances of the provocation were unclear.

The reason that personality variables influenced aggressive cognitions when the violence was of intermediate intensity cannot be ascertained without further investigation. One possibility, however, is that personality has an effect on the encoding processes under conditions of stimulus ambiguity. Subjects who were either physically assaultive or inclined not to screen out stimuli may have been more likely than their respective counterparts to attribute a clear aggressive meaning to a scene that was

in fact relatively unclear in meaning. Such imputations of meaning would increase the videotape's potential as a priming stimulus for aggressive thoughts or emotional reactions. In the presence of clearly aggressive or nonaggressive scenes, however, the individual difference variables would be less important. Under these conditions, the aggressive stimulus would prime every observer in approximately the same way.

The approach taken here is representative of a current trend toward more complex explanatory models of social behavior. Markus and Zajonc (1985) recommended the development of theories that posit the interplay of informational processes and emotions related to internal cognitive structures. Markus and Zajonc also suggested that cognitive and emotional reactions to stimuli may be moderated by stable differences among individuals, arguing that these sources of variance "are not caused by random error and need to be systematically explored" (p. 211). Current work in our laboratory is in the process of exploring whether the cognitive and emotional states that are elicited by violent stimuli, and moderated by personality variables, lead to overt aggressive behavior.

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