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Moderating Role of Trait Aggressiveness in the Effects of Violent Media on Aggression

Brad J. Bushman
Iowa State University

Three studies were conducted to test the hypothesis that high trait aggressive individuals are more affected by violent media than are low trait aggressive individuals. In Study 1, participants read film descriptions and then chose a film to watch. High trait aggressive individuals were more likely to choose a violent film to watch than were low trait aggressive individuals. In Study 2, participants reported their mood before and after the showing of a violent or nonviolent videotape. High trait aggressive individuals felt more angry after viewing the violent videotape than did low trait aggressive individuals. In Study 3, participants first viewed either a violent or a nonviolent videotape and then competed with an "opponent" on a reaction time task in which the loser received a blast of unpleasant noise. Videotape violence was more likely to increase aggression in high trait aggressive individuals than in low trait aggressive individuals.

> Movie violence is like eating salt. The more you eat, the more you need to eat to taste it. People are becoming immune to its effects. That's why death counts have quadrupled and blast power is increasing by the megaton. (Alan J. Pakula, director of *All the President's Men* and *Presumed Innocent*)

It is estimated that there are more television sets in the United States than there are toilets. Ninety-eight percent of American homes have at least one television set (American Psychological Association [APA], 1993). Children in America spend more time watching television than attending school (Huston et al., 1992). Much of what is shown on television is violent. Over half of the major actors and about one third of all the actors shown on network television are involved in violent interactions (Gerbner, 1994). By the time the average child graduates from elementary school, he or she will have witnessed more than 8,000 murders and more than 100,000 other assorted acts of violence (Huston et al., 1992). The emergence of cable television and the videocassette allows even more frequent and extreme acts of aggression to be portrayed in the home.

How does this barrage of screen violence affect the behavior of the individual viewer? Media industry leaders often claim that observed violence affects the behavior of only certain individuals who are highly aggressive by nature. It is difficult to evaluate this claim, however, because researchers have largely ignored the role of personality variables in media-related aggression.

More than 20 years ago, the U.S. Surgeon General concluded that "television violence, indeed, does have an adverse effect on *certain members* of our society" (Steinfeld, 1972, p. 26, italics added). Unfortunately, we know little more now than we did then about which members of society are most adversely affected by violent media. Perhaps this is why the APA Commission on Violence and Youth offered the following recommendations for expanding basic research efforts on media-related aggression.

> We recommend that research be conducted to study how the documented effects of watching violence in the mass media are engendered in the individual viewer of media violence. Among the questions to be answered are: Who is most susceptible to these media effects? Which media effects are most likely for particular individuals?...By what mechanisms do these media effects occur? (APA, 1993, pp. 67-68)

The present research addresses these important questions.

The lack of interest in personality as a variable in media-related aggression research can be attributed to several causes. One cause has been the tendency of social psychologists to place a relatively greater emphasis on situational determinants of aggression than on stable characteristics of persons, although there have been a few notable exceptions to this tendency (e.g., Caprara et al., 1985; Dengerink, O'Leary, & Kasner, 1975; Josephson, 1987; Strube, Turner, Cerro, Stevens, & Hinchey, 1984). Another cause has been the absence, until recently, of coherent theories of aggression within which personality constructs can be embedded. Although several theories of aggression have been proposed (e.g., Bandura, 1973; Berkowitz, 1974; Zillmann, 1979), none has specifically addressed the role of personality, nor has any theory suggested clearly which personality variables might moderate the situational effects being described.

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Correspondence concerning this article should be addressed to Brad J. Bushman, Department of Psychology, Iowa State University, Ames, Iowa 50011-3180. Electronic mail may be sent via the Internet to *sl.bjb@isumvs.iastate.edu*.

Some current developments, however, indicate that the study of personality factors in media-related aggression may now be feasible. Research has shown that aggressive tendencies over time and situations are more stable than was previously thought to be the case (e.g., Huesmann, Eron, Lefkowitz, & Walder, 1984; Olweus, 1979). In addition, Berkowitz (1984) proposed a theory that is especially suitable as a scheme into which personality variables can be assimilated.

Berkowitz (1984) posited that thoughts, feelings, and action tendencies are linked together in memory, thereby forming an associative network. The *associative network*, an idea borrowed from cognitive psychology, allows meaningful relations among concepts in memory to be represented using a graph that consists of concepts and links that represent relations among concepts (Collins & Loftus, 1975). The properties of the network are such that once a concept is processed or stimulated, activation spreads out along the network links and primes (activates) associated or related concepts as well. Thus, concepts that have been primed become more accessible in memory. Berkowitz extended the idea of associative networks by proposing that "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 action tendencies (Bower, 1981; Lang, 1979). Thus, observation of media violence can engender a complex of associations consisting of aggressive ideas, emotions related to violence, and the impetus for aggressive actions.

Although Berkowitz (1984) did not discuss the role of personality traits in his model, personality traits can be easily incorporated into it (see Bushman, in press; Bushman & Geen, 1990). Individual differences in aggressiveness are generally measured by personality tests. Responses to items on such tests reflect past instances of aggressive acts, thoughts, motives, and emotions as the individual recalls them. For example, a sample item from the Aggression Questionnaire (Buss & Perry, 1992) is: "I have threatened people I know." Responses to this item depend, in part, on how readily the individual can recall past instances in which he or she has threatened others. Thus, responses to personality test items are likely rooted in the same network of associations that provides the basis for the priming function of violent stimuli. Scores on personality tests may therefore provide an indirect measure of the extent and development of an individual's aggressive cognitive–associative network. People with high scores on trait aggressiveness inventories should have more extensive aggressive networks than should those with low scores.

Bushman (in press) found some support for the idea that high trait aggressive individuals have more extensive aggressive cognitive–associative networks than do low trait aggressive individuals. In this study, participants who were either high or low in trait aggressiveness provided similarity ratings for word pairs. Some words in the pairs had clear aggressive connotations (e.g., FIGHT, KILL), whereas other words had ambiguous connotations with respect to aggression (e.g., ALLEY, STICK). Thus, there were three types of word pairs: aggressive–aggressive (e.g., FIGHT and KILL), aggressive–ambiguous (e.g., FIGHT and ALLEY), and ambiguous–ambiguous (e.g., ALLEY and STICK). The results showed that associations among aggressive words, and associations between aggressive words and ambiguous words, were stronger for high trait aggressive individuals than for low trait aggressive individuals. Associations among ambiguous words were not significantly different for high and low trait aggressive individuals.

