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Attention and level of processing: movie viewing styles and the priming of aggressive cognitions

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Movie viewing styles and the priming of aggressive cognitions

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CHAPTER 1. INTRODUCTION

Consider the following two situations. Situation 1: It has been a long day at work. You are tired and grumpy and just want to spend the night relaxing, doing something that requires very little thought. You decide this would be a great time to watch that R-rated movie that arrived from the DVD-club a couple of weeks ago. You pop some popcorn, turn off the lights, and get comfortable for a night of "mindless" entertainment.

Situation 2: The Academy Awards are scheduled for this coming Sunday, and you have been hearing a lot about this new R-rated film. The actors and director are well known for making poignant and thought-provoking films. You decide you are going to rent this movie tonight to see what it is all about and to judge for yourself whether or not it deserves the Oscar.

Each of these situations involves sitting down to watch the same R-rated film; however, in one situation you are intending to watch mindlessly while in the other you are expecting to think. These approaches to viewing a film are not uncommon and are just two examples of the many different ways that people may watch a movie. It would not be surprising to find that people walk away from a film with different impressions and perhaps even different conclusions about their experience. One important consideration in the above situations is the impact of the violence likely to be in the movie. Aggression research suggests that because the movie has violence in it, you are likely to have an increase in aggressive affect and cognitions and, therefore, have now been put at risk for a short-term increase in aggressive behavior, regardless of how you watched it (Anderson, 1997; Anderson, Berkowitz, Donnerstein, Huesmann, Johnson, Linz, et al, 2003; Anderson & Bushman, 2002b; Betsch & Dickenberger, 1993; Bushman, 1995; Bushman & Geen, 1990;

Bushman & Huesmann, 2006; Dunand, Berkowtiz, & Leyens, 1984; Johnson, Cohen, Smailes, Kasen, & Brook, 2002; Leyens, Cisneros, & Hossay, 1976; Leyens & Dunand, 1991; Mathews, Kronenberger, Wang, Lurito, Lowe, & Dunn, 2005; Sebastian, Parke, Berkowitz, & West, 1978).

Previous research on media violence has consistently shown that exposure to violent images and ideas can increase the likelihood of aggressive behavior, both in the short-term and in the long-term. Boys are more likely to act aggressively towards one another after repeated viewings of violent movies (Sebastian, et al., 1978), and people are more likely to inflict a shock or loud noise to another person after violent media exposure (Bartholow, Anderson, Carnagey, & Benjamin, 2004; Bushman, 1995; Leyens, et al., 1976; Leyens & Dunand, 1991, Lindsay & Anderson, 2000). These outcomes are explained using a social-cognitive framework. In particular, the aggressive concepts in the media are proposed to activate aggressive cognitions, which lead to the increased risk for aggressive behavior.

A number of factors have been considered as potentially increasing or decreasing the magnitude of these behaviors, such as: sex, trait aggressiveness, intelligence, charisma of perpetrator, justification of aggression, and rewards for aggressive behavior (Anderson, et. al., 2003; Berkowitz, 1986). Despite the thorough investigation of these and other variables, little research has considered the differences in "viewing style" as something that could influence the magnitude of the media effect. What the viewer attends to in the movie and how deeply they process it are two cognitive viewing-style factors that need more research for a better understanding of media violence effects.

The first of these factors is attention. A movie contains, on average, two hours worth of auditory and visual stimuli that are organized to create plots, symbolism, storylines,

themes, and messages. This allows for a number of concepts to which the viewer can attend. Additionally, in the case of violent movies, there are also a number of non-violent scenes as well as storylines, themes, or messages that may be unrelated to aggression altogether. The second factor that ought to be addressed is level of processing. In the opening paragraphs, two different types of viewer-styles are described: one in which the viewer intends to watch a violent movie without much mental effort, and one in which the viewer intends to be involved and to think. At present, the manner in which the viewer processes the movie is not considered in the media violence literature, and the research may simply suggest that viewing style does not matter; everyone would be at risk for an increase in aggressive behavior.

Differences in attention and level of processing allow for a number of situations worth considering in the media violence discussion. If the viewer is focused on the non-violent aspects of the movie, do the violent scenes still have the same impact? Does thinking about the movie during viewing change the magnitude of the media effects? And how do these two factors interact? In particular, how does a deeper processing of non-violent themes compare to a general "surface-level" processing of the movie? As the research on media violence effects on aggression uses a social-cognitive model that emphasizes the role of cognition leading to aggressive behavior (Anderson & Carnagey, 2004; Anderson & Huesmann, 2003; Bandura, 2001; Lindsey & Anderson, 2000) it is important, therefore, to begin at the cognitive level to answer these questions. Specifically, research should look at how attention and processing factors can change the accessibility of aggressive cognitions. Much of the media violence research that uses movies as a stimulus only use isolated clips of violent or non-violent scenes, and for that reason, it cannot answer these important full-movie questions. The cognitive research on semantic priming, however, offers important

insights that could be integrated into the media effects research.

Semantic priming is the cognitive preparedness of semantically related concepts after exposure to an initial stimulus, such that these other concepts are more readily available. Research in the cognitive area focuses extensively on how a single word can increase the accessibility of other categorically, or semantically, related words (Neely, 1991). Various studies have shown that what a person attends to and the level of processing used can have an impact on semantic priming (Dark, Johnston, Myles-Worsley, & Farah, 1985; Friedrich, Henik, & Tzelgov, 1991; Henik, Friedrich, & Kellog, 1983; Henik, Friedrick, Tzelgov, & Tramer, 1994; Neely, 1991; Remington & Folk, 2001). One finding is that if two categorically-unrelated words are presented at the same time, then the word attended to more elicits a stronger semantic priming effect (Woltz & Was, 2006). It has been theorized that this is due to the limited amount of cognitive resources available for these types of processing (Anderson, Reder, & Lebiere, 1996; Oberauer, 2002; Otsuka & Kawaguchi, 2001; Smith, Bentin, & Spalek, 2001). Focusing one's attention on one word depletes the amount of resources available for priming effects of the other word. These findings have important implications in the more macrocosmic level of watching a movie as there are a potentially large number of different concepts upon which to focus.

By incorporating the semantic priming research on cognitive resources and multiple primes into the media violence research, perhaps some of these questions regarding viewing styles can be answered. If thinking about a movie uses cognitive resources, then there may be a limit to the number of concepts primed. The interaction that needs to be considered is how thinking deeply or not thinking deeply about either aggressive or non-aggressive concepts may have different effects on the subsequent accessibility of aggressive cognitions.

CHAPTER 2. LITERATURE REVIEW

Aggression

The definition of aggression consists of three components. First, there must be intent to harm. Second, there must be some expectation that the behavior will result in harm. Finally, there is an expectation that the other person is motivated to avoid the harm (Gentile & Anderson, 2006). There are many circumstances that can result in a person behaving in this way. Research on aggression is dedicated to understanding what these circumstances are and how they elicit such outcomes. The General Aggression Model (GAM) provides a social-cognitive framework for understanding the processes involved that lead to aggressive behavior by considering the way external and internal inputs interact to influence our emotions and cognitions, and through them our subsequent decisions (Anderson & Carnagey, 2004; Anderson & Bushman, 2002a; Anderson & Huesmann, 2003; Lindsey & Anderson, 2000). The GAM considers the different types of inputs, short-term outcomes, and the routes connecting the two in a single cycle of a social interaction (See Figure 1).

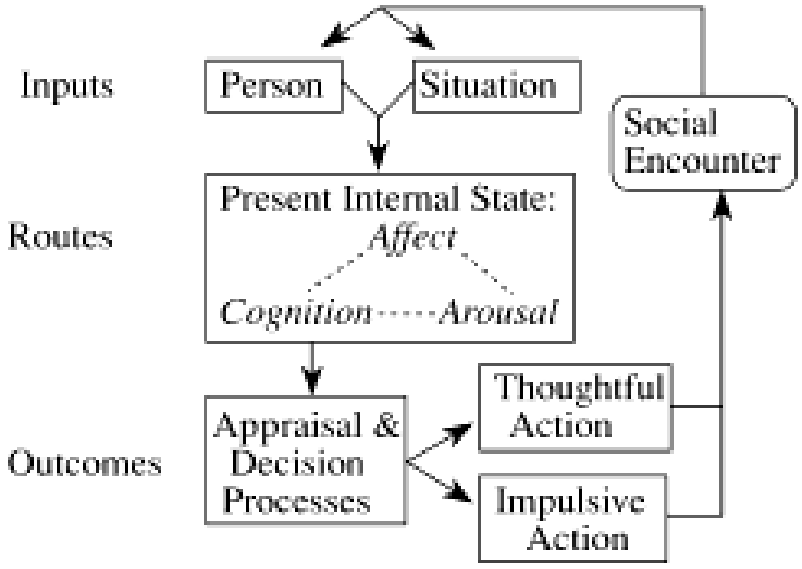

Figure 1. The General Aggression Model (Anderson & Bushman, 2002a).

A single cycle begins with a combination of personal and situational inputs. The personal inputs are those qualities that the person brings into the situation, such as attitudes, beliefs, and behavior tendencies. Trait aggression, for example, is a personal input; the natural tendency for a person to be more prone to aggressive reactions is likely to have an impact in the outcome of the interaction (Anderson, 1997; Bushman, 1995; Buss & Perry, 1992). The other type of input is situational: those qualities that exist in the environment that could either increase or inhibit the likelihood of an aggressive outcome. A situational input could come from either another person or simply the setting. For example, if another person insults the person being examined, this is a situational factor that could increase the likelihood of an aggressive reaction (Anderson & Bushman, 2002a). Similarly, an uncomfortable temperature is a factor of the environment that might increase aggression (Anderson, 1989).

Following the personal and situational inputs in the model are the affective, cognitive, and arousal routes to aggression. These routes operate within the present internal state. The present internal state is how the person is feeling, both emotionally and physically, and thinking during this particular cycle. A personal or situational factor may influence one or more of these routes to aggression. For example, an insult may have an effect on the person's thoughts and feelings. Similarly, an uncomfortable temperature can change one's physiological arousal. These routes may also interact with each other in the present internal state. The change in arousal due to temperature may then alter the affect of the person by increasing his or her experience of anger, or the anger one feels after being insulted may bring forth memories of a previous incident.

The present internal state, which has been affected by the inputs, then influences the

third part of the cycle: the outcomes. An important part of the outcomes is the appraisal process, of which there are two types (see Figure 2). The first is immediate appraisal, which is dependent on automatic processes and can lead to an impulsive outcome. If enough cognitive resources are available and the outcome is deemed important, however, there may be a more controlled reappraisal step that would result in a more thoughtful action. The present internal state influences both whether reappraisal is an option and which outcome is selected. If the inputs have made aggressive cognitions more readily available in the present internal state, then it is more likely that an aggressive outcome will be chosen.

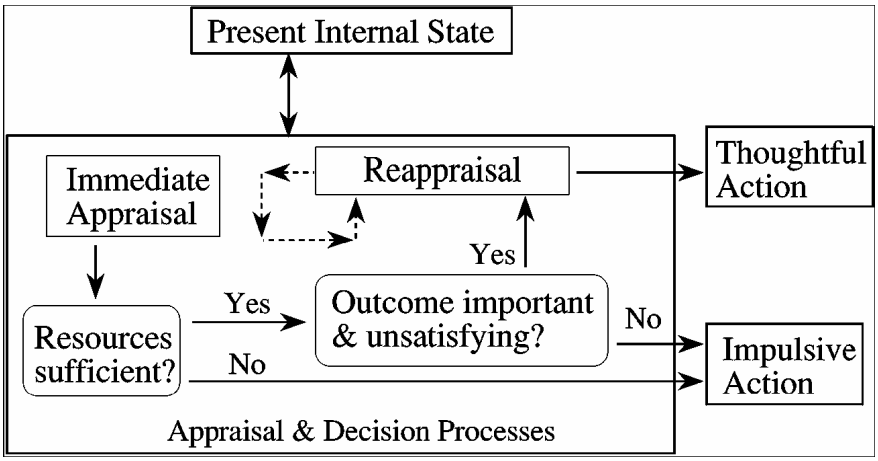

Figure 2. The General Aggression Model:
Expanded appraisal and decision processes (Anderson & Bushman, 2002a).

Numerous studies have been conducted testing the GAM, particularly in the realm of media effects. Research has looked at each part of the model and has tested it on the outcomes of behavior, affect, arousal and cognition (Anderson, 1997; Bartholow, et al., 2005; Lindsey & Anderson, 2000). Although it is ultimately interesting to demonstrate that the media can influence future behaviors, it is necessary to understand the process by which media exposure leads to behavior. Cognition is an important starting point of this process:

> Most external influences affect behavior through cognitive processes rather than directly. Cognitive factors partly determine which environmental events will be observed, what meaning will be conferred on them, whether they leave any lasting effects, what emotional impact and motivating power they will have, and how the information they convey will be organized for future use (Bandura, 2001, p. 267).

Researchers have examined this cognitive level and, using a variety of different methodologies, have found support for the theory that violent media increases aggressive cognitions.

One method that has been used measured aggressive cognitions by having participants list their thoughts, after which the experimenters counted the number of aggressive thoughts in the list (Bushman & Geen, 1990). In this study, participants were randomly assigned to watch a segment of one of five movies. The movies varied on how aggressive the content was, based on previous coding, ranging from a scene with no physical violence to one of excessive and gory violence. After viewing the clip, participants were given three minutes to list the thoughts they had while watching the clip. Results supported the theory by showing that the more aggressive the movie clip was rated, the more aggressive thoughts the participants listed. This study gives potential evidence for the link between media violence and aggressive thoughts, but could instead be showing a link between content and the participants' ability to describe the content opposed to an actual priming effect.

Another method used to study the increase of aggressive cognitions is by measuring the amount of time it takes for a participant to respond to a particular target, such as reading a word. A faster response to aggressive words than to control words serves as a measure for accessibility of aggressive cognitions. Anderson (1997) used a reading-reaction-time task to

measure this accessibility. After viewing a violent or non-violent movie scene, participants were asked to read aloud each word that was presented individually on a computer screen. The 192 trials of the task consisted of 24 aggressive words, 24 anxiety words, 24 escape words, and 24 control words, each presented twice in a randomized order. The dependent variable, aggression accessibility, was constructed by subtracting the average reaction time of the aggressive words from the average reaction time to the rest of the words. The results showed that, for those with low trait aggression, the participants who watched the violent clip had a higher aggressive accessibility score than those who watched the non-violent clip. This method gives further support for the link between media violence and increased aggressive cognitions.

A third method that has been used to measure concept accessibility is the lexical decision task where participants must decide if a group of letters is a word or a non-word (Neely, 1991). A study designed to test the GAM directly used this task to measure aggressive cognitions in participants (Lindsey & Anderson, 2000). Half of the participants were asked to rate 18 photographs of weapons, while the other half were asked to rate 18 photographs of nature scenes. Following these ratings, participants were then asked to identify letter-strings on a computer screen as either words or non-words by pressing either a 'yes' or 'no' key. Of the 96 trials, 24 were of aggressive words, 24 were escape-related words, 23 were control words, and 25 were non-words. Similar to the procedure with the reading-reaction-time task, aggressive accessibility was calculated by subtracting the average reaction time for the aggressive words from the non-aggressive words. Results showed that participants in the weapon photographs condition had higher aggressive accessibility scores than those who were shown the nature scene photographs. These three studies are examples

of research methods that have been used to demonstrate that exposure to violent media can increase the accessibility of aggression cognitions as proposed by the cognitive route in the GAM.

Semantic Priming

The phenomenon that violent media content, as a situational input, increases the accessibility of aggressive cognitions happens according to a process called semantic priming. Semantic priming can be conceptualized as a form of cognitive-preparedness and is founded on the assumption that concepts are organized in memory according to a semantic network (Anderson & Huesmann, 2003; Berkowtiz, 1984; Collins & Loftus, 1975; Neely, 1991). At each node in the network is a concept, such as 'bird' or 'robin' or 'red'; concepts are connected in this network with links based on semantic relatedness. The more related the concepts are, the stronger and "closer together" the links are. As the concept of 'robin' is very semantically related to the concept of 'bird,' these two would lie close together in the semantic network and have a strong link between them. The concept of 'red' may be weakly linked with 'robin,' but not directly connected to 'bird' (See Figure 3). Quillian's theory of

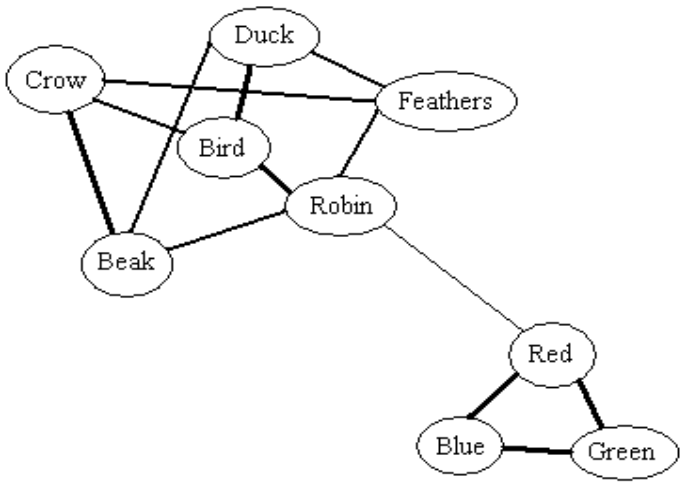

Figure 3. An example of the semantic network

semantic memory holds that all semantic information is organized in this fashion (Collins & Loftus, 1975).

Spreading activation is the next step towards understanding the priming phenomenon (Berkowitz, 1984; Collins & Loftus, 1975, Neely, 1991). When a single concept is activated, such as when a person thinks of a particular idea, the activation spreads outwards along the network and partially activates other semantically-related concepts. These partially activated concepts are now more likely to be accessed in a subsequent scan for information. For instance, when a person is shown the word 'robin,' the concept 'robin' is activated in the semantic network. This activation then spreads out along the network to related nodes and the concept 'bird' may now be partially activated. When the person is subsequently shown the word 'bird' and required to process the word, such as by reading it, the concept 'bird' will be processed more quickly because it was already partially activated after being primed by the word 'robin.' In this way, groups of concepts can have an increased accessibility through exposure of a single, semantically-related concept.

In social cognition, each section of the network that holds information regarding a collection of related concepts or propositions is referred to as a schema. Similarly, a series of connected nodes that hold information about behaviors and the order of events are called scripts (Anderson & Carnagey, 2004; Fiske & Taylor, 1991). For example, the interconnected nodes that hold information regarding aggressive concepts would be an aggressive schema and those that hold information about aggressive behavior would be an aggressive script (See Figure 4). Altogether, this is how being shown a picture of a gun can increase the accessibility of aggressive cognitions, and how it can then increase the

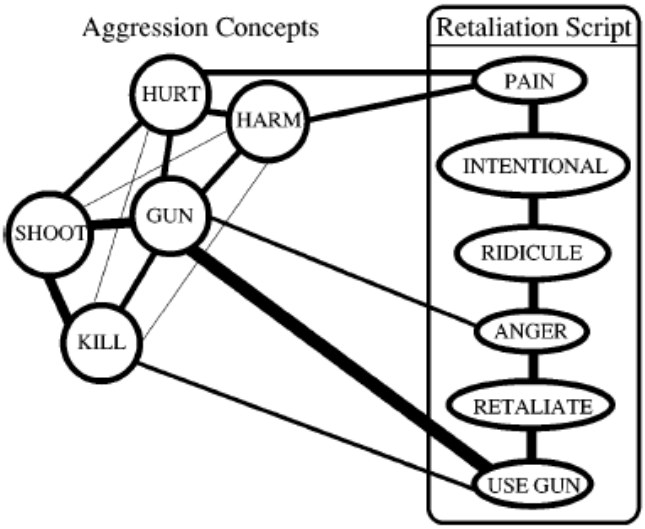

Figure 4. Simplified associate network of aggression concepts and a retaliation script (Anderson & Bushman, 2002a).

likelihood of aggressive behavior.

Although semantic priming occurs very rapidly and below conscious awareness, the automatic nature of this process is not infinitely powerful. Spreading activation, for instance, decreases in strength the further it travels along the network. In this way, those concepts that are weakly associated or semantically distant from the activated word will not be primed (Collins & Loftus, 1975). In addition to the attributes of spreading activation, attention and level of processing are other factors that could potentially restrain the magnitude of semantic priming (Dark, et. al., 1985; Friedrich, et al., 1991; Henik, et al., 1983; Henik, et. al., 1994; Neely, 1991; Remington & Fold, 2001).

Attention and Processing

Attention and level of processing are theorized to impede semantic priming because of presumed cognitive resource limits in working memory. According to theories of memory, knowledge is stored in long-term memory and the contents of long-term memory

remain below the level of conscious awareness. When a concept is activated, it is thought to be 'brought' from long-term memory into working memory (Baddeley & Hitch, 1974). Attending to a prime and processing it on deeper levels requires concepts to be activated in working memory. When one prime is attended to, cognitive resources are allocated to the processing of that prime over another. Similarly, the more processing one engages in of a single prime, the more resources are used. Although there are many theories on exactly how resources are allocated in working memory, it is generally accepted that working memory does not have an infinite capacity and that there are limits to how much can be processed at a time (Anderson, et al., 1996; Collins & Loftus, 1975; Miller, 1956; Oberauer, 2002; Otsuka & Kawaguchi, 2007; Smith, et al., 2001).

The strongest evidence for how the allocation of cognitive resources for attention and processing can have an impact on semantic priming is found in research on priming effects of single words. The participant is exposed to a priming word stimulus and then asked to respond in some way to a target word. There is evidence that when participants focus on the specific qualities of words, instead of the word itself, there is no semantic priming. This has been demonstrated by variety of methods including asking participants to search for a specific letter within the word, to identify initial letters as consonants or vowels, and with Stroop tasks (Friedrich, et al., 1991; Henik, et al., 1983; Henik, et. al., 1994). To understand these effects, a variety of theories have been developed that propose how resources are allocated. One particular theory incorporates the idea of attention modulation. Specifically, this theory proposes that there is a limited capacity of resources and semantic activation can be modulated depending on the allocation of cognitive resources towards processing attended to stimuli (Smith, et al., 2001).

Otsuka and Kawaguchi (2007) tested this using an auditory task to consume cognitive resources during a standard priming task. Participants were shown an initial "+" symbol and were simultaneously presented with a tone. Following a 500 ms black and silent screen, participants were then shown a prime stimulus word while also being presented with a second tone. The participants had been told that they would be asked to indicate whether the two tones were identical. Following this was 50 ms of black and a silent period, and then participants where shown a target stimulus for which they had been instructed to indicate whether it was a word or a non-word. After making their selection, a 1,000 ms blank and silent period was followed by a "?" which indicated to the participant to choose whether the two tones were the same. The participants were not expected to make any connection between the two words presented, only the two tones.

This task required the use of cognitive resources as participants had to hold information in short-term memory about the two tones while completing the lexical decision portion. By allocating resources to attend to the tones, it was hypothesized that there would not be sufficient resources for semantic priming of the target word by the initial word. Three conditions were used for the auditory task: a full attention condition where no tones were presented, a low-divided attention condition where the tones were clearly different, and a high-divided attention where the tones were close in frequency, making it a difficult judgment. A series of three experiments were conducted using this paradigm to test the attention modulation hypothesis while ruling out other possible explanations. It was consistently found in all three experiments that for the high-divided attention conditions there was no semantic priming effect, whereas the full attention condition had a normal semantic priming effect, and the low-divided condition had a reduced semantic priming effect.

A repetition priming effect – where the same word is repeated as both prime and target – was found in the high-divided attention condition. Repetition priming happens when a person responds quicker to a word the second time he or she sees it. The first time the person processes the word, the concept is activated; upon the second presentation, the concept is still activated and the reaction time decreases. Repetition priming does not require spreading activation. Because the repetition-priming still occurred in the high-divided condition, this study provides evidence that the spreading activation necessary for semantic priming requires cognitive resources that were otherwise being allocated to the auditory task.

In addition to splitting attention between word features or other sensory tasks, the role of cognitive resources in priming has also been evaluated with identical types of processing. Looking at features of a word directs attention away from the whole word itself, and listening to tones involves different sensory processes. Woltz and Was (2006), however, investigated what would happen when participants were presented with two types of whole-word primes. Along with establishing that both words could produce the priming effect, a deeper processing of one of the words resulted in a greater magnitude of priming semantically related words. Participants were shown four words from two different categories (e.g. "ruby", "daughter", "diamond", "uncle"). They were then given instructions to remember one of the categories and asked to recall the two words. Following this, they were given a same-different category task, which involved showing the participant two words simultaneously and asking them to indicate whether the words were from the same or different categories (e.g. "leaf/spoon", "century/month"). One-third of the word-pairs were from the category participants were asked to remember, one-third were from the other initially primed category, and the remaining third involved unprimed categories.

Results showed that participants responded most quickly to matching pairs of words in the category they were told to focus on. The ignored category was still primed, but the magnitude was not as high as for the focused category. This study provides evidence that multiple primes, of which the participant is aware, can have differential semantic activation effects depending on where attention is directed.

Attention and Processing in Media Effects

Because attention to stimuli and depth of processing have an impact on the magnitude of semantic priming, they are potentially important factors that need to be incorporated in the cognitive routes to aggression as additional personal and/or situational factors. Attention and depth of processing are of particular importance when discussing a stimulus like a movie. The multitude of images, motifs, themes, and messages offer a large array of items to attend to along with different levels of processing for each concept. Although these factors have not been studied in depth in the media violence research, a few studies have begun to investigate attention and processing.

Bushman and Geen (1990) included an attention measure in their study of the effects of violent movie clips on aggressive cognitions, affect, and arousal. In addition to irritability and hostility, a measure of stimulus screening was included in the study. It was theorized that stimulus screening is a form of selective attention. Some people may try to defend themselves against arousing stimulation in the media by selectively attending to other stimuli, those that would not result in such high stimulation. This selective attention could result in preventing the activation of semantic networks related to the blocked stimuli. Using the thought listing task as a measurement of aggressive cognitions, it was found that those participants who scored as high stimulus screeners listed fewer aggressive thoughts after

observing a violent movie clip than low stimulus screeners. It appears that a natural disposition for selecting what stimuli are attended to could moderate the violent media effect. Although this was not a very rigorous test of attention moderating semantic priming, and could benefit from the use of a reaction-time dependent variable, it is a beginning step in suggesting that viewers' differential attention to a movie could have different outcomes related to aggressive cognitions.

The notion of how the prime is processed has also been briefly examined in media effects research. Similar to the word versus letter level of analysis tasks described earlier, Leyens, Cisernos, and Hossay (1976) manipulated the level of analysis in slides of weapons and demonstrated different behavioral outcomes. Although cognitions were not measured, the General Aggression Model holds that there would likely be a cognitive route from picture viewing to aggressive behavior. Participants were shown slides of either aggressive or neutral content, such as weapons or nature scenes, and then were given a measure of aggressive behavior that consisted of ostensibly administering electric shocks to another person. Some of the participants exposed to the aggressive slides were told beforehand that they were to evaluate the slides for the aesthetic qualities of framing and focus. Like the letter-level task, this required participants to attend to more specific parts of the picture rather than looking at it as a whole. The results of the study showed that those subjects who were told to look at the aesthetic qualities of the aggressive slides behaved less aggressively than those who saw the aggressive slides and were given no instructions. It should also be noted that those participants who looked for aesthetic qualities of the aggressive slides did not differ significantly in aggressive behavior from those who looked at the neutral slides with no instructions. Although this study cannot offer conclusions regarding differences in semantic

priming, it supports differential outcomes based on levels of processing.

Another important consideration of processing, besides the level, is that of meaning. Concepts must be processed on a meaningful level for semantic priming to take place, as supported by the letter-level of analysis studies. One study of media effects on aggression considered how different types of meaning can result in different outcomes (Bartholow et al., 2004). To investigate the importance of meaning, the well-established weapons effect was tested for different samples in three experiments. The phenomenon that the mere presence of a weapon, or an image of a weapon, can increase aggressive behavior is known as the weapons effect (Berkowitz & LePage, 1967). Bartholow et al. (2004) hypothesized that hunters and non-hunters would have different schemas regarding hunting weapons, and these differences in meaning would result in different aggressive outcomes. To test this, hunters and non-hunters were recruited for participation. The first experiment established that hunters had more knowledge about guns than did non-hunters, suggesting the possibility that different nodes, or sets of nodes, were connected to the concept of a hunting gun in the semantic network.