The above extension of Berkowitz's (1984) theory provides one underlying mechanism for predicting who will be most susceptible to media violence effects. Individual differences in aggressiveness should interact with the presence of violent stimuli in the elicitation of aggression-related thoughts, emotional states, action tendencies, and behavioral responses. More specifically, high trait aggressive individuals should manifest all of these responses to aggressive cues more than should low trait aggressive individuals, because they have more extensive aggressive cognitive–associative networks.

Aggressive cognitive–associative networks are formed, in part, through repeated exposure to scenes of violence in the mass media. Perhaps high trait aggressive individuals have more elaborate aggressive cognitive–associative networks than do low trait aggressive individuals because they habitually view violent media.

This article describes the results from three studies that build on one another. Study 1 was conducted to determine whether a correlation exists between trait aggressiveness and attraction to media violence. If such a correlation exists, it would be interesting to determine if the joint effects of trait aggressiveness and media violence explain unique variation in aggressive affect and behavior above and beyond the variation explained by habitual exposure to television violence. Study 2 was conducted to determine whether violent media are more likely to elicit aggressive affect in high trait aggressive individuals than in low trait aggressive individuals, after controlling for habitual exposure to television violence. Finally, Study 3 was conducted to determine whether violent media are more likely to elicit aggressive behavior in high trait aggressive individuals than in low trait aggressive individuals, after controlling for habitual exposure to television violence.

An equal number of male and female participants were included in each of the three studies reported in this article. Female participants were included in the studies to enhance the generalizability of the results and to determine if the effects of violent media on aggressive affect and behavior are similar for men and women.

Study 1

Study 1 was conducted to determine whether high trait aggressive individuals are more attracted to media violence than are low trait aggressive individuals. Participants were male and female undergraduate psychology students who had previously completed a self-report measure of trait aggressiveness in mass testing sessions. Participants were told that the study was part of a "National Consumer Research Project" to evaluate "made-for-television movies." Participants first reported the amount of time they spent watching different types of television programs, including violent drama. Participants then read descriptions of violent and nonviolent films. After reading each film description, participants rated how much they wanted to watch the film, and they selected a film to watch.

A positive correlation was predicted between trait aggressiveness and habitual exposure to violent drama. Trait aggressiveness was expected to be positively correlated with desire to watch the violent films and uncorrelated with desire to watch the nonviolent films. The higher the level of trait aggressiveness, the more participants were expected to choose a violent film to watch. No sex differences were expected in film ratings or film selections because the violent and nonviolent films were previously judged to be equally exciting and interesting by both men and women. Men were, however, expected to report spending more time watching violent drama than were women.

Method

Trait Aggressiveness

In Study 1, scores on the Physical Aggression subscale of the Aggression Questionnaire (Buss & Perry, 1992) were used to measure trait aggressiveness. The Aggression Questionnaire, a revised version of the Buss–Durkee Hostility Inventory (Buss & Durkee, 1957), has four subscales measuring, respectively, Physical Aggression, Verbal Aggression, Anger, and Hostility. Although some studies have shown that the entire scale is related to aggression in experimental settings, more common are studies in which aggression is predicted from scores on various subscales. Of the four subscales of the Aggression Questionnaire, the Physical Aggression subscale shows the strongest association with peer nominations of aggression (Buss & Perry, 1992).

The Physical Aggression subscale contains 9 items along with a Likert-type scale for each item, ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). The coefficient alpha for the Physical Aggression subscale is .85, and the test–retest correlation is .80 (Buss & Perry, 1992). Sample items from the Physical Aggression subscale include "Once in a while I cannot control my urge to strike another person," and "If somebody hits me, I hit back."

Participants

Participants were 420 undergraduate psychology students (210 men and 210 women) who had previously completed the Physical Aggression subscale of the Aggression Questionnaire as part of a battery of questionnaires given in mass testing sessions. The mass testing and experiment proper sessions were separated by about 3 weeks.

Film Descriptions

The violent and nonviolent film descriptions were selected from a pool of 28 fictitious, untitled made-for-television films (Bushman, 1995). Half of the descriptions were for violent films, and half were for nonviolent films. An example of a *violent film* description is

> Nicoline Chester isn't your average femme fatale. She's a hired killer who has a way with words. She even has the police fooled into believing her innocence. Lieutenant David Otello isn't convinced, though. He pursues her forcefully after she kills his uncle, only to learn that he's the next target. Their final confrontation leads them into the Dallas Museum of Natural History where a bloodbath ensues. Otello discovers that Nicoline won't let anyone get in the way of her work.

An example of a *nonviolent film* description is:

> Professor Bertilson and his 10-year-old son Bill depart from Boston on a voyage of exploration. They are sailing their schooner in uncharted waters when a typhoon strikes with sudden fury. The mountainous waves rip loose the topsail and fling their schooner into a line of breakers. The two manage to make it to shore, parched and groggy. Professor Bertilson and his only son are stranded on a lost island, where dinosaurs and people live together in peaceful interdependence. This film chronicles their exciting, and often spectacular, adventures.[1]

Judges were 31 male and 31 female undergraduate psychology students drawn from the same population as those who would later serve in the experiment. Judges indicated how interesting, exciting, and violent the film descriptions were. Ratings were made along a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*extremely*). From the pool of 28 film descriptions, 12 (6 violent, 6 nonviolent) were selected for the present study to have equal interesting and exciting ratings but different violence ratings (see Table 1). There were no significant sex differences in ratings of the film descriptions.

Procedure

Each participant was given a cover sheet and consent form. The cover sheet stated that the study was being conducted by the Department of Journalism and Mass Communication, with the Department of Psychology cooperating on the project to assist with the measurement of attitudes. The following cover story was used.

> The present study is part of a National Consumer Research Project being conducted to evaluate "made-for-television movies." These untitled films have never been shown in movie theaters or on television. We want to see what types of films people are interested in viewing. After reading and rating brief descriptions of 12 films, you will be asked to select one of the films to watch. Because there is not sufficient time to watch the film in its entirety, segments of the films have been videotaped. Finally, you will tell us whether you liked the film you watched.