The second and third experiments evaluated aggressive-concept accessibility and aggressive behavior, respectively, after being primed with images of either hunting or assault weapons. The aggressive-concept activation was measured using the reading-reaction-time task described earlier and found that hunters responded less quickly than non-hunters to aggression-related words after viewing images of hunting weapons. This suggests that the hunting weapon concepts may have been linked to other non-aggressive concepts in the hunters' semantic networks, whereas non-hunters had the more traditionally assumed links with aggression concepts. The behavioral measure of giving noise blasts to an ostensible

partner also showed these differences. Hunters gave more noise blasts after being primed with assault rifles than with hunting rifles, whereas non-hunters gave about the same number of noise blasts regardless of weapon type. These two findings support the link between differential accessibility of aggressive cognitions and subsequent aggressive behavior. Furthermore, this study corroborates the idea that different semantic meaning associated with the stimulus can influence the priming effect. Along with the Leyens et al. (1976) study and the letter-level research demonstrating that it is possible to not process the semantic meaning of a stimulus, the Bartholow et al. study elucidates that similar processing, but different meanings, can influence the accessibility of aggressive cognitions. Altogether, attention and processing have been briefly investigated in aggression research, but more work is needed to determine the impact these factors have on media violence effects.

Viewing Styles

In addition to just considering attention and processing, it must be acknowledged that people differ in what they attend to and how they process the information. Unlike in the word tasks, these differences do not solely come from features within the movie or the instructions given by an experimenter. According to the uses and gratifications theory, people have a variety of needs that influence their viewing behaviors, including needs for relatedness, identification, information and escaping from reality (Blumler, 1979; Blulmer & Katz, 1974; Katz, Blumler, & Gurevitch, 1973). How a person chooses to fulfill these may influence both the selection of movie content, as well as the level of processing applied. Besides picking which movies to watch, viewers might also choose which type of scenes they will attend to during the movie. Some may be more intrigued by violence and thus pay closer attention to these scenes, whereas others may be more interested in the relationship-

oriented storyline. Additionally, some people may choose to process the images and dialogues on a relatively surface level in order to simply follow the plot, thus requiring the use of fewer cognitive resources (Lang, 2000). Others may choose to process these on a deeper level to get at the underlying messages, by looking for symbolism or thinking about themes, for instance, and would thus use more cognitive resources in the process (Lang, 2000). Others may not consciously think about all the ideas presented but will become emotionally involved, by allowing themselves to empathize with the characters to discern meaning and thus activate schemas (Lang, 2000; Miall, 1989).

Furthermore, attention and processing are closely related because one must pay attention to something in order to process it on a deeper level. In the movie setting, however, it is possible to attend to one type of scene for plot-related information, but not process it on a meaningful level. This makes it important to consider attention and level of processing separately, unlike in the letter-level type tasks where attention and deeper processing are more directly correlated. With the evidence that attention and type of processing can have an impact on the magnitude of semantic priming effects, and the contention that semantic priming can serve as a cognitive route to aggressive behavior, the roles attention and type of processing have in media violence effects need further investigation.

The Current Study

The current study was designed to test the hypothesis that the media violence effect could change based on different viewing styles. Because different movie-viewing styles have yet to be established, a basic approach was taken by classifying participants as either surface-viewers or depth-viewers. These correspond to different levels of processing: surface-viewers engage in minimal processing and depth-viewers actively seek deeper

messages in the movie. A manipulation was used in the study to classify the participant as either a surface or depth viewer. Additional personality measures were included, however, to explore the idea that because people have different needs that influence their media use, they may have a natural inclination in how they watch a film, regardless of the instructions given.

It is worth noting that this discussion has described viewing styles as varying by depth, predominately defined as thinking or not thinking. Given that most literary works, including movies, are designed to elicit emotional responses in viewers, it may be that depth of feeling could also be a dimension of viewing style (Miall, 1989). In particular, depth of feeling and depth of thinking may go hand-in-hand in processing movie messages. Thoughts and feelings, therefore, must be considered as potential characteristics of depth. It is beyond the scope of this paper to come to a definitive definition of different viewing styles, but both thinking and feeling were considered as potential routes to deeper processing.

Attention was also considered in the current study, but was not manipulated or controlled. The stimulus chosen for the study was a full-length, R-rated film that contained a number of violent and non-violent scenes. Following the movie, participants described the two scenes they found most striking. These data were used to determine to what type of scenes participants attended. By combining the surface/depth classification with the type of scenes described, the study was able to investigate the level of processing and attention effects on the priming of aggressive cognitions after viewing a violent movie. Based on previous research in media effects and semantic priming, five hypotheses were posited about accessibility of aggression and movie-related concepts after watching a full-length violent movie:

Hypothesis I: Participants in the experimental conditions (those who completed the

dependent measure after watching the movie) would be primed for aggression and for movie concepts, as compared to the control condition (who completed the dependent measure before watching the movie.

Hypothesis II: Those participants who attended to non-aggressive scenes would be less primed for aggression than those who attended to aggressive scenes.

Hypothesis III: Participants who attended to non-aggressive scenes would be more primed for movie-related words than for aggression-related words. The opposite was expected for those who attended to aggressive scenes.

Hypothesis IV: There would be an interaction between attention and level of processing, with deep processing of non-aggressive scenes being the least primed for aggression.

Hypothesis V: There would be an interaction between attention and level of processing when comparing within group movie-related and aggression-related priming. The finding expected in hypothesis III would be stronger for those with deep processing, thus polarizing the effect.

CHAPTER 3. METHODS

Design

The study was developed according to a 2 (Level of Processing: depth, surface) by 3 (Attention: aggressive, mix, non-aggressive) design with the incorporation of a control condition. Each session consisted of a group of up to four people, and each session was randomized into one of three conditions (two of which the level of processing was manipulated). Two of the conditions, depth and surface, included instructions on how to watch the movie, either by encouraging or discouraging thinking; participants completed a lexical decision task (LDT) immediately following the movie. Participants in the third (control) condition completed the LDT before watching the movie and were given no instructions on how to watch the movie. To measure attention, participants were asked questions about their experience watching the movie. These data were coded to determine the type of scene to which the participants paid attention. Table 1 lays out the nine-cell design along with the number of participants in each cell.

Table 1. Layout of nine-cell design and corresponding number of participants.

	Post-Hoc Attention Measure			
Condition	Aggressive Scene	Mix Scene	Orthogonal Scene	Total N
Surface (A)				
Watched movie before LDT	25	9	38	72
Told to relax				
Depth (B)				
Watched movie before LDT	24	20	22	66
Told to pay attention				
Control (C)				
Completed LDT before movie	27	9	24	60
No instructions given				
Total N	76	38	84	198

Participants

A total of 208 students from a large Midwestern university participated in this study for partial credit for their introductory psychology classes. The data for six participants were thrown out of the analysis because of the following problems that arose during the study. Two participants did not watch the entire movie. One participant was unable to complete the lexical decision task in the time allotted. Another participant completed the lexical decision task at the wrong time in the procedure. After a preliminary pass of the lexical decision data, one participant did not appear to comply with the rules of the task, as he answered "word" for all practice and actual trials, including all the non-words. Finally, one participant's lexical decision data was accidentally overwritten. Four additional participants were further dropped from the study after the lexical decision task data was cleaned. This procedure and the reason for dropping the participants are discussed in the results section.

Of the remaining 198 participants, 95 were male (48%) and 176 (88.9%) self-identified as Caucasian/European American. The average age of the participants was 19 years; their ages ranged from 18 to 28. After three weeks of collecting data, an amendment was made to the study to recruit only students fluent in the English language because the dependent variable required reading English words. Eleven students (5.6%) indicated they were not native English speakers. Students were recruited using the online sign-up system, SONA, and were asked to participate only if they were at least 18 years of age and had previously participated in one of the mass testing sessions held by the psychology department. Of these 198 participants, 179 (90.4%) completed the measures that were presented in the mass testing sessions. The remaining 10% were only excluded from analyses that included these measures.

Measures

An audience experience questionnaire and the Buss-Perry Aggression Questionnaire (Buss & Perry, 1992) were presented during mass testing sessions held by the psychology department because the content of these scales was overtly related to the hypotheses of the study. Presenting these questionnaires outside the context of the current study was expected to reduce the likelihood of demand characteristics. The rest of the measures were presented during the 150-minute study session.

Levels of Processing

Audience Experience Questionnaire (*AEQ*). The AEQ was designed specifically for this study to determine whether a person naturally tends to watch movies on a deep level or not. A series of statements were assembled describing different ways people watch movies or use movies in their lives. Each statement was followed by a five point Likert-type scale, asking participants to select from "strongly disagree" to "strongly agree." A pilot study was conducted and a series of factor analyses were performed to determine which questions were most appropriate to measure depth of viewing. A total of 505 participants were administered the first draft of the AEQ as part of a series of online questionnaires.

Statements were selected according to their effect on the reliability of the scale and how items correlated according to the factor analysis. Based upon the groupings of the items, the factors retained for the scale were those that reflected emotional or cognitive involvement in a movie. Unfortunately, from the items tested, there was no factor reflecting a surface-only construct. It was decided that the scale would be used as a measure of depth-viewing. Those who scored low on depth would be considered non-depth, or surface, viewers.

A total of four factors emerged in the final assembly of the scale: thinking, escaping, absorption, and feeling. The items corresponding to each of these factors and their respective alpha coefficients can be seen in Table 2. The final AEQ has a total of 20 items with an internal reliability of .86. To calculate a total AEQ score and obtain a "depth" score, the escaping, absorption, and feeling items were averaged together to create an emotive score, due to the amount of overlap these items had in the factor analysis. This score represents the degree to which deeper experience occurs through emotional routes. For the total AEQ score, the emotive score and the thinking score are averaged together. This allows for thinking, the depth experience through cognitive routes, to be weighted equally with the feeling, absorption, and escaping subscales. In the current study, the full AEQ had a Cronbach's alpha of .85; the reliability coefficients for the individual subscales are listed in Table 2. The correlations between all the potential processing measures are presented in Table 3.

Need for Cognition (NFC; Cacioppo & Petty, 1982). Because the AEQ is a newly developed scale, the Need for Cognition scale (NFC) was used as an additional measure of depth through cognition. The NFC measures "tendency for an individual to engage in and enjoy thinking" (Cacioppo & Petty, 1982, p. 116) and is made up of 34 statements. Each statement is rated on a 9-point Likert-type scale ranging from -4, "very strong disagreement" to +4 "very strong agreement." Items on the NFC include "I really enjoy a task that involves coming up with new solutions to problems," "The notion of thinking abstractly is not appealing to me," and "I appreciate opportunities to discover the strengths and weaknesses of my own reasoning." In this study, the Cronbach's alpha for the NFC scale was .99.

Table 2. The Audience Experience Questionnaire

Subscale	Reliability	Items
Thinking	$\alpha = .706^{a}$	I like movies that make me think.
	$\alpha = .728^{b}$	I like when I have to figure out what's going on in a movie.
		After seeing a movie, I like to talk about and analyze it.
		When I watch a movie again, I like to look for things I missed the first time.
		I like to interpret the symbolism in a movie.
		I do not give any thought to a movie after it has ended (Reverse Score).
Escaping	$\alpha = .740^{a}$	Movies work well to distract me from my life.
	$\alpha = .729^{b}$	Sometimes when I watch a movie it feels like everything else in the world just goes away.
		I often lose track of time when I watch a movie.
		I will watch a movie to distract me from my problems.
Absorption	$\alpha = .812^{a}$	Often a movie can feel real to me.
	$\alpha = .796^{b}$	When I watch a movie, I like being in the moment and experiencing everything with the characters.
		I have been known to lose myself in a movie.
		There can be something magic about a movie.
		If the main character is feeling a particular emotion (happy, sad, angry) I will start to feel that way too.
		I often put myself in the character's shoes.
Feeling	$\alpha = .754^{a}$	I want to watch a movie that makes me feel something.
	$\alpha = .721^{b}$	I prefer to feel something about a movie rather than just think about it.
		I enjoy being touched by a movie.
		A good movie (to me) is one that moves me.

[a] indicates alphas from the initial pilot test. [b] indicates alphas from this current study.

Table 3. Descriptive statistics for and bivariate correlations between potential processing measures.

		Mean	Std. Dev.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.	AEQ: Total	7.36	1.07	--										
2.	AEQ: Emotive	3.48	.63	**.807****	--									
3.	AEQ: Think	3.88	.67	**.830****	**.341****	--								
4.	AEQ: Feel	3.77	.69	**.625****	**.745****	**.292****	--							
5.	AEQ: Escape	3.28	.85	**.636****	**.833****	**.226****	**.353****	--						
6.	AEQ: Absorb	3.38	.76	**.739****	**.891****	**.334****	**.557****	**.645****	--					
7.	NFC	5.83	.87	**.179****	.019	**.268****	.118	-.004	-.056	--				
8.	QMEE	5.96	.76	**.227****	**.374****	.008	**.421****	**.191***	**.338****	.054	--			
9.	KTS: Extrovert/Introvert	1.65	.89	.100	.107	.059	.095	.059	.114	-.056	**.149***	--		
10.	KTS: Sensing/Intuition	1.99	.94	**.167***	**.154***	.121	**.167***	.139	.076	**.192****	**.304****	-.045	--	
11.	KTS: Thinker/Feeler	2.42	.87	.131	**.204****	.016	**.204****	.133	**.177***	-.127	**.394****	-.097	**.307****	--
12.	KTS: Judger/Perceiver	1.58	.87	.131	.081	.133	.069	.080	.049	.078	-.007	-.041	**.424****	**.243****

Note. AEQ = Audience Experience Questionnaire; NFC = Need for Cognition; QMEE = Questionnaire Measure of Emotional Empathy; KTS = Kiersey Temperament Sorter

*p<.05, ** p<.01

Questionnaire Measure of Emotional Empathy (QMEE; Mehrabian & Epstein, 1972). The Questionnaire Measure of Emotional Empathy (QMEE) was used as an additional measure of emotional depth. Thirty-one items were used to measure an individual's awareness and responsiveness to another's emotions. Each statement was rated on a 9-point Likert-type scale, ranging from -4, "very strong disagreement" to +4 "very strong agreement." Items on the QMEE include "I become very involved when I watch a movie," "I am very upset when I see an animal in pain," and "I am able to make decisions without being influenced by people's feelings." In this study, the Cronbach's alpha for the QMEE was .83.

Keirsey Temperament Sorter (KTS; Keirsey & Bates, 1984). The Keirsey Temperament Sorter (KTS) is a personality assessment based on the psychological types proposed by C.G. Jung (1923). It assigns people to one of 16 types, similar to the Myers-Briggs Type Indicator. Scores lie along four dichotomies – extroversion/introversion, sensing/intuition, thinking/feeling, and judging/perceiving – that give each person four letters (e.g. 'ESFP,' 'INTJ') matching one of the 16 types. The letter 'X' can be assigned whenever a person lies directly between the two extremes. For instance, if a person selected an equal number of 'extrovert' and 'introvert' responses, they would receive an 'X' instead of an 'E' or 'I.' The 'X' would then be incorporated into their label (e.g. 'IXTJ,' 'ENFX'). The KTS is made up of 70 items that ask the participant to select between two possible responses. Items on the KTS include: "At parties do you (a) stay late, with increasing energy, (b) leave early, with decreased energy," "Are you more attracted to (a) sensible people, (b) imaginative people," "Are you more interested in (a) what is actual, (b) what is possible," and "Does it bother you more having things (a) incomplete, (b) completed." In this study, Cronbach's

alpha for the KTS was .98.

Accessibility of Cognitions

The accessibility of aggressive cognitions was measured using a lexical decision task (LDT; Neely, 1991). Target word stimuli were presented to participants, and their reaction times were measured using the DirectRT computer program module for MediaLab. All letter strings were presented in white font on a black background in the middle of the computer screen. Each trial began with a 500 ms presentation of 'XXX' in the center of the screen, followed by 250 ms of black, and then the target string, which remained on the screen until participants made a selection. The "z" button on the keyboard was labeled "non-word" and the "/" button was labeled "word." Participants were instructed to indicate the letter string as either a word or non-word by pressing the button as fast, but as accurately, as possible. A practice session of detailed instructions and six trials were presented to the participants before completing the actual task. The practice session had three control words and three non-words that were not used in the later task.

The full LDT consisted of 98 trials. The first two trials were always either a control word or a non-word, and these were treated as additional practice. The following 96 trials consisted of 24 aggression related words, 24 movie related words, 24 control words, and 24 non-words. These words were arranged into 12 randomly presented blocks. Each block contained two of each word type and these eight words were randomized as well. Words were chosen for this task using the word and non-word generators on the English Lexicon Project website (Balota, Cortese, Hutchison, Neely, Nelson, Simpson, & Treiman, 2002).

The following specifications were used to create a word list: six or seven letters, an average reaction time between 560 and 670 ms, and a log transformed frequency score

between six and ten. Once this list was complied, 24 words were chosen that were aggression-related and 24 that were unrelated to aggression or the movie. Similarly, the 24 movie-related words were chosen from the list meeting the following criteria: three six-letter and three seven-letter relationship-related, journey-related, scene-specific words, and Amish culture-related words. The non-words were selected from a non-word generated list using the 6-7 letter and 560 – 570 ms reaction time criteria. The full word list can be found in Table 4.

Table 4. Lexical Decision Task word list

Type	Word	Type	Word	Type	Word
Aggressive		Movie		Control	
	brutal	Relational	beloved		applies
	dagger		caring		chants
	grabbed		grandpa		charms
	gunfire		parent		chilled
	gunshot		passion		choices
	harmed		trusts		fashion
	harmful	Journey	adjust		gossip
	injured		belong		lately
	insult		courage		margin
	kicked		healing		monkey
	killers		helping		motels
	lethal		hiding		orange
	murders	Scene	dancing		pancake
	pistol		garage		paused
	punched		raising		planner
	pushed		swings		resorts
	shoved		thirst		rhythm
	smacked		tourist		skilled
	stabbed	Amish	customs		slender
	threat		farmer		tailor
	victim		horses		tipping
	violent		passive		wealthy
	weapon		praying		widely
	wounds		virtue		wonders

Other Measures

Buss-Perry Aggression Questionnaire (BPAQ;Buss & Perry, 1992). Aggression research has previously shown a link between trait aggression and violent media effects (Anderson, 1997; Bushman, 1995). It was important to include a trait aggression measure to be able to ensure that surface/depth effects could not otherwise be explained as a trait aggression effect. The Buss-Perry Aggression Questionnaire (BPAQ) is made of up 29 statements. Participants were instructed to answer each item on a 7-point Likert-type scale which ranged from "extremely uncharacteristic of me" to "extremely characteristic of me." Example items are "I can't help getting into arguments when people disagree with me," "At times I feel I have a gotten a raw deal out of life," and "If somebody hits me, I hit back." An alpha coefficient for the Aggression Questionnaire has been reported at .89 and was .90 for the current study.

Striking Scenes Questions. Questions were asked at the end of the study about the participants' experience with the film. Following the procedure used in literary studies on absorption during reading, participants were asked to identify the two most striking scenes from the movie and to describe what made the scene striking (Kuiken, Phillips, Gregus, Miall, Verbitsky, & Tonkonogy, 2004). A striking scene was defined to participants as "your favorite scene or one that was just particularly memorable." Participants were also directed to include in their description any thoughts or feelings they may have had while watching the scene.

Demographics and Cohort Questions. In addition to the personality questionnaires and striking scenes questions, participants were also asked a series of demographic and cohort questions. Participants were asked to indicate their age, sex, ethnicity, major, year

classification (freshman, sophomore, junior, senior) and whether or not they were a native English speaker. There was also a series of questions administered after the movie that asked how many people were in the group and to indicate on a 7-point Likert-type scale whether there was any talking during the movie, if they found the talking to be distracting, and if the talking changed their experience with the movie. There was also a final question asking if any of the other people in the group were the participant's friend.

Stimulus

The movie used in the current study was *Witness* (Feldman, Bombyk, & Weir, 1985), starring Harrison Ford and Kelly McGillis. It is 112 minutes long and is rated R. This movie was selected for the numerous violent and non-violent scenes it contains, as well as themes that contrasted with the violent storyline, such as community and romance. This movie was also chosen because it is relatively old and unknown, particularly among the population sampled. This increased the likelihood that participants had not previously seen the movie and would not introduce a confounding variable of past experience or knowledge related to the movie.

Procedure

The study was conducted with participants in groups of one to four people. Before the experiment began, the groups were randomly assigned by a die roll to one of three conditions: surface, depth, or control. Signs were displayed above the television set to remind participants of their instructions. All conditions required posting 'Please refrain from talking' and 'Please no texting' signs. In the surface condition, two additional signs were posted: 'Relax,' 'Just veg-out.' In the depth condition, the signs 'Pay attention' and 'What messages are there?' were posted. Upon arriving in the laboratory, participants were directed

to individual cubicles where they were given informed consent documents to read and sign. After agreeing to participate, the experimenter went over the major details of the study again in case the participant had any initial questions.

The first task that all participants completed was the practice lexical decision task. Experimenters explained the basics of the task, asked if there were any questions, and then directed participants to the computer where more detailed instructions were given. Following the practice task, all participants were presented with the demographic questions. Participants then completed the three personality questionnaires (NFC, QMEE, and KTS), which were presented in random order on the computer. After these, a screen on the computer instructed the participant to open the cubicle door and wait for the experimenter.

At this point in the study, those participants in the control condition were reminded the goals of the word task and completed the full LDT. Following this, control participants moved into a larger room with the others to watch the movie. Participants in the surface and depth conditions moved into the larger room after completing the personality questionnaires. The following instructions were read to the participants:

> [Surface Condition]: You are now going to watch the movie *Witness* starring Harrison Ford. Please make yourselves comfortable as the movie is approximately two hours long. One way people watch movies is for entertainment and as a way to relax or unwind. For some people, watching a movie is a great way to veg-out and turn your brain off. Have you watched a movie for this purpose, to just relax and not have to think? Okay. We would like to try to re-create this experience as you watch the movie. So I'll ask that you please relax and imagine you've just picked up this movie at the end of a long day for some light entertainment and a chance to decompress. I'll

also ask that you try to refrain from talking so each person can fully enjoy the movie. When the final credits begin, please open the door.

[*Depth Condition*]: You are now going to watch the movie *Witness* starring Harrison Ford. Please make yourselves comfortable as the movie is approximately two hours long. One way people watch movies is to get very involved in the film and try to pick up on everything that is going on. Remember in English class the teacher asking you to pay attention to the details, themes, and messages of the story? People may watch movies for this purpose as well. Have you ever watched a movie this way? Okay. We would like to re-create this experience as you watch the movie. Allow yourself to become engaged with the characters. There is generally more to a movie than the basic plot, so while you are watching, pay attention to all the different messages and ideas that are in the movie. I'll also ask that you try to refrain from talking so each person can fully enjoy the movie. When the final credits begin, please open the door.

[*Control Condition*]: You are now going to watch the movie *Witness* starring Harrison Ford. Please make yourselves comfortable as the movie is approximately two hours long. Please try to refrain from talking so each person can fully enjoy the movie. When the final credits begin, please open the door.

After the movie, all participants were directed to return to their original cubicles. Participants in the surface and depth conditions were now reminded of the goals of the word task and completed the full LDT. Following this, or directly following the movie for the control condition, participants were told that their next task was to select two striking scenes from the movie and to describe why they picked them. This task was also completed on the computer; then, the cohort questions were presented. Once the computer tasks were finished,

the experimenter asked the participants if they had ever seen the movie before, if they had any trouble with any of the instructions during the experiment, including directions on how to watch the movie if they were in the surface or depth condition, and if they had a guess as to the hypothesis being tested in the study. Finally, the experimenter debriefed the participants, explaining that the purpose of the experiment was to see if the different ways in which people watch movies changes the way the violent content affects them. Participants were then given their credit receipt and thanked for their time.

CHAPTER 4. RESULTS

Attention Measure: Type-of-Scene Coding

To determine the type of scene participants attended to, the striking scene questions completed after the movie were coded. Participant responses were randomized and given a new subject number to blind the raters to condition. For each of the first two scenes mentioned by the participant, a rating of either 'Orthogonal,' 'Mix,' or 'Aggressive' was assigned. The term 'orthogonal' was used as part of the coding scheme to emphasize that these ideas were unrelated to aggression in any form, whereas 'non-aggressive' could imply the inclusion of scenes where characters ceased harming others or protected others from harm.

An orthogonal rating was assigned to responses that mentioned a scene containing no acts of aggression during the entire scene and where the respondent did not discuss anything related to aggression – in either the form of intentionally hurting someone or preventing someone from being hurt. An aggressive rating was assigned to responses that mentioned a scene that contained any act of aggression (physical or verbal) and when the respondent's discussion focused on aggressive themes; again, this included discussing the prevention of harm because the concept of harm is still incorporated. Finally, a mix rating was assigned to responses that either mentioned an orthogonal scene but discussed aggressive ideas or mentioned a part of a scene that included acts of aggression but discussed orthogonal ideas. For any participants who mentioned more than two scenes, only the first two scenes were considered.

Two coders independently rated 160 of the responses. After coding approximately 30 participants, the raters compared their results. When disagreements in the ratings were

encountered, the two raters discussed their reasons for their decision and came to a consensus for the final rating. Comparisons were made after each set of 30 participants in order to decrease the possibility of rater drift, as the discussions of disagreements helped formalize the coding criteria. A kappa coefficient was calculated to determine the reliability of the two raters, K=.81, p<.001. For the following analyses, only the first scene described by the participants was used. There was no relation between the type of scene chosen first and second, $\chi^2(4)=3.129$, p=.536; therefore, it was decided to only use the first scene as an indicator of type-of-scene attended to because it was the scene the participants found the most striking.

Dependent Variables: Lexical Decision Data

Prior to testing the hypotheses, the lexical decision data were cleaned and analyzed for potential outliers. A variety of different methods have been used to identify which trials should be deleted from the analysis, and which trails should be truncated, including using Tukey's hinges or two standard deviations from the mean (Lindsey & Anderson, 2000; Otsuka & Kawaguchi, 2007). The following procedure was used for this analysis. For any aggression, movie, or control word the participant did not accurately identify as a word, that trial was deleted. A modified box plot was calculated of each individual's reaction time for aggression, movie, and control words. Any individual reaction time that was identified as an extreme outlier was deleted. Three participants were excluded from further analyses for having more than ten total trials deleted from their data. Those reaction times that were labeled as moderate outliers were truncated. Slow reaction times were replaced with the value of the third quartile plus 1.5 times the interquartile range. Fast reaction times were replaced with the value of the first quartile minus 1.5 times the interquartile range. After

each individual's data were cleaned, modified box plots were calculated for each condition by means for word type to determine if there were additional outliers. One additional participant was further excluded from analysis because his average reaction time for each type of word was twice that of the group mean, and ranged from 250 ms to 650 ms slower than the next slowest participant.

The reaction time data from the LDT was used as a measure of semantic priming. For the following analysis, three index scores were calculated from the reaction time data to serve as the dependent variables instead of using mean scores. This was done to control for individual variances in average reaction time. An *aggression score* was calculated by subtracting an individual's mean reaction time for the aggression words from their mean reaction time for the control words. A *movie score* was calculated similarly, by subtracting mean movie-related times from mean control times. Positive scores on these indices reflected that participants were primed because they responded faster to the aggression and/or movie-related words than the control words. Finally, a *difference score* was created in order to test if participants were more primed for movie-related or for aggression words. The movie score was subtracted from the aggression score to determine the difference score. A positive score reflected a participant being more primed for aggression than the movie, and a negative score reflected a participant being more primed for the movie than aggression.

Primary Results

Baseline Effects

Because sex and trait aggression, as measured by the BPAQ, have previously been linked to aggression, it was tested to see if these factors would predict LDT aggression scores in the control group as baseline effects. A linear regression revealed that trait aggression did

not predict aggression scores in the control group, β = -.144, $t(1)$ = -.821, p = .416, but an independent samples t-test was significant for sex, $t(50.1)$=2.046, p=.045. In the control group, males had a mean aggression score (and standard deviation) of 11.40(50.41), whereas females had a mean aggression score (and standard deviation) of -12.52(36.37).

A 2 (Sex) x 3 (Condition) ANOVA was conducted to test if the sex differences in baseline would create an interaction between sex and condition; the interaction was not significant, $F(2,192)$ = .374, p = .689. Similarly, a 2 (Sex) x 3 (Type-of-Scene) ANOVA was conducted only on those participants in the experimental conditions to explore a sex by type-of-scene interaction. This interaction was not significant, $F(2,132)$ = .172, p = .842. These null results suggest males and females were not affected differentially based on condition; therefore, the following analyses were collapsed across sex.