After informed consent was obtained, participants reported the number of hours per week they spent watching various types of television programs, including violent drama. The number of hours per week spent watching violent drama was used to measure habitual exposure to television violence. Each participant then read 12 film descriptions (6 violent, 6 nonviolent). The order of the film descriptions was counterbalanced according to a Latin square design (see Cochran & Cox, 1957). For each film, participants responded to the statement "I would like to watch this film." Responses were made along a 7-point Likert-type scale ranging from −3 (*strongly disagree*) to 3 (*strongly agree*).

After the participant rated the films, the experimenter showed the participant how to operate the videotape player, told the participant to select one film to watch, and then left the room. The videotapes, located on the table in front of the participant, were clearly labeled "FILM 1" through "FILM 12." The experiment was terminated after the participant began playing the videotaped film segment he or she had selected for viewing. (The experimenter could see the participant through a one-way mirror.) After the experiment was terminated, the participant was questioned for suspicion, fully debriefed, thanked, and dismissed. No participant expressed suspicion about the purpose of the study.

Results

Desire to Watch the Violent and Nonviolent Films

Repeated measures regression analysis was used to determine the role of trait aggressiveness and sex on participants' desire to

[1] This film description was adapted from Gurney (1992).

view the violent and nonviolent films. Significant main effects were found for film type and sex, $F(1, 417) = 41.99, p < .0001$, and $F(1, 417) = 4.70, p < .04$, respectively; and a nearly significant main effect was found for trait aggressiveness, $F(1, 417) = 3.56, p < .06$. These main effects, however, were qualified by significant interactions. As expected, there was a significant interaction between film type and trait aggressiveness, $F(1, 417) = 8.29, p < .005$ (see Figure 1). Simple effects analyses revealed a significant positive relation between trait aggressiveness and desire to watch the violent films, $F(1, 418) = 27.67, p < .0001, b = 0.23, r = .25$.[2] There was no significant relation between trait aggressiveness and desire to watch the nonviolent films, $F(1, 418) = 0.79, p < .4, b = -0.0055, r = -.04$.

In addition, there was significant interaction between film type and sex, $F(1, 417) = 13.18, p < .0003$. Simple effects analyses revealed that men expressed a greater desire to watch the violent films than did women (Ms = 0.5 and −0.1, respectively), $F(1, 418) = 32.34, p < .0001, d = 0.55$. Men and women did not significantly differ in their desire to watch the nonviolent films (Ms = 0.6 and 0.7, respectively), $F(1, 418) = 1.14, p < .3, d = 0.10$.

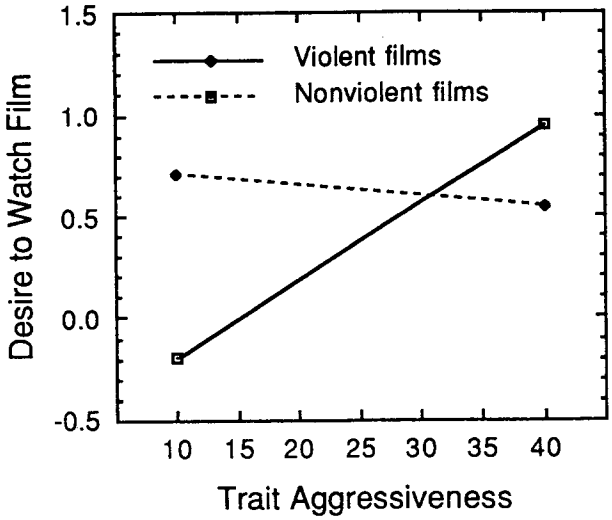

Figure 1. The moderating role of trait aggressiveness on desire to watch the violent and nonviolent films.

Habitual Exposure to Television Violence

Correlation analysis was used to determine whether trait aggressiveness and sex were associated with habitual exposure to television violence. The results showed that trait aggressiveness was positively correlated with habitual exposure to violent drama ($r = .17, p < .0006$). In addition, men reported spending more time watching violent drama than did women (Ms = 0.8 and 0.4 hours, respectively), $t(418) = 4.09, p < .0001, d = 0.40$.

Selection of Violent and Nonviolent Films

Because film choice was measured on a dichotomous scale (i.e., 1 = violent, 0 = nonviolent) and trait aggressiveness was measured on a continuous scale, logistic regression analysis was used to analyze these data. The results showed that as the level of trait aggressiveness increased, the likelihood of choosing a violent film to watch also increased, Wald $\chi^2(1, N = 420) = 4.58, p < .04, r_{pb} = .13$. Film choices were not significantly different for men and women, Wald $\chi^2(1, N = 420) = 2.06, p < .2$.

Table 1
Comparisons of Violent and Nonviolent Film Descriptions on Different Rating Dimensions

Type of film description	Rating dimension					
	Interesting		Exciting		Violent	
	M	*SD*	*M*	*SD*	*M*	*SD*
Violent	2.6_a	1.1	2.6_a	1.2	3.0_a	1.3
Nonviolent	2.8_a	1.2	2.5_a	1.1	1.3_b	0.7

Note. All ratings were made along a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*extremely*). Higher numbers indicate higher values on the dimension being rated. Each mean represents average ratings from six films. Subscripts refer to within-column comparisons. Means with the same subscript are not significantly different from each other at the .05 level by means of a paired t test. Means with different subscripts are significantly different from each other at the .0001 level by means of a paired t test.

Correlations Among the Criterion Variables

Not surprisingly, the more participants wanted to watch the violent films, the more likely they were to select the violent films over the nonviolent films to watch ($r_{pb} = .12, p < .02$). Habitual exposure to violent drama was significantly correlated with desire to watch the violent films and with selection of violent films ($r = .23, p < .0001$, and $r_{pb} = .41, p < .0001$, respectively).

Discussion

The results from Study 1 indicate that individuals do differ in their attraction to media violence. Trait aggressiveness was positively correlated with desire to watch violent films, replicating findings from previous research (O'Neal & Taylor, 1989). Level of trait aggressiveness also was positively correlated with habitual exposure to violent drama. Finally, when given a choice between watching a violent film or a nonviolent film, high trait aggressive individuals were more likely to choose a violent film than were low trait aggressive individuals.

Although causal inferences cannot be made from these correlational results, these findings are consistent with the idea that habitual exposure to media violence can lead to the development of more extensive aggressive cognitive-associative networks in high trait aggressive individuals than in low trait ag-

[2] Cohen (1988) offered conventional values for "small," "medium," and "large" effects. For the standardized mean difference, these conventional values are $d = 0.20$, $d = 0.50$, and $d = 0.80$, respectively. For the Pearson product–moment correlation coefficient, these conventional values are $r = .10$, $r = .30$, and $r = .50$, respectively. According to Cohen, most of the effects in the social sciences are in the small-to-medium range.

gressive individuals. These findings also are consistent with related work showing that aggressive thoughts lead to interest in viewing violence (e.g., Fenigstein, 1979; O'Neal & Taylor, 1989); aggressive thoughts should be more accessible for high trait aggressive individuals than for low trait aggressive individuals.

Study 2

Study 2 was conducted to test the hypothesis that media violence is more likely to elicit aggressive affect in high trait aggressive individuals than in low trait aggressive individuals, after controlling for habitual exposure to television violence.[3] Participants were male and female undergraduate psychology students who had previously completed a self-report measure of trait aggressiveness in mass testing sessions. Participants were randomly assigned to watch either a violent or a nonviolent 15-min videotaped segment. Participants completed a measure of aggressive affect before and after the showing of the videotape.

Participants in the violent videotape condition were expected to report higher levels of aggressive affect than were participants in the nonviolent videotape condition. In addition, trait aggressiveness was expected to interact with videotape content in the elicitation of aggressive affect. Specifically, a significant positive relation was predicted between trait aggressiveness and aggressive affect in the violent videotape condition. Trait aggressiveness was not expected to be significantly related to aggressive affect in the nonviolent videotape condition. No sex differences in aggressive affect were expected in Study 2; both sexes were included in the study to increase the generalizability of the results.

Method

Trait Aggressiveness

In Study 2, scores on the Assault subscale of the Buss–Durkee Hostility Inventory (BDHI; Buss & Durkee, 1957) were used to define operationally the level of trait aggressiveness. The BDHI has been shown to correlate with real world and laboratory measures of aggression in numerous studies (see Anderson & Bushman, 1995, for a review).

The Assault subscale of the BDHI is functionally equivalent to the Physical Aggression subscale of the Aggression Questionnaire. The Assault subscale of the BDHI contains 10 true–false items. In Study 2, the items were rated along a 6-point Likert-type scale ranging from 0 (*completely false for me*) to 5 (*completely true for me*) because BDHI scores have been shown to be more stable when items are scored with a rating-scale format than when they are scored with a true–false format (Velicer, Govia, Cherico, & Corriveau, 1985). The test–retest correlation for the Assault subscale is .78 (Buss, 1961). Sample items from the Assault subscale of the BDHI include "Once in a while I cannot control my urge to harm others," and "Whoever insults me or my family is asking for a fight."

Participants

Participants were 160 undergraduate psychology students (80 men and 80 women) who had previously completed the Assault subscale of the BDHI as part of a battery of tests given in mass testing sessions. In the present study, the Assault alpha coefficients were .81 for men, .76 for women, and .82 for the total sample. In exchange for their voluntary participation, students received course credit. The mass testing and experiment proper sessions were separated by about 3 weeks.

Videotapes

Because excitatory cues have been shown to facilitate aggression (e.g., Tannenbaum & Zillmann, 1975; Zillmann, 1971), videos for the proposed studies were selected to be equally exciting but differentially violent. The following two videotapes were selected from a pool of 35 tapes. Each videotape was approximately 15 min in length.

Karate Kid III In a karate tournament, a young man defeats an arrogant opponent who repeatedly violates the rules by fighting "dirty." Prior to the tournament, the opponent had insulted the young man, destroyed his property, and kicked his girlfriend in the stomach.

Gorillas in the Mist A scientist observes gorillas in their natural habitat. In time, the gorillas begin to trust the scientist, and they allow her to interact with them. Although this segment is intense and emotionally moving, it contains no violence.

A total of 1,400 undergraduate psychology students acted as judges. Each of the 35 videotapes was viewed by 20 men and 20 women. The judges filled out a set of 11-point rating scales indicating the degree to which the videotape was enjoyable, exciting, boring, arousing, emotionally moving, action-packed, entertaining, interesting, violent, frightening, humorous, sad, and realistic. The scales were anchored at one end by 0 (*not at all*) and at the other end by 10 (*extremely*). Exciting, boring, arousing, emotionally moving, and action-packed ratings were used to measure the excitatory content of the tapes, whereas violence ratings were used to measure the violent content of the tapes. The judges also reported whether or not they had seen the movie from which the segment was taken; this measure was used as a covariate in the analyses. A cover sheet explained that the questionnaires were part of a media evaluation study being conducted jointly with the Department of Journalism and Mass Communication.

Analysis of covariance revealed no significant differences between the *Karate Kid III* and *Gorillas in the Mist* videotapes on any of the excitement measures (see Table 2). The *Karate Kid III* videotape was judged to be significantly more violent than was the *Gorillas in the Mist* videotape, $F(1, 77) = 76.89$, $p < .0001$, $d = 2.00$ (see Table 2). Additional analyses revealed that enjoyable, entertaining, humorous, sad, and frightening ratings were not significantly different for the *Karate Kid III* and the *Gorillas in the Mist* videotapes. The *Gorillas in the Mist* videotape, however, was judged to be more interesting and more realistic than was the *Karate Kid lll* videotape, $F(1, 77) = 19.01$, $p < .0001$, $d = 0.99$; and $F(1, 77) = 33.14$, $p < .0001$, $d = 1.31$, respectively (see Table 2). Ratings of how interesting and realistic the films were were therefore used as covariates in subsequent analyses, though they did not alter the pattern of results. There were no sex differences on any of the ratings.