Priming of Aggression and Movie-Related Concepts

Hypothesis I stated that participants in the experimental conditions would be primed for aggression and for movie concepts as compared to the control condition. The mean indices for aggression and movie related words are presented in Table 5. A one-way ANOVA was conducted to determine if the two conditions of participants that completed the lexical decision task after watching the movie responded faster to the aggressive words than

Table 5. Mean aggressive and movie scores by condition.

	Condition	N	Mean	Std. Deviation
Aggression Score	Surface	72	9.4146	44.52193
	Depth	66	10.9875	50.39522
	Control	60	-1.3555	45.62401
Movie Score	Surface	72	15.3656	40.25912
	Depth	66	15.2692	45.74242
	Control	60	5.7612	40.16824

the control words, as compared to the control condition. There was no significant effect, $F(2,195) = 1.282$, $p = .280$. Additionally, an independent samples t-test was conducted comparing the experimental groups (collapsing the surface and depth conditions) and the control group; the test was not significant despite the means being in the expected direction, $t(116) = 1.615$, $p = .109$. A second one-way ANOVA was conducted to look at the priming of movie-related words. There was no significant effect, $F(2, 195) = 1.076$, $p = .383$. The independent samples t-test comparing the collapsed surface and depth conditions with the control group was also not significant, but the means were again in the expected direction, $t(119.15) = 1.508$, $p = .134$.

Three one-sample t-tests were conducted to further investigate if the two experimental groups were primed for aggression. For each condition, the indexed aggression score was tested for being different from zero. In theory, if the scores are significantly different from zero, this would indicate that participants reliably responded faster to the aggressive words than to the control words. For the surface condition, the mean aggression score was marginally significantly different from zero, $t(71) = 1.794$, $p = .077$; for the depth condition, the mean aggression score was also marginally significantly different form zero, $t(65) = 1.771$, $p = .081$. For the control condition, the mean aggression score was not significantly different from zero, $t(59) = -.230$, $p = .819$.

Three additional one-sample t-tests were conducted to investigate if the two experimental groups were primed for the movie-related words. For each condition, the indexed movie score was tested for being different from zero. For the surface condition, the mean movie score was significantly different from zero, $t(71) = 3.239$; $p = .002$; for the depth condition, the mean movie score was also significantly different from zero, $t(65) = 2.712$, $p =$

.009. For the control condition, the mean movie score was not significantly different from zero, $t(59) = 1.111$, $p = .217$. Although neither the one-way ANOVA nor the independent samples t-test were significant, these one-sample t-test results suggest that participants in the experimental conditions, both surface and depth, were marginally primed for aggression and primed for the movie, while those in the control condition were not.

Attention and Aggression Score

Hypothesis II predicted that those participants who attended to orthogonal scenes would be less primed for aggression than those who attended to aggressive scenes. This analysis only looked at the participants in the experimental conditions because the control group completed the LDT before watching the movie; therefore, what scene they attended to would not be able to predict their aggression score. To determine if the aggression score changed as a function of type-of-scene attended to, a one-way ANOVA was conducted. The results were not significant, $F(2,135) = .096$, $p = .908$. To test attention to aggressive scenes compared to attention to orthogonal scenes more definitively, an independent samples t-test was conducted of just these two groups. The results were also not significant, $t(106.15) = .303$, $p = .762$.

Attention and Difference Score

Hypothesis III predicted that participants who attended to orthogonal scenes would be more primed for movie-related words than for aggression-related words, whereas the opposite was expected for those who attended to aggressive scenes. A one-way ANOVA was conducted for type-of-scene with the difference score as the dependent variable in order to test if the magnitude of the movie priming was greater or less than the aggressive priming. The test was significant, $F(2,135) = 3.9$, $p = .023$; however, it was not in the expected

direction. Participants who chose an aggressive scene had a mean difference score (and standard deviation) of -13.51 (36.63), indicating they responded faster to movie-related words than aggressive words. Participants who chose an orthogonal scene had a mean difference score (and standard deviation) of 6.45 (37.94), suggesting they may have been slightly more primed for aggression (See Figure 5). Pair-wise comparisons revealed that the scores were significantly different for those participants who selected an orthogonal scene and those who selected an aggressive scene, mean difference = 19.959, $t(101.19) = 2.775$, $p = .007$. The orthogonal – mix and the mix – aggressive comparisons were both non-significant, $t(58.4) = 1.557$, $p = .125$; $t(53.22) = .705$, $p = .484$, respectively.

Interaction of Attention and Processing for Aggression Score

Hypothesis IV stated there would be an interaction between attention and level of processing, with deep processing of non-aggressive scenes being the least primed for

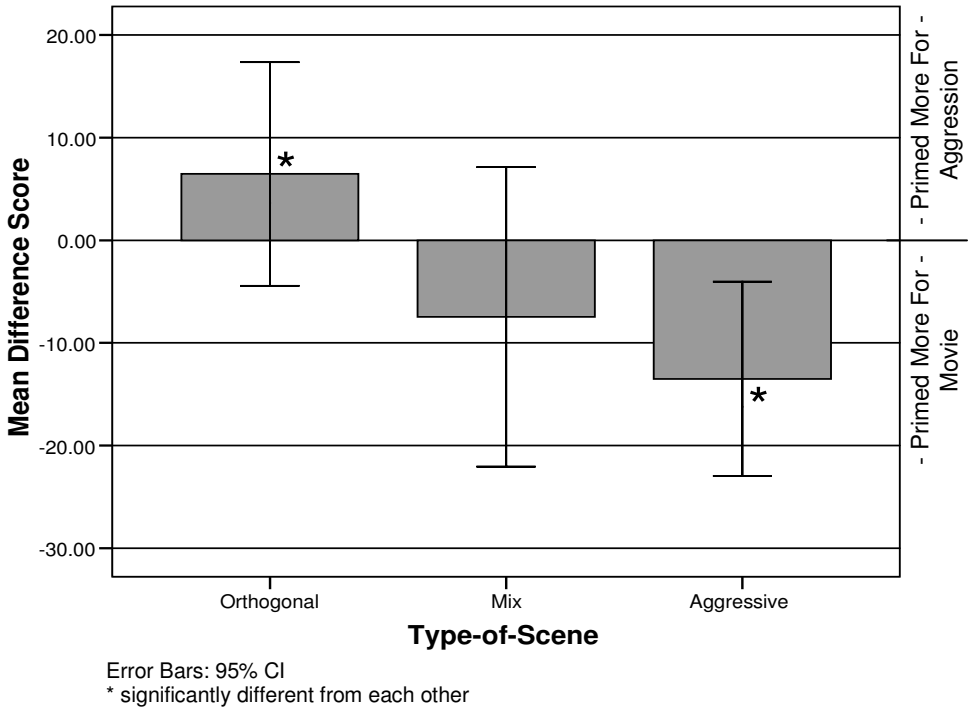

Figure 5. Mean difference score by type-of-scene.

aggression. A 2(Condition) X 3 (Type-of-Scene) ANOVA was conducted to see if there would be an interaction between level of processing and type-of-scene for aggression scores. The interaction was not significant, $F(2, 132) = 1.235$, $p = .294$.

Interaction of Attention and Processing for Difference Score

Hypothesis V predicted there would be a polarization for the main effect of scene predicted in hypothesis III, where the magnitude of priming would be stronger in the depth condition according to what was attended to. A 2(Condition) X 3(Type-of-Scene) ANOVA was conducted for the difference score. The interaction was not significant, $F(2,132) = 1.775$, $p = .173$, but there was a main effect for type of scene, $F(2,132) = 4.460$, $p = .013$. Despite the interaction being non-significant, the depth condition did appear to pull the effect towards the extremes. The difference scores for the depth condition were more polarized

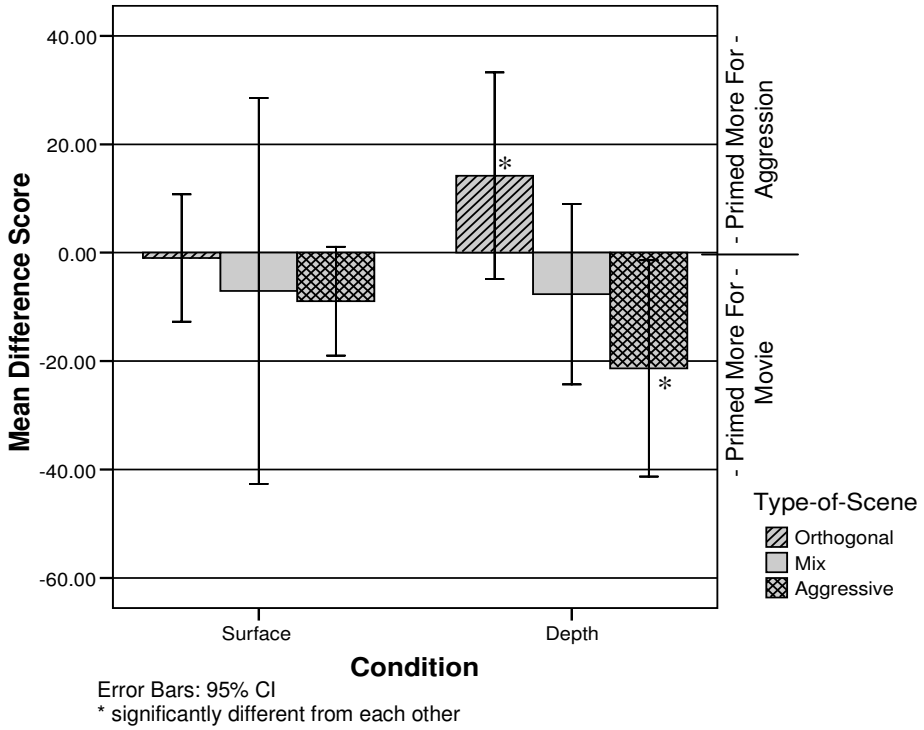

Figure 6. Mean difference score by type-of-scene and condition.

than those in the surface condition (See Figure 6). The results of the pair-wise comparisons are presented in Table 6, and show that the simple main effect of orthogonal compared to aggressive scene difference scores was significantly different in the depth condition.

Summary of Primary Results

The only primary hypothesis that was supported by the data was that participants in the experimental conditions were primed for aggression and movie related words, as determined by a one-sample t-test that compared the indexed aggression score to zero. Although there was a significant main effect of type-of-scene on the difference score, it was not in the hypothesized directions. Furthermore, there was a trend towards polarization as hypothesized, but the interaction was not significant.

Table 6. Pair-wise comparisons for condition by scene.

Group	Comparison	t	df	p	Mean Difference	Std. Deviation
Surface Condition						
	Orthogonal - Aggressive	1.059	54.06	0.294	7.98	7.537
	Orthogonal - Mix	0.369	10.253	0.719	6.074	16.45
	Aggressive - Mix	-0.118	9.709	0.907	-1.907	16.212
Depth Condition						
	Orthogonal - Aggressive	2.672	43.680	0.011	35.553	13.304
	Orthogonal - Mix	1.796	41.890	0.080	21.862	12.171
	Aggressive - Mix	-1.099	39.270	0.279	-13.692	12.469
Orthogonal Scene						
	Surface - Depth	-1.401	38.482	0.164	-15.174	10.828
Mix Scene						
	Surface - Depth	0.035	12.437	0.972	0.614	17.364
Aggressive Scene						
	Surface - Depth	1.148	32.374	0.259	12.399	10.797

Exploratory Results

Although the hypotheses regarding attention and level-of-processing were not supported by the primary analyses, it may be that there are other variables that do result in differences in the aggression and movie scores. If the randomization process was successful, it is possible that these differences were averaged out in the manipulated groups. Particularly, people may have an inclination for how they will choose to watch a movie and the manipulation may not have been effective. A variety of potential depth measures were included in this study to explore other ways people may approach movies.

Manipulation Check

Before looking into personality variables, it is of interest to check if the manipulation worked. Although 100% of participants indicated during the debriefing interview that they had no difficulties following the directions on how to watch the movie, a more objective method was included. The following coding scheme was applied to the striking scene questions to determine if participants were able to follow the directions they were given on how to watch the movie.

As the directions for the intended depth condition specifically asked participants to pay attention to 'details, themes, and messages' and compared the way they should watch the movie to an "English class," a coding scheme was developed using critical approaches to literature to distinguish between those participants who were attempting to derive a deeper meaning from the movie and those who remained on a surface or plot level. Similar to the type-of-scene coding, each participant was randomly assigned a second identification number that blinded the raters to the participants' condition. Raters read both scene descriptions and discussions for all 208 participants and rated the first two scenes mentioned individually. For

any participant who discussed more than two scenes, only the first two were coded.

Two passes through the responses were involved in the coding process. The first pass through the data had each rater independently assign each scene to one of three classifications: 'depth,' 'borderline-depth,' and 'surface.' Scenes were rated 'surface' if the discussion did not include any information regarding meaning. Scenes were rated 'depth' or 'borderline-depth' if participants used one of five approaches in an attempt to get at a deeper level of meaning in the scene. The 'borderline-depth' category was for those participants who were on the border between surface and depth. This category was necessary for the first pass as many responses were not clearly 'depth' or 'surface.'

The five approaches to meaning were: moral, personal, literary-device, literary-characterization, and literary-theme (Seldon, 1989). The moral approach was defined as participants discussing rules of behavior or mores that could be inferred from the movie; this did not involve making judgments on the moral behavior of the characters, but rather taking an "Aesop's Fables" approach to the 'moral of the story.' The personal approach involved participants relating something in the scene to something in their personal lives in order to derive meaning from the movie; a participant discussing something along the lines of 'I liked the farm scene because I lived on a farm' was not sufficient to classify as depth-personal because there was no attempt at finding meaning. The literary approach was broken into three sub-groups: device, characterization, and theme. Literary-device was defined as participants who used literary jargon or implied the use of techniques like foreshadowing or symbolism in the discussion. Once again, using this approach to discern meaning was required, and misusing a literary term did not guarantee a 'depth' rating. Literary-characterization was defined as those discussions that described the growth of characters in

the movie, and literary-theme included those responses that mentioned over-arching themes of the movie; again, using the approach to derive meaning was required. Although these approaches were necessary to help the raters understand what classified as 'depth', the classification of these scenes into each category was not used in further analyses.