Procedure

Each participant was tested alone in a small room. The participant was given a cover sheet and consent form. The cover sheet explained that the study was being conducted jointly with the Department of Journalism and Mass Communication to evaluate media. After informed consent was obtained, the participant was given a mood form and was told that these measures would be taken periodically to "control for the effects of mood on media evaluations." The mood form consisted of the 15 adjectives (e.g., annoyed, hostile, irritated) from the Hostility subscale of the revised Multiple Affect Adjective Checklist (MAACL; Zuckerman & Lubin, 1985), along with several other adjectives added as fillers. The adjectives were rated along an 11-point Likert-type scale anchored at one end by 0 (*not at all*) and at the other end by 10 (*extremely*). The state version of the form was used; that is, the partici-

[3] Heart rate and aggressive behavior also were measured in Study 2. Because of instrumental and methodological problems, these data are not reported in this article.

Table 2
Comparison (Mean Ratings) of the Nonviolent and Violent Videotapes on Various Dimensions

Measure	Videotape	
	Gorillas in the Mist	*Karate Kid III*
Excitatory cues		
Exciting	6.9_a	7.1_a
Boring	1.7_a	1.9_a
Arousing	5.0_a	5.8_a
Emotionally moving	7.1_a	6.1_a
Action packed	4.8_a	5.3_a
Violence cues		
Violent	2.2_a	7.2_b
Other		
Enjoyable	7.1_a	6.4_a
Entertaining	6.5_a	6.5_a
Frightening	3.6_a	3.0_a
Humorous	2.8_a	2.8_a
Sad	2.9_a	3.3_a
Interesting	7.9_b	5.6_a
Realistic	6.6_b	3.2_a

Note. Subscripts refer to within-row comparisons. Means having the same subscript are not significantly different at the .05 level. Means having different subscripts are significantly different at the .0001 level. The means were adjusted for whether or not judges had seen the movie from which the segment was taken.

pant was told to "describe how you feel at this moment." The participant's level of aggressive affect was defined as the sum of his or her ratings for the hostile adjectives. Immediately after observation of the videotape, the participant completed a second mood form. The aggressive affect alpha coefficients at baseline were .93 for men, .94 for women, and .94 for the total sample. The aggressive affect alpha coefficients after the showing of the videotape were .96 for men, .94 for women, and .95 for the total sample. After completing the second mood form, the participant evaluated the videotape on a number of dimensions, reported whether he or she had seen the movie from which the segment was taken, and reported the number of hours per week he or she spent viewing various types of television programs, including violent drama. Finally, the participant was questioned for suspicion, fully debriefed, thanked, and dismissed.

Results

Ratings of the hostile adjectives after the showing of the videotape were used to measure aggressive affect. Ratings of the hostile adjectives before the showing of the videotape were included as a covariate in the analysis. Additional covariates included ratings of how interesting and realistic the videotape was, whether or not the participant had seen the movie from which the videotaped segment was taken, and the number of hours per week the participants spent watching violent drama.

All data were analyzed with regression analysis. In regression analysis, most researchers recommend centering the predictor variables when testing for interaction effects (e.g., Aiken & West, 1991; Jaccard, Turrsi, & Wan, 1990). This transformation, which reduces the correlation between the product term and the component parts of the term, was used in the present analysis. The regression model included all predictor variables, two-way interactions between the manipulated videotape variable and the measured participant variables (i.e., trait aggressiveness and sex), and all covariates. Multicollinearity, or correlation among the predictor variables, was tested by means of variance inflation factors (VIF; e.g., Neter, Wasserman, & Kutner, 1990). A VIF of 1 indicates that the model terms are not linearly related. A maximum VIF value in excess of 10 is often taken as an indication that multicollinearity may be unduly influencing the least-squares estimates.

The regression analysis showed that participants who had seen the violent videotape reported higher levels of aggressive affect than did those who had seen the nonviolent videotape (adjusted *M*s = 25.2 and 9.5, respectively), $t(148) = 4.41$, $p < .0001$, $d = 0.67$. In addition, there was a nearly significant positive relation between trait aggressiveness and state hostility, $t(148) = 1.93$, $p < .06$, $r = .16$.

As expected, trait aggressiveness moderated the effects of videotape content on aggressive affect. This was indicated by a significant Videotape × Trait Aggressiveness interaction, $t(148) = 2.92$, $p < .004$. The Videotape × Trait Aggressiveness interaction, displayed in Figure 2, revealed a significant positive relation between level of trait aggressiveness and level of state hostility among participants who had seen the violent videotape, $t(77) = 1.81$, $p < .04$, one-sided, $b = 0.42$, $r = .20$. In contrast, there was no significant relation between level of trait aggressiveness and level of state hostility among those who had seen the nonviolent videotape, $t(77) = -0.56$, $p < .6$, $b = -0.077$, $r = -.06$.

The only significant covariate was baseline level of hostility, $t(148) = 8.00$, $p < .0001$, $r = .52$. The maximum VIF was 1.9, indicating that the model terms were not collinear.

Discussion

Study 2 was conducted to test the moderating role of trait aggressiveness on the relation between media violence and ag-

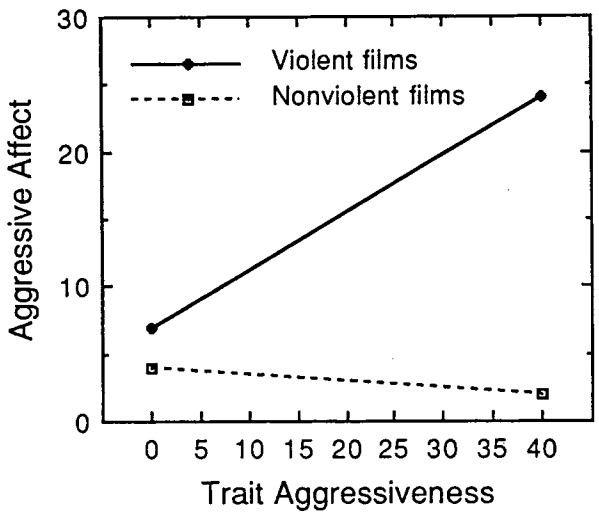

Figure 2. The moderating role of trait aggressiveness on the relation between media violence and aggressive affect. Baseline level of aggressive affect was used as a covariate.

gressive affect. As expected, participants who had seen the violent video reported higher levels of aggressive affect than did participants who had seen the nonviolent videotape. In addition, trait aggressiveness interacted with videotape content to elicit aggressive affect. As expected, trait aggressiveness was positively correlated with aggressive affect when the videotape was violent and was uncorrelated with aggressive affect when the videotape was nonviolent.

Study 3

Study 3 was conducted to determine the moderating role of trait aggressiveness on the relation between violent media and aggressive behavior, after controlling for habitual exposure to television violence. It should be emphasized that Berkowitz's (1984) 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). Berkowitz's theory may not be applicable to *instrumental aggression* (i.e., aggression that is a means to some other outcome). According to Berkowitz (1983), affective aggression is elicited by aversive events such as provocation, frustration, unpleasant noise, extreme temperatures, and foul odors. In Study 3, provocation was used to elicit affective aggression in participants.

Participants were male and female undergraduate psychology students who had previously completed a self-report measure of trait aggressiveness in mass testing sessions. Participants were randomly assigned to watch either a violent or a nonviolent 15-min videotaped segment. Blood pressure and heart rate were measured at baseline and during the showing of the videotape. No significant differences were expected between the violent and nonviolent videotapes on the cardiovascular measures of arousal (i.e., systolic and diastolic blood pressures and heart rate), because the two videotapes were selected to be equally exciting (see Table 2). Immediately after viewing the videotape, participants competed with an ostensible "opponent" on a reaction time task in which the slower responding person received a blast of noise. Provocation was manipulated by increasing the intensity of noise the "opponent" set for the participant across trials on the reaction time task. Aggressive behavior was defined operationally as the intensity of noise participants set for their "opponents" on the reaction time task.

Main effects were predicted for videotape content, sex, and trait aggressiveness. Participants in the violent videotape condition were expected to set higher noise levels for their "opponent" on the reaction time task than were participants in the nonviolent videotape condition. Men were expected to set higher noise levels for their "opponent" on the reaction time task than were women. High trait aggressive individuals were expected to set higher noise levels for their "opponent" on the reaction time task than were low trait aggressive individuals. In addition, trait aggressiveness was expected to interact with videotape content in the elicitation of aggressive behavior. Videotape content was expected to have greater effect on the aggressive behavior of high trait aggressive individuals than on the aggressive behavior of low trait aggressive individuals. Because Study 3 was primarily concerned with affective aggression, the predicted effects were expected to be stronger when participants were provoked than when they were not provoked.

Method

Participants

From a pool of 738 undergraduate psychology students (330 men, 408 women) who completed the Physical Aggression subscale of the Aggression Questionnaire as part of a battery of tests given in mass testing sessions, 149 individuals (75 men and 74 women) who scored above the 75th percentile on the scale, and 150 (76 men and 74 women) who scored below the 25th percentile, were contacted and scheduled as participants. Percentiles were calculated separately for men and women because men had significantly higher physical aggression scores than did women (Ms = 24.1 and 16.9, respectively), $F(1, 736) = 14.894$, $p < .0001$, $d = 1.10$. The data from 3 men were discarded because they were suspicious about the procedure. Thus, the final sample consisted of 148 high trait aggressive individuals (74 men and 74 women) and 148 low trait aggressive individuals (74 men and 74 women). In exchange for their voluntary participation, students received course credit. The mass testing and experiment proper sessions were separated by about 3 weeks.

Apparatus

Blood pressure and heart rate were measured by means of a Cor Medical Corporation 7000 continuous noninvasive monitor. After a 15-s occlusive calibration measurement, the cuff deflates to a comfortable pressure of only 15–20 mmHg. Thereafter blood pressure is monitored continuously and with high reliability. The monitor was fitted with a long tube that allowed the experimenter to collect the blood pressure and heart rate data from an adjacent room. National Instruments LabView 2 data acquisition software was used to collect the blood pressure and heart rate data on a Macintosh computer.

Procedure

Each participant was tested alone in a small room. The participant was given a cover sheet and consent form. The cover sheet stated that the study was being conducted by the Department of Journalism and Mass Communication, with the Department of Psychology cooperating on the project to assist with the physiological and reaction time measurements. The ostensible purpose of the study was to test the effects of media on blood pressure. The following rationale was given for measuring reaction time.

> In this experiment, we are studying the effects of movies on blood pressure. One variable that could influence blood pressure, other than how exciting the movie is, is how sensitive the viewer is to stimuli. The movies may be more arousing to people who are sensitive to stimuli than to people who are not sensitive to stimuli. In order to determine the effects of the movies on blood pressure, we need to measure how sensitive each viewer is to stimuli. Reaction time is an excellent measure of stimulus sensitivity. We are using two people on the reaction time task because we can get more data this way. In addition, we have found that participants are more motivated to respond quickly when they are competing against another person on the reaction time task than when they are competing against the clock. We are using noise on the reaction time task as a negative reinforcer. By responding quickly, you can avoid hearing the noise.

After informed consent was obtained, the compression cuff was placed

over the brachial artery of the participant's nondominant arm, and a 5-min baseline blood pressure and heart rate measurement was taken.

The experimenter then explained the reaction time task to the participant. The procedure used was a variation of procedures used by other researchers (e.g., Bond & Lader, 1986; Taylor, 1967). The task consisted of 25 trials. The computer screen for the reaction time program is depicted in Figure 3. Each reaction time trial consisted of the same sequence of six events. Those events were as follows.

(1) When the Target square turned green, the participant used the scale on the right side of the computer screen to set the level of white noise (which sounds like radio static) that he or she wanted the ostensible "opponent" to receive if the opponent's response was slower. The noise levels ranged from 1 (60 decibels [dB]) to 10 (105 dB), in 5-dB increments. A 0 intensity level also was included to give the participant a nonaggressive response alternative.

(2) After the participant set the noise level, he or she pressed the R button.

(3) When the Target square turned yellow, the participant prepared to respond by placing his or her finger on the mouse button.

(4) When the target square turned red, the participant pressed the mouse button as quickly as possible.