For any scenes where the raters disagreed on the code to assign, one of two actions was taken. If raters disagreed between 'surface'/'borderline depth,' or 'borderline depth'/'depth,' a consensus was reached to pick one of the two ratings. If the raters disagreed between 'surface'/'depth,' a 'borderline depth' rating was assigned without further discussion. The second pass through the responses required raters to independently return to all scenes rated 'borderline depth' and make a second judgment, forcing the scene into either the 'surface' or 'depth' rating. This time when raters disagreed, a consensus was reached. The final dichotomous split of 'surface' or 'depth' was meant to serve as the manipulation checks. To avoid rater drift, classifications were compared and discussed every 15-40 participants. An inter-rater reliability coefficient was calculated for the two raters on the dichotomous ratings, $K = .863$, $p < .001$. A chi-square was calculated and revealed a relation between the 'surface'/'depth' rating in the first and second scene, $\chi^2(1) = 12.423$, $p < .001$. For this reason, the ratings for both of the participants' scenes were combined to create a single, dichotomous level-of-meaning variable. In the experimental conditions, a total of 96 participants were given a 'surface' rating and 42 received a 'depth' rating.

To determine if the manipulations of the surface and depth conditions were successful, a chi-square was calculated comparing level-of-meaning and condition. Participants in the control condition were left out of this analysis as they were not instructed on how to watch the movie. The test was not significant, suggesting that the manipulation

Table 7. Percentage of level-of-meaning ratings by condition.

	Level-of-Meaning	
Condition	Surface	Depth
Surface	36.2%	16.0%
Depth	33.3%	14.5%

did not work, $\chi^2(1) = .001$; $p = .974$. Table 7 shows the frequencies for each level of meaning by condition cell.

Hypotheses IV and V were retested using level-of-meaning as the level-of-processing variable instead of condition; however, both 2(Level-of-Meaning) X 3(Type-of-Scene) ANOVAs were not significant, $F(2,132) = 2.090$, $p = .128$; $F(2,132) = .713$, $p = .492$, respectively. To test attention to aggressive scenes compared to attention to orthogonal scenes more definitively, a 2(Level-of-Meaning) X 2(Aggressive/Orthogonal) ANOVA was conducted. The interactions were still not significant, $F(1,105) = .001$, $p = .980$; $F(1,105) = 1.231$, $p = .270$, respectively. The main effect of type-of-scene on the difference score became significant, $F(1, 105) = 4.418$, $p = .038$, but, again, in the opposite direction than predicted . Unlike the results of hypothesis IV with condition as the depth variable, the polarization trend did not appear when the groups were split by surface or depth levels of meaning (See Table 8).

Table 8. Mean difference scores for level-of-meaning by type-of-scene.

Level-of-Meaning	Type-of-Scene	N	Mean	Std. Deviation
Surface	Orthogonal	31	12.9743	40.02142
	Aggressive	49	-13.621	38.58017
Depth	Orthogonal	18	-4.7801	32.04152
	Aggressive	11	-12.9974	27.75265

Personality Measures

The purpose of this set of analyses was to determine if personality variables could serve as a better operational definition of level-of-processing in hypotheses IV and V. As the question of interest here is related to the difference in priming after watching the movie, the control condition was excluded in the analyses. The following scales were examined as potential measures of level-of-processing: the total AEQ, its four subscales (thinking, feeling, escaping, and absorption), the AEQ emotive scale (the combined scores of the feeling, escaping, and absorption subscales), the QMEE, the NFC, and the four subscales of the KTS (Extrovert/Introvert, Sensing/Intuition, Thinker/Feeler, and Judger/Perceiver). The additional variables of sex and trait aggression were used as control variables because they are not appropriate measures of processing but have previously been found to predict aggressive thoughts, feelings, and behaviors. The potential that sex or trait aggression could be a better predictor over and above a personality measure was not overlooked and was addressed when necessary.

Hypotheses IV and V were retested in four separate analyses (See Table 9). First, an overall investigation was conducted to determine if any personality measures were related to the aggression score for all participants in the experimental conditions (collapsed across surface and depth conditions). Any measures that emerged as predicting aggression score were then tested for an interaction with type-of-scene.

Second, a further investigation into predictors of the aggression score was conducted, but the surface and depth conditions were tested separately to determine if there was an interaction between participants' natural viewing style and the way they were instructed on how to watch the movie. Again, any measures that emerged as predicting aggression score

Table 9. Layout of Exploratory Analyses.

Analysis	Scales	Condition	Type-of-Scene	Response Variable
1a	All	Collapsed[b]	All	Aggression Score
1b	Emergent[a]	Collapsed[b]	Each[c]	Aggression Score
2a	All	Surface	All	Aggression Score
2b	Emergent[a]	Surface	Each[c]	Aggression Score
2c	All	Depth	All	Aggression Score
2d	Emergent[a]	Depth	Each[c]	Aggression Score
3a	All	Collapsed[b]	All	Difference Score
3b	Emergent[a]	Collapsed[b]	Each[c]	Difference Score
4a	All	Surface	All	Difference Score
4b	Emergent[a]	Surface	Each[c]	Difference Score
4c	All	Depth	All	Difference Score
4d	Emergent[a]	Depth	Each[c]	Difference Score

Note. [a]Only variables that emerged as significant predictors in the prior test were used; [b]Surface and depth conditions are collapsed together; [c]Regressions were conducted separately for each type-of-scene, or Type-of-Scene was included as a factor in an ANOVA.

for either condition were then tested for an interaction with type-of-scene. This block also included an 2(Level-of-Meaning) X 2(Condition) X 3(Type-of-Scene) ANOVA for aggression score to explore if a participants' actual discussion of meaning would interact with condition and type-of-scene. Although the main effect of level-of-meaning tested during the manipulation check was non-significant, this test was included as a further investigation of whether natural viewing style and how one is told to watch would interact.

The third and fourth analyses repeated the method above. These looked for an overall predictor of the difference score and then tested for predictors by condition. These two analyses offered information regarding whether the viewer was more primed for aggressive or movie-related concepts. In the following analyses, all personality measures were examined independently of each other due to their high amount of co-linearity (See Table 3).

Analysis 1: General depth predictors of aggression score

As each of the above measures was tested as a measure of the same construct (level-of-processing) and were generally correlated, linear regressions were conducted separately on the continuous variables (AEQ, including its subscales, QMEE, and NFC) and independent t-tests were run on the subscales of the KTS (excluding the 'X' classifications where the participant scored equally for each type) to determine if any factors predicted the aggression score for all experimental participants. The Thinker/Feeler subscale of the KTS was marginally significant for aggression score, $t(124)=1.853$, $p=.006$, but after including the X classification and controlling for sex, the effect became non-significant, $F(2,204) = 1.757$, $p = .178$. None of the other variables were found to have significant effects. Since no factors emerged as overall general predictors of aggression score, an interaction with type-of-scene was not tested. These null results suggest that no personality measures included in this study predicted which participants were more primed for aggression after watching the movie.

Analysis 2: Condition by natural depth for aggression score

There may be an interaction between how one would naturally process a movie and how he or she was told to watch it. To investigate this, participants were split based on their manipulated condition to see if any of the personality measures would predict the aggression score, again, the control condition was not included in the analysis. Two factors emerged as predicting aggression score: one for the surface condition and one for the depth condition.

For the surface condition, the Thinker/Feeler subscale of the KTS was significantly related to aggression score, even after controlling for sex and trait aggression and including the X classification, $F(2,59) = 3.408$, $p = .040$. Participants classified as Thinkers had a higher mean aggression score. This would suggest that those participants who are more

inclined to consider things objectively and logically were more primed for aggression (Keirsey & Bates, 1984). For the depth condition, the NFC scale significantly predicted aggression score after controlling for sex and trait aggression, $\beta = -.297$, $t(54) = -2.312$, $p = .025$. Contrary to those people in the surface condition, this suggests that the less need for cognition participants had, the more likely they were to be primed for aggression.

To test for an interaction between level-of-processing, as defined by the Thinker/Feeler variable, and attention for the surface condition, a 3(Type-of-Scene) X 3(Thinker/X/Feeler) ANCOVA was run, controlling for sex and trait aggression. The interaction was not significant, $F(4,53) = 1.169$, $p = .335$. The interaction was also tested for level-of-processing being defined by the NFC. For the depth condition only, linear regressions were conducted on each type of scene for NFC on aggression score, controlling for sex and trait aggression. NFC was found to be a significant predictor only for those participants in the depth condition who selected an aggressive scene, $\beta = -.467$, $t(18) = -2.237$, $p = .038$, indicating that lower need for cognition only predicts higher aggression scores for participants in the depth condition who chose an aggressive scene, whereas need for cognition did not predict aggression score for those who attended to the other scene types (See Figure 6).

Finally, a 2(Type-of-Scene) X 2(Level-of-Meaning) X 2(Condition) ANOVA was run to investigate if natural level-of-processing, as defined by actual discussion of meaning in the striking scenes questions, would have an interaction with scene and condition. The three-way interaction was not significant, $F(1,101) = .029$, $p = .865$.

Analysis 3: General depth predictors of difference score

The same exploratory analyses were conducted to test if any of the personality

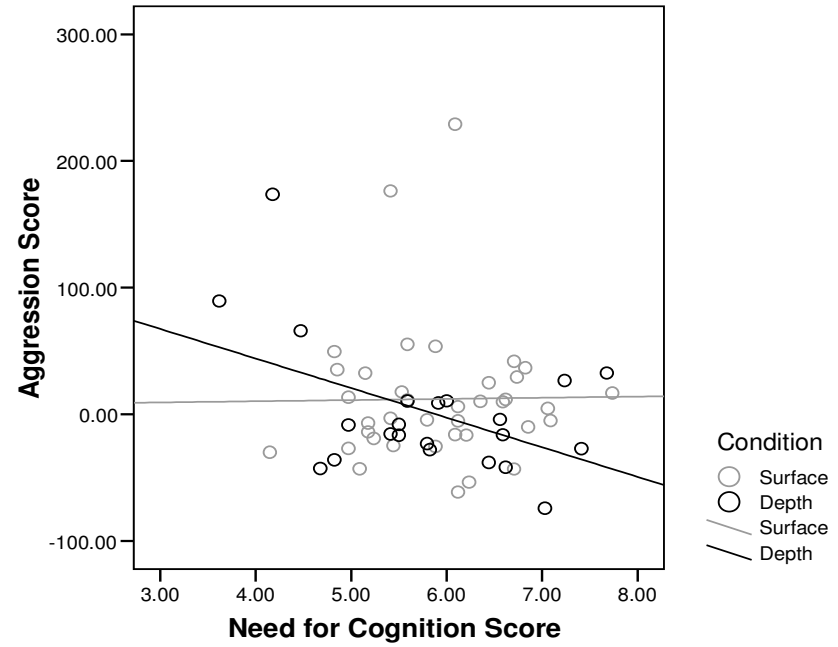

Figure 7. Scatter plot of NFC on aggression score for aggressive scene.

variables would predict whether participants were more primed for aggression or more primed for movie-related words, using the difference score as the dependent variable. The NFC scale, after controlling for sex and trait aggression, predicted the difference score, with less need for cognition predicting more priming for aggression than movie-related words, β = -.178, $t(118) = -2.003$, $p = .047$. Although it is not a measure of processing, it is worth nothing that the independent samples t-test for sex was significant, $t(136) = 3.103$, $p = .002$, with females being more primed for movie related words compared to aggression words and males being slightly more primed for aggressive words than movie words, *M(SD)* = 14.67(36.82), *M(SD)* = 4.93(37.38), respectively.

The interaction between NFC and type-of-scene was tested by conducting separate linear regressions of NFC on the difference score for each type of scene. Type-of-scene was

not included in the regression as a predictor variable due to the qualitative nature of the factor. After controlling for trait aggression and sex, the NFC scale significantly predicted difference score for those who chose an aggressive scene, $\beta = -.311$, $t(52) = -2.452$, $p = .018$, with less need for cognition predicting that participants were more primed for aggression than for the movie-related concepts. This result corresponds with the finding that less need for cognition was related to high aggression scores.

Analysis 4: Condition by natural depth difference score

As with the aggression scores, it was further investigated to see if any of the personality measures would predict the difference score when participants were split based on their manipulated condition; again, the control condition was not included in the analysis. Four personality measures emerged as predicting difference scores: three for the surface condition and one for the depth.

For the surface condition, the feeling subscale of the AEQ, the escape subscale of the AEQ, and the emotive subscale of the AEQ were marginally significant predictors for aggression scores after controlling for sex and trait aggression, with higher feeling, escape, and emotion scores resulting in lower difference scores (See Table 10). These results suggest that the more emotionally involved participants were in the movie, the more likely they would be more primed for movie-related concepts than for aggressive ones. It should also be noted that the independent samples t-test for sex was significant, $t(69.9) = 2.080$, $p = .041$, with females being more primed for movie-related words than aggression words.

For the depth condition, the NFC scale was a marginally significant predictor of difference score after controlling for sex and trait aggression (See Table 10), again suggesting that the higher participants need for cognition, the more likely they were to be

primed for movie-related concepts than aggressive ones. Sex was significant for the depth condition as well, with females being more primed for movie-related words than aggression words, $t(59.9) = 2.351$, $p = .022$.

To test for an interaction between level-of-processing, as defined by the three AEQ subscales, and type-of-scene for the surface condition, separate regressions were conducted controlling for sex and trait aggression on the differences score. The escape subscale and the emotion subscale predicted difference scores only for those participants who selected an aggressive scene (see Table 10). These results suggest it was only for those participants who chose an aggressive scene that being emotionally involved in the movie was related to more priming for movie-related words than aggressive words.

Table 10. Feeling and thinking predictors of difference score.

Variable	Condition	Scene	β	T	p
AEQ Feel	Surface	**Overall**	**-0.211**	**-1.713**	**0.092**
		Orthogonal	-0.100	-0.418	0.681
		Mix	-0.261	-0.500	0.644
		Aggressive	-0.248	-1.390	0.175
AEQ Escape	Surface	**Overall**	**-0.216**	**-1.758**	**0.084**
		Orthogonal	0.111	0.422	0.678
		Mix	-0.388	-0.820	0.458
		Aggressive	**-0.354**	**-2.070**	**0.047**
AEQ Emotion	Surface	**Overall**	**-0.244**	**-1.972**	**0.053**
		Orthogonal	0.032	0.126	0.901
		Mix	-0.460	-0.856	0.440
		Aggressive	**-0.347**	**-2.005**	**0.054**
NFC	Depth	**Overall**	**-0.237**	**-1.840**	**0.071**
		Orthogonal	-0.212	-0.787	0.435
		Mix	-0.057	-0.189	0.853
		Aggressive	**-0.487**	**-2.633**	**0.017**

Note: All regressions were run controlling for sex and trait aggression.