(5) The scale on the left side of the computer screen indicated the level of noise the "opponent" had set for the participant to receive on that trial. Provocation was manipulated by increasing the intensity of noise set by the "opponent" across blocks of trials. After the initial (no provocation) trial, the remaining 24 trials were divided into three blocks with 8 trials in each block. The level of noise the "opponent" set for the participant to receive on the first trial was selected randomly from Levels 1, 2, 3, and 4. In the first block of trials (low provocation), the "opponent" set noise at Levels 1, 1, 2, 2, 3, 3, 4, and 4, in a random order. In the second block of trials (moderate provocation), the "opponent" set noise at Levels 4, 4, 5, 5, 6, 6, 7, and 7, in a random order. In the third block of trials (high provocation), the "opponent" set noise at Levels 7, 7, 8, 8, 9, 9, 10, and 10, in a random order. Provocation was manipulated in the present experiment to facilitate affective aggression in participants.

(6) The participant heard noise on 50% of the trials within each block. The 2-s noise blasts were delivered through a pair of headphones. Whether the "opponent" or the participant heard noise on a given trial was determined at random.

The participant always competed with an "opponent" of the same sex. A Macintosh computer controlled the events in the reaction time task and recorded the noise levels the participant set for his or her "opponent." Before beginning the reaction time task, the participant was given samples of noise levels 1 (60 dB), 5 (80 dB), and 10 (105 dB).

The participant was randomly assigned to watch either the violent video (i.e., *Karate Kid III*) or the nonviolent video (i.e., *Gorillas in the Mist*). Blood pressure was monitored during the showing of the videotape. Immediately after viewing the videotape, the participant competed with an ostensible "opponent" on the reaction time task. After completing the reaction time task, the participant evaluated the videotape on a number of dimensions and reported the number of hours he or she spent watching different types of television programs, including violent drama. Finally, the participant was questioned for suspicion, fully debriefed, thanked, and dismissed.

Results

Cardiovascular Arousal

No significant differences were found between the *Karate Kid lll* and the *Gorillas in the Mist* videotapes on any of the cardiovascular measures of arousal. Thus, the two videotapes appear to be equally physiologically arousing. These physiological data are consistent with the self-report data given in Table 2.

Unprovoked Aggression

Univariate ANCOVA was performed to test the effects of videotape content and individual differences on the level of unprovoked aggression. The amount of time participants spent watching violent drama was used as a covariate in the analysis. Significant main effects were found for videotape content and trait aggressiveness. Participants who had watched the violent videotape gave their opponent more intense noise on the first

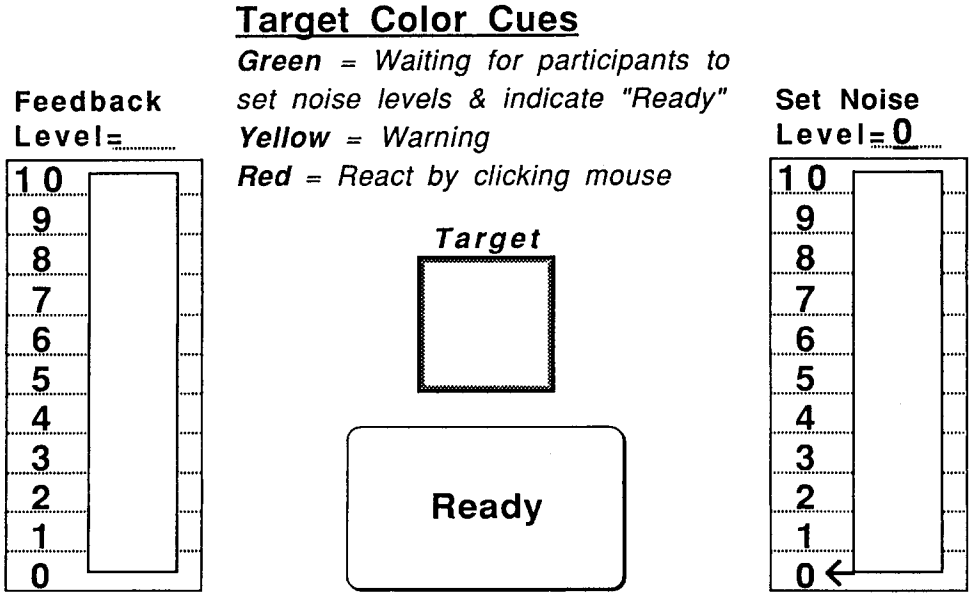

Figure 3. Reaction time task computer screen.

trial of the reaction time task than did participants who had watched the nonviolent videotape (adjusted *M*s = 4.6 and 3.9, respectively), $F(1, 288) = 7.51$, $p < .007$, $d = 0.32$. High trait aggressive individuals gave their opponent more intense noise on the first trial of the reaction time task than did low trait aggressive individuals (adjusted *M*s = 4.3 and 3.6, respectively), $F(1, 288) = 11.07$, $p < .001$, $d = 0.39$. The covariate also was significant; there was a positive correlation between exposure to televised violence and level of noise participants gave their "opponent" on the first trial of the reaction time task, $F(1, 288) = 10.10$. $p < .002$, $r = .19$.

Although the predicted Trait Aggressiveness × Videotape interaction was nonsignificant on the first trial of the reaction time task, it was in the predicted direction. High trait aggressive individuals who had watched the violent videotape gave more intense noise blasts to their "opponent" than did high trait aggressive individuals who had watched the nonviolent videotape (*M*s = 5.0 and 4.3, respectively), $t(146) = 2.17$, $p < .02$, one-sided, $d = 0.36$. Low trait aggressive individuals who had watched the violent videotape tended to give more intense noise blasts to their "opponent" than did low trait aggressive individuals who had watched the nonviolent videotape (*M*s = 4.1 and 3.6, respectively), $t(146) = 1.51$, $p < .07$, one-sided, $d = 0.25$.

Provoked Aggression

Multivariate analysis of covariance (MANCOVA) was used to test the effects of videotape content, individual differences, and provocation (i.e., low, medium, high) on aggression levels. Significant main effects were found for videotape content, trait aggressiveness, and sex. Participants who had watched the violent videotape gave louder blasts of noise to their "opponent" than did participants who had watched the nonviolent videotape (adjusted *M*s = 4.9 and 4.3, respectively), $F(1, 288) = 10.32$, $p < .002$, $d = 0.38$. High trait aggressive individuals gave more intense noise blasts to their "opponent" than did low trait aggressive individuals (adjusted *M*s = 5.1 and 4.2, respectively), $F(1, 288) = 23.21$, $p < .0001$, $d = 0.57$. Men gave more intense noise blasts to their "opponent" than did women (adjusted *M*s = 4.8 and 4.4, respectively), $F(1, 288) = 5.06$, $p < .03$, $d = 0.27$.