To test for an interaction between processing and attention for the depth condition, linear regressions were conducted for each type of scene for NFC on aggression score, controlling for sex and trait aggression. NFC was found to be a significant predictor only for those participants with an aggressive type-of-scene (See Table 10). This result is consistent with previous NFC findings that the lower participants were on need for cognition the more likely they were to be primed for aggressive words than for movie-related words.

Finally, a 2(type of scene) X 2(level-of-meaning) X 2(condition) ANOVA was conducted to investigate if natural level-of-processing, as defined by actual discussion of meaning in the striking scene responses, would have an interaction with scene and condition. The three-way interaction was marginally significant, $F(1,101) = 2.834$, $p = .095$. The means for these groups are presented in Table 11, and they show that the polarization effect only occurred for those participants who did not discuss meaning in their striking scene responses.

Overall, the results of these exploratory analyses showed that Need for Cognition consistently emerged as a predictor for those participants who were in the depth condition.

Table 11. Three-way interaction of difference score by condition, level-of-meaning, and type-of-scene

Level-of-Meaning	Condition	Type-of-Scene	N	Mean	Std. Deviation
Surface	Surface	Orthogonal	14	1.186	34.84861
		Aggressive	31	-6.8696	30.83757
	Depth	Orthogonal	17	22.6824	42.36462
		Aggressive	18	-25.2483	47.93959
Depth	Surface	Orthogonal	11	-3.7366	18.5518
		Aggressive	7	-18.2188	29.47789
	Depth	Orthogonal	7	-6.4199	48.27129
		Aggressive	4	-3.8598	25.58382

Lower need for cognition repeatedly predicted both being more primed for aggression in general and being more primed for aggressive concepts than for movie-related concepts. No single variable emerged as a consistent predictor for those participants in the surface condition. The Thinker/Feeler subscale of the KTS was related to aggression scores for those participants in the surface condition. A classification of 'Thinker' was associated with higher aggression scores, or being more primed for aggression. The feeling, escaping, and emotive subscales of the AEQ were related to differences scores for participants in the surface condition. Higher scores on each of these scales predicted more priming of movie-related words than aggressive ones. Finally, there did appear to be a three-way interaction between level-of-meaning, condition, and type-of-scene. The hypothesized effect that a deeper level-of-processing would increase the magnitude of priming only occurred for those participants who did not discuss meaning in their striking scene responses.

CHAPTER 5. DISCUSSION

As movies are filled with a variety of images, motifs, and messages, it is important to consider what viewers attend to and the level of processing they engage in when discussing the effects of the media. Because previous aggression research has suggested that semantic priming is one of the cognitive routes to aggression (Berkowitz, 1984; Lindsey & Anderson, 2000), and research in semantic priming has shown that the magnitude of semantic priming can change based on attention and levels of processing (Otsuka & Kawaguchi, 2007; Woltz & Was, 2006), it is important to merge these findings into a more complete understanding of violent media effects. The current study attempted to investigate how attention and levels of processing would affect the magnitude of aggressive priming after viewing of violent movie.

Priming

The first objective of this study was to establish that the participants were primed for both aggressive and movie-related concepts. The test comparing the two experimental groups to the control group, who completed the lexical task before watching the movie, suggested that priming may not have occurred after watching the movie. It was not the case, however, that participants were responding with equal mean reaction times to the aggressive, movie, and control words; instead, the control group also responded faster to the aggressive and movie words, making the control group not significantly different from the experimental groups. The additional tests showed that, for the experimental groups, the movie and aggression scores were significantly and marginally significantly different from zero, respectively, while the scores for the control group were not. It appears then, that the experimental groups were responding faster to the movie and aggressive words than to the control words, which supports the hypothesis that they were primed.

There are a number of possibilities that could explain why the experimental groups and control groups were not significantly different in the current study. The first is that there may be a quality of the aggression and movie words that would make them more accessible to begin with, compared to the control words that were used in the task. Although all the words for the lexical decision task were chosen based on similar average reaction time and frequency of use from the English Lexicon Project (Balota et. al., 2002), they were not pre-tested as three sets of words with matching qualities. Furthermore, differential baseline reaction times to the words existed. The males responded faster to the aggression words than the control words, while the females responded slower, before watching the movie. These differences could also affect the variance of the groups, resulting in the non-significant results.

It is also possible that priming should not have been expected to occur from the movie in the first place. Semantic priming is considered to be very short-lived, lasting only for seconds (Collins & Loftus, 1974; Neely, 1991), and the increased accessibility of certain types of words may have decayed before the participants completed the lexical decision tasks in the experimental conditions. Other research, however, has suggested that semantic priming is not as short-term as originally thought (Bargh, Chen, & Burrows, 1996; Becker, Moscovitch, Behrmann, & Joordens, 1997). Because the cognitive route to aggression includes the phenomenon of semantic priming, according to the GAM, it is worth further investigating how long the effects last or if the person is no longer primed when leaving the movie theater.

Finally, this study was a between-subjects design and could not fully test if the participants were actually primed. The priming hypothesis was tested between the

experimental and control conditions, but as the sex baseline test showed, there is reason to suspect that there was a large amount of variance between participants. Participants in the experimental conditions ranged from responding to aggressive words 200 ms faster to 200 ms slower than the control words, with an average difference of 15 ms. It may be that comparing reaction times to a different set of participants is not the most accurate measure of priming. Instead, future research should compare participants' reaction times after watching the movie to their own, within-group, reaction times before the movie. Although this will not eliminate all possible alternative hypotheses, it may offer information on individual differences in the semantic priming of a movie.

Attention

Previous research has shown that attention can influence the magnitude of semantic priming because attention allocates cognitive resources towards one concept and away from another (Dark, et al., 1985; Otaku & Kawaguchi, 2007; Smith, et al., 2001). Based on this idea, hypothesis II predicted that participants who attended to the aggressive scenes would be more primed for aggression than those who attended to orthogonal scenes. Similarly, hypotheses III stated that participants who attended to orthogonal scenes would be more primed for movie-related words than aggressive words, as compared to those who attended to aggressive scenes. These hypotheses were not supported by the data. Although there was no difference in aggression score among the three types of scenes, the test of the difference score was significant, but in the opposite direction than predicted. Those participants who attended to an orthogonal scene were more primed for the aggressive than the movie words, while those participants who attended to the aggressive scenes were more primed for the movie words than for the aggressive ones.

Although this outcome is the opposite of the predicted result, there are a few possible explanations that can be considered. The first possibility is that using the first scene selected as the type-of-scene was not an accurate measure of attention. By writing down the first scene that came to mind, there may be no correlation between this type of scene and what the participants paid attention to overall during the movie. This is further supported by the fact that there was no relation between what type of scene participants chose for their first and second scenes. If they initially chose an aggressive scene, there was no pattern to suggest they would pick an aggressive scene as their second choice.

There is a second possibility that the coding scheme used to identify type of scene was too simplified for the context of a full-length movie. Any concept that was related to hurting, whether it was inflicting or preventing harm, was considered as part of the aggressive classification. This was done under the assumption that the activation of the concept "not hurt" would still require the activation of the concept "hurt," and spreading activation should still spread to related aggressive concepts. For example, if the participant described the part of the scene where the antagonist put down his gun and the conflict ended, this was coded as aggressive. The presence of the gun in the scene, even if was not being used, should still elicit the previously established 'weapons effect' and prime the aggressive words related to gun. Nevertheless, it may be that harming concepts and not-harming concepts do not belong on the same continuum and activation spreads to different networks.

Similarly, the non-aggressive scenes were all lumped together in the orthogonal category. It may be that some scenes or storylines were more related than others to the aggressive ideas present in the movie, even if there was no violence in the scene or aggression mentioned in the discussion. For example, one scene that was chosen by a

number of participants took place in the police station where the little boy is looking through mug shots and eventually finds a photograph of the perpetrator in a newspaper clipping. Many participants discussed this scene in terms of looking at the boy in a new place or the way that the police officer did not doubt the boy's accusation despite their differences. Because the scene itself did not have any acts of aggression in it, and the discussion was related to the ideas of culture or new experiences, it would have received a rating of orthogonal. It may be, however, that because the scene itself is so integral to the violent storyline, the participant's attention during the entire film was still on the aggressive aspects.

There is a third possibility that could also explain the opposite direction of the effect, one that allows for the coding of type-of-scene as a measure of attention to still be considered somewhat accurate. The participants were specifically asked to describe the scene they found to be "the most striking." They were further instructed, "This could be either your favorite scene or one that you just found particularly memorable." The first scene chosen may have been particularly striking because it was different from everything else the participant was attending to during the movie. For instance, if the participant spent the movie attending to the romantic relationship between the two main characters, they may have found one of the aggressive scenes striking because it was so different from that on which they focused. Similarly, if the participant was invested in the aggressive storyline, a non-aggressive scene that focused on community building and social support could have been striking because it was in such contrast to the violence.

In this case, the type of scene classification could be an indicator of the types of concepts they were not paying attention to for the majority of the movie. Furthermore, the opposite direction of the results could then be interpreted as supporting the hypothesis. If

participants initially chose an orthogonal scene because it was different from the aggression they had been paying attention to, then the results showed they were more likely to be primed for aggression. Similarly, if the participants initially chose an aggressive scene as most striking because they had been attending to one of the non-violent storylines, then the results showed they were more likely to be primed for the movie. Further research is needed to test this possible alternative explanation of the results found in the current study.

Level of Processing

In addition to the analyses on attention, hypotheses IV and V predicted that there would be an interaction between type of scene and condition for both the aggression and difference scores. This interaction was predicted from previous research (Lang, 2000; Woltz & Was, 2006) by incorporating level of processing with attention, suggesting that, for all participants who attended to one type of scene, a deeper level of processing would result in a larger priming effect. Although neither interaction was significant, pair-wise comparisons of the difference score showed a trend toward polarization. The main effect of scene, with participants who selected an orthogonal scene being more primed for aggression and participants who selected an aggressive scene being more primed for the movie, was stronger in the depth condition than in the surface condition. Although the scene effects were not in the predicted direction, the trend of the effect being larger for the depth condition is congruent with the theory that a deeper level of processing would increase the magnitude of the priming effect.

Although the polarization of the depth condition was not significant in the test of hypothesis V, the three-way interaction of type-of-scene, condition, and processing as defined by the ratings of the striking scene responses was marginally significant, despite the

different number of participants in each group with some groups being small in number. In particular, the polarization effect was found only for those participants who were rated as having a surface level of processing, based on their striking scene responses. For participants rated as 'surface,' the main effect for scene was larger for participants who were instructed to pay attention to messages than for those instructed to relax. For participants whose responses were rated as 'depth,' this pattern was not found.

This finding seems to simultaneously support and contradict the polarization hypothesis. On the one hand, for those participants whose responses were rated as 'surface,' those who were told to engage on a deeper level had larger effects for both types of scene. On the other hand, those participants whose responses were rated as 'depth' only had an increase in magnitude of effect if they were in the surface condition and selected an aggressive scene initially. It appears that there may be an interaction between how a person may choose to watch a movie and how he or she is told to watch it, because the surface-condition/depth-rating and the depth-condition/surface-rating groups were the only ones to demonstrate any strength of priming while the congruent groups (surface/surface, depth/depth) had very similar aggression and movie scores. Perhaps simply having incongruent instructions and tendencies actually created a situation where participants were more focused on the movie because they were asked to behave in a way different than was normal for them.

There are, of course, a number of possibilities that would suggest this marginally significant finding is merely an artifact of other confounding variables; these may also contribute to why the two-way interactions were not significant. As with the type-of-scene analysis, the interactions between attention and level of processing may not have been

significant because the method used to establish what the participants attended to was not sufficient. Similarly, the manipulations used in the surface and depth conditions may not have been sufficient to elicit true surface and depth levels of processing. The manipulation check indicated that there was no relation between how participants were told to watch the movie and how they actually watched it; however, the three-way interaction described above suggests it may have still had an effect.

Furthermore, it may be that the coding scheme used to determine surface and depth processing from the striking scene questions was insufficient. The coding scheme divided participants into dichotomous categories; however, it may have been more appropriate to place participants along a continuum instead, as addressed in the initial need for a 'borderline-depth' category. It is also important to recognize that the surface/depth ratings were based on the ability of the participants to derive meaning from the scene. The coding scheme was devised in this way in order to serve as a manipulation check, as participants were specifically instructed to think about "ideas, themes, and messages" within the movie. Nevertheless, the requirement of deriving meaning may be only one possible level of processing among many. In this way, participants may have actually processed the movie deeply, but not in a way that was recognized by the raters. Similarly, the rating of depth was contingent on participants' abilities to articulate their experience with the movie. It may be that a number of the 'borderline-depth' participants were ultimately rated as 'surface,' not because they did not engage in the movie on a deep level, but rather because they could not articulate meaning sufficiently.

Exploratory Discussion

The instructions given and the rating of striking scene responses were intended to

create and capture differences in level of processing. It was recognized that the concept of viewing styles as described here does not yet have a definitive definition; therefore, exploratory analyses were included to determine if other variables could serve as level-of-processing measures. The hypotheses of attention and processing, for both the aggression and difference scores, were explored for the various personality measures included in the study. What emerged for these analyses was a pattern where high feeling scores were correlated with lower aggression scores for participants in the surface condition. Similarly, higher thinking scores were correlated with lower aggression scores for participants in the depth condition.

In the analysis of the aggression scores, the Thinker/Feeler subscale of the KTS (Figure 8) and the Need for Cognition scale (Figure 9) were the only measures that emerged as significant. The Thinker/Feeler classifications were related to aggression scores for those participants in the surface condition, with the Thinkers having higher aggression scores. In contrast, the NFC scale was a significant predictor for participants in the depth condition, but in the direction that a lower need for cognition results in a higher aggression score. Although these findings may seem contradictory, neither scale was a significant predictor in the other condition. It is not the case that NFC had a positive correlation with aggression scores in one condition and a negative correlation in the other. It may, instead, be the case that they are measuring different cognitive constructs despite the 'thinking' label for both scales. This interpretation is supported by the lack of correlation between these two scales (Table 3).