Trait aggressiveness moderated the effects of videotape content on aggressive behavior, as indicated by a significant Trait Aggressiveness × Videotape interaction, $F(1, 288) = 4.48$, $p < .04$ (see Figure 4). Simple effects analysis revealed that high trait aggressive individuals who had watched the violent videotape gave more intense noise blasts to their "opponent" than did high trait aggressive individuals who had watched the nonviolent videotape, $t(145) = 3.62$, $p < .0002$, one-sided, $d = 0.60$. In contrast, videotape content did not significantly influence the intensity of noise low trait aggressive individuals gave their "opponent," $t(145) = 0.83$, $p < .3$, one-sided, $d = 0.14$.

There was a significant effect for provocation on noise intensity, $F(2, 287) = 187.02$, $p < .0001$. As provocation increased, physical aggression increased. The covariate also was significantly related to noise intensity. There was a positive correlation between the amount of time participants spent watching televised violence and the level of noise they gave their "opponent" on the reaction time task, $F(1, 288) = 8.89$, $p < .004$, $r = .20$.

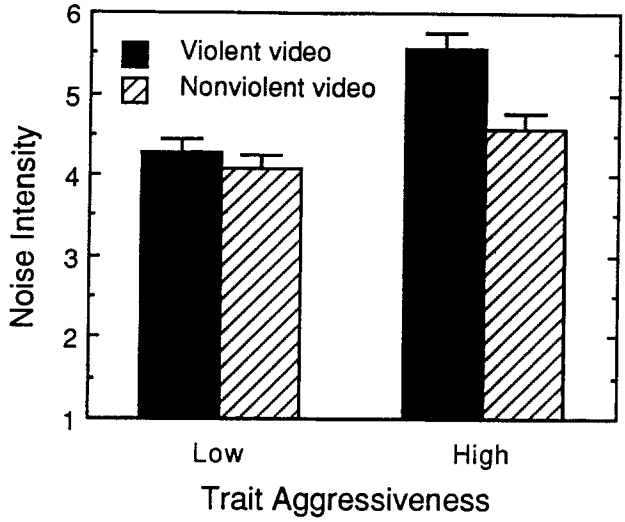

Figure 4. The moderating role of trait aggressiveness on the relation between media violence and aggressive behavior. Capped vertical bars denote 1 standard error.

Discussion

In Study 3, main effects were predicted for videotape content, trait aggressiveness, and sex. In addition, trait aggressiveness was expected to interact with videotape content to produce aggressive behavior. The effects were expected to be stronger when participants were provoked than when they were not provoked. The results showed that the videotape and trait aggressiveness main effects were significant when participants were not provoked, whereas all predicted effects were significant when participants were provoked. The predicted effects did not, however, depend on the level of provocation (i.e., low, moderate, high).

As expected, participants who had watched the violent videotape gave their opponent significantly louder blasts of noise than did participants who had watched the nonviolent videotape. The videotape effect sizes obtained in Study 3 were similar in magnitude to the effect sizes reported in meta-analytic reviews of media-related aggression (e.g., Hearold, 1986; Paik & Comstock, 1994; Wood, Wong, & Chachere, 1991). These effect sizes are particularly impressive when one considers that the violent and nonviolent videotapes were not significantly different on the self-report and cardiovascular measures of arousal. In addition, the violent videotape did not contain graphic scenes of violence (i.e., no blood was shown, and none of the characters were killed or seriously injured). The Motion Picture Association of America rating for *Karate Kid III* is PG-13. Thus, even stronger effects might be obtained for movies containing more graphic depictions of violence (e.g., R-rated movies). It is very difficult, however, to find nonviolent movies that are not significantly different from graphic violent movies in terms of their arousal value.[4]

[4] One could probably find erotic nonviolent movies that are not significantly different from graphic violent movies in terms of their arousal

Consistent with previous research (e.g., Eagly & Steffen, 1986), men were significantly more aggressive than were women. Sex did not, however, interact with videotape content to influence aggressive behavior. The effects of violent media on aggression were similar for men and women even though the violent video primarily showed male-on-male aggression.

A main effect was obtained for trait aggressiveness. High trait aggressive individuals gave their opponent significantly louder blasts of noise than did low trait aggressive individuals.

As expected, there was a significant interaction between trait aggressiveness and videotape content. This interaction revealed that media violence elicited more aggression in high trait aggressive individuals than in low trait aggressive individuals.

Conclusions

Who is most susceptible to media violence effects? The results reported in this article indicate that media violence is more likely to elicit aggressive affect and behavior in high trait aggressive individuals than in low trait aggressive individuals. There were no sex differences in susceptibility to media violence.

By what mechanisms do these media effects occur? According to Bushman's (Bushman, in press; Bushman & Geen, 1990) extension of Berkowitz's (1984) cognitive–neoassociation theory, high trait aggressive individuals are more susceptible to the effects of violent media than are low trait aggressive individuals because they possess a relatively large network of aggressive associations that can be activated by violent cues. Habitual exposure to television violence might be partially responsible for the more extensive aggressive cognitive–associative networks in high trait aggressive individuals than in low trait aggressive individuals.

In light of these results, the U.S. Surgeon General's claim that "television violence, indeed, does have an adverse effect on certain members of our society" appears to have some merit (Steinfeld, 1972). The negative effects of television violence seem to be most pronounced for individuals who are highly aggressive by nature than for their nonaggressive counterparts. These results should not, however, be interpreted to mean that media violence does not affect most members of society.

Pakula was right when he said that media violence is like eating salt—the more you eat, the more you need to eat to taste it. There is reason to believe, however, that no matter how much media violence is presented, some people are not immune to its effects. The victims may be actors, the blood may be ketchup, the bullets may be blanks, but for some viewers, the image on the screen is all too real.

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value. Erotic content, however, might confound the results by introducing a potentially important variable along which the violent and nonviolent videotapes differ.

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