Only the NFC emerged as an overall predictor of difference score, when the surface and depth conditions were collapsed. The test of the NFC by type-of-scene interaction revealed that the NFC was negatively correlated with the difference score only for those

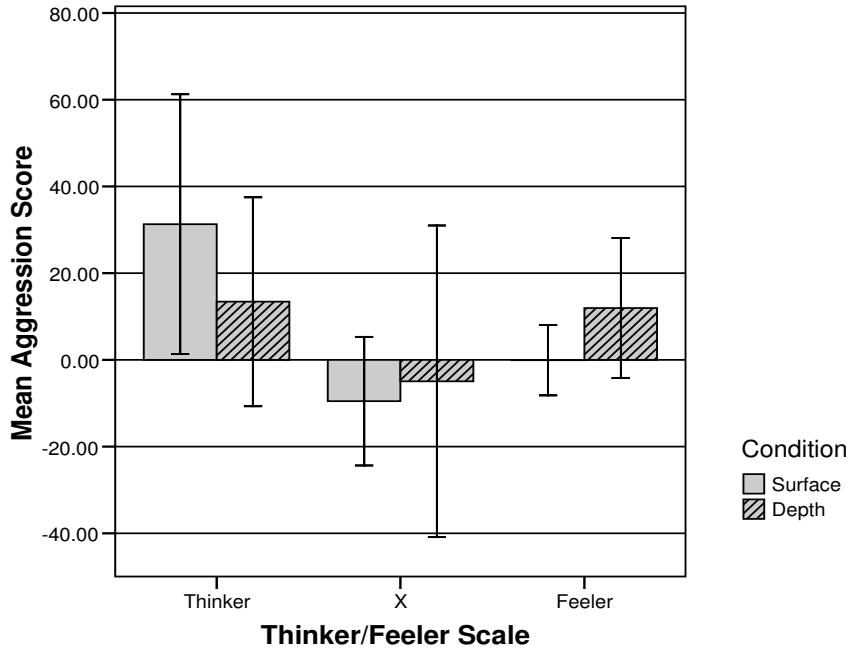

Figure 8. Thinker/Feeler subscale relation with mean aggression scores collapsed across type-of-scene.

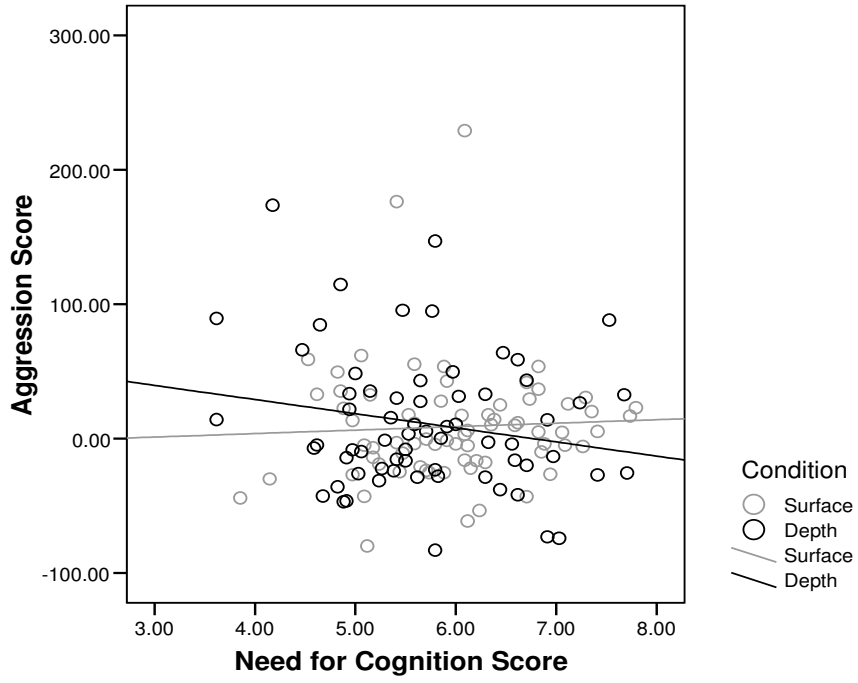

Figure 9. Need for cognition relation with mean aggression score collapsed across type-of-scene.

participants who selected an aggressive scene. The higher the need for cognition, the more quickly participants responded to the movie-related words than the aggressive words. When the potential processing variables were examined by condition the feeling, escaping, and emotive subscales of the AEQ were negatively correlated with the difference score for those participants in the surface condition (See Figure 10). This suggests that the less feeling, less escaping, and less emotive scores the participants had, the faster they responded to the aggression words than to the movie words. For the depth condition, the lower the NFC score the more primed the participants were for aggressive words than for movie-related words (See Figure 10).

By combining the results for the aggression score and the difference score on these exploratory analyses, a pattern can be discerned. The Thinker/Feeler subscale of the KTS and the feeling, escaping, and emotive subscales of the AEQ emerged as predictors only in the surface condition. Although the classification of Thinker in the KTS subscale might be assumed to be related to Need for Cognition, it instead may be more appropriate to compare it to its Feeler counterpart. This interpretation is supported by the Thinker/Feeler subscale being significantly correlated with the feeling and emotive subscales of the AEQ, as well as the QMEE, but not correlated with the NFC scale (refer to Table 3 above). 'Not feeling' may be the necessary interpretation for the predictor of high aggression scores. In other words, for participants who were told to relax and not be involved in the movie, those participants who are inclined to become emotionally engaged were less primed for aggression. For those people who were told to process the movie on a deeper level, it was the people who are normally inclined to think (a high need for cognition) who were less primed for aggression.

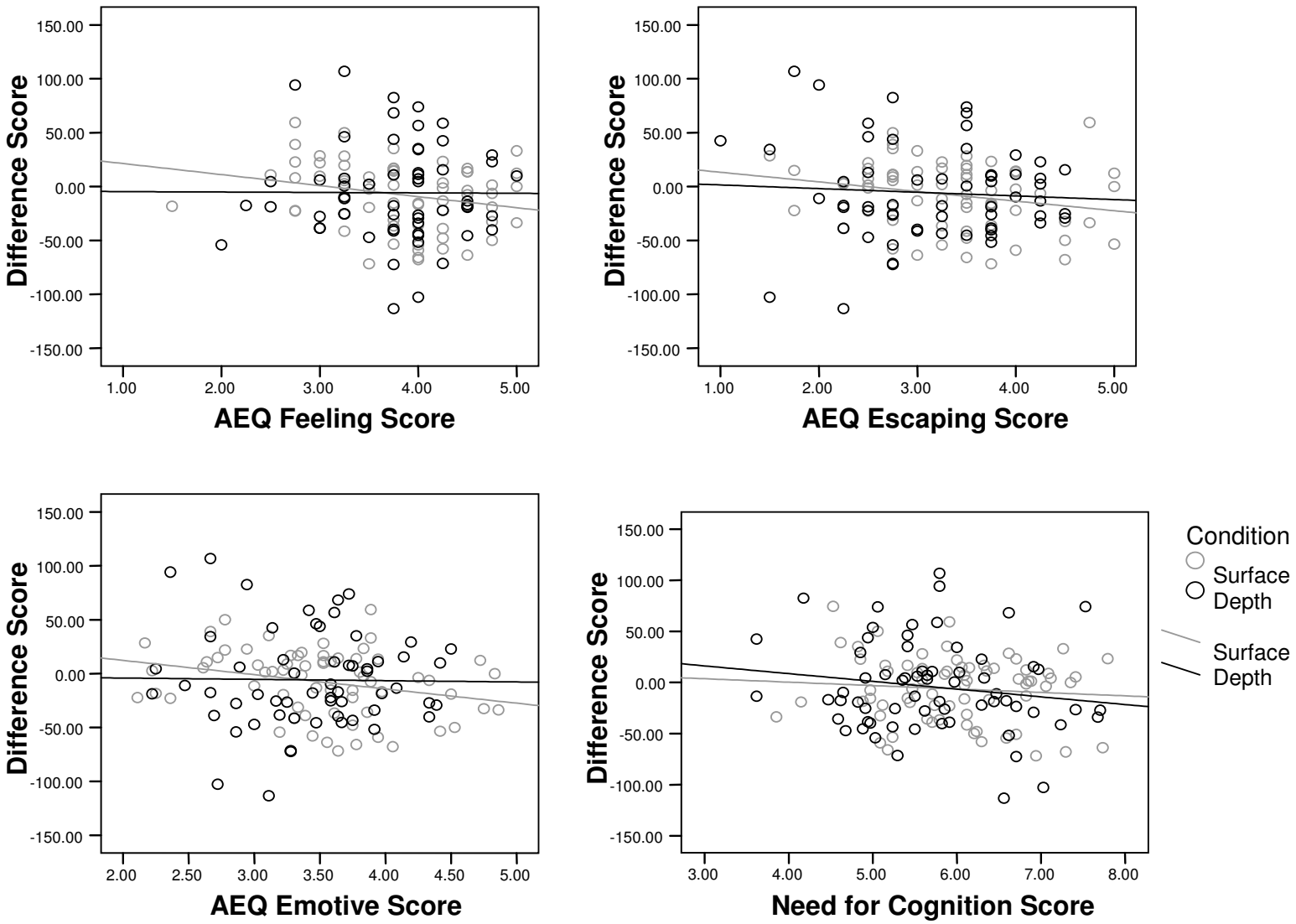

Figure 10. Feeling, escaping, emotive and need for cognition relations with difference score collapsed across type-of-scene.

Although different constructs seem to be responsible for predicting aggression score in the surface and depth conditions, there appears to be a pattern that not thinking and not feeling result in higher aggression scores, which would be predicted if surface is defined as not thinking and not feeling. Furthermore, when the level-of-processing by attention hypotheses were tested using these variables, the escaping and emotive subscale of the AEQ and the NFC had predictive power only for those participants who selected an aggressive scene. Future research is needed to determine what constructs these scales are actually measuring and if there is a single construct (and appropriate measure) that would predict overall semantic priming regardless of condition and type of scene.

Limitations of the Current Study

As has already been discussed to some extent, there are a number of limitations in the present study. The coding schemes used for the type-of-scene and level-of-meaning variables were based on a limited number of possible ratings and may not have accurately reflected the attention and level-of-processing factors as intended.

Similarly, the entire study was designed according to two dichotomies: surface/depth and aggressive/orthogonal scenes. Whereas this was convenient for coding and analysis purposes, it may not accurately reflect the reality of viewing styles and how they can influence the activation of concepts in the semantic network. For instance, in the lexical decision task the movie words were chosen as six relationship, six journey, six scene-specific, and six Amish words. Instead, it may have been appropriate to separate these four ideas into their own 24-word categories, and create four consummate categories for the type-of-scene coding. Similarly, for the type-of-scene coding, no distinction was made between aggressive and pro-social concepts; intentionally not hurting was coded as related to

aggression. It may have been more appropriate to have coded these scenes separately and include a pro-social category of words in the lexical decision task. This greater variety of categories to which participants could pay attention could have provided a richer view of the audience experience.

Besides variable level limitations, other areas of the current study could have been improved. The words chosen for the aggressive, movie, and control categories in the lexical decision task were not pre-tested for similarity. As a result, the participants in the control condition responded faster to the aggressive and movie words than to the control words, when it was expected that there would be no difference between the word types at baseline. The striking scene questions used at the end could also have been improved. They were very simple questions that may not have provided enough information for the participants to answer the question fully. More specific questions could have been asked regarding the participants' experiences with the movie, such as what storyline they attended to, what they enjoyed, what they disliked, and perhaps any specific messages they discerned from the movie. It may be beneficial to consider having the experimenter conduct the interviews in person; however, using the computer seems to have allowed enough anonymity that the participants may have answered more honestly than if talking to a person.

Another limitation is that only one movie was used. Stimulus sampling (Wells & Windschitl, 1999) was not considered for the current study because the questions being asked were regarding differential effects among participants and not about reactions to movies as a whole. Regardless of this, the conclusions that can be drawn from this study are limited because they may have come from features of the movie itself rather than actual differences among participants. Future studies on viewing styles would need to incorporate a variety of

movies for strong external validity.

A final limitation of the current study is the lack of a proper viewing-styles control group. The control group that existed in the study was used as a comparison group for priming, as they completed the lexical decision task before watching the movie. There was no comparable control, however, for the instructions that were given to the participants in the surface and depth conditions on how to watch the movie. If there are natural ways that viewers may approach movies, it will be necessary to include a group of participants that are given no instruction on how to watch the movie and then complete the dependent measure following the movie. This is particularly important as the results from this study suggest there may be an effect when the instructions on movie watching are incongruent with one's natural tendency.

Implications

The General Aggression Model proposes that one short-term process responsible for aggressive behavior is the priming of aggressive concepts in the present internal state (Lindsey & Anderson, 2000). The presentation of an aggressive stimulus increases the accessibility of semantically related concepts through spreading activation. This, in turn, increases the likelihood that an aggressive outcome will be selected during the decision making processes of an interaction. The findings of the current study offer some insights into this process, and a few theoretical ideas that ought to be incorporated into the GAM as an explanatory model for media effects.

The first is that viewing styles, namely what the viewer attends to and how he or she processes this information, need to be considered in the GAM. The results of this study show that all participants were not equally primed for aggression, and attention and processing

were able to account for some of the differences in scores among participants. Currently, the GAM includes a number of personal and situational inputs into a cycle that are used to explain differences in outcomes. These inputs are factors such as trait aggression, parental involvement, and qualities of the perpetrator (Anderson et. al., 2003). Attention and level-of-processing should be included as inputs into the model.

The current approach would suggest that how a person processes a movie and what they choose to attend to are qualities of the person, as investigated in the exploratory analysis with personality measures. The results of this study would also suggest, however, that processing could be considered a situational input, as supported by the interaction of natural processing with condition. Following this, it could be assumed that attention could also be a situational, as well as personal, input. For instance, a person may be naturally inclined to watch a movie in a particular way, but being told to attend to or process certain things could change their experience. In this way, attention and processing are important factors to consider in what affects the present internal state.

Additionally, one current constraint of the GAM is that it is only a model of aggressive inputs and aggressive outcomes; it does not consider aggression in a fuller context where more than one concept is available for processing. The current study, however, looked at how aggressive priming compared with other types of conceptual priming from the movie. The results suggest that the priming of aggression is not all or nothing; participants were primed for both aggression and for other movie-related concepts. In particular are the findings that some participants were more primed for aggression than movie concepts, while others were more primed for movie concepts than aggressive ones. Which type of concept activation is more likely to influence immediate behavior? The aggression may have been

primed, but the non-violent, movie-related words were more easily accessible for some participants. It may be the case, then, that during the appraisal stage of the GAM, the concepts of community building or romance would be more likely to influence behavior initially.

Although the current study cannot offer information for effects on behavior, the question of differential priming has important implications for future research on media violence effects, especially when considering media that use aggressive imagery to produce a non-violent message. For example, violence and gore are staples of war films; however, this genre of movies often has anti-violent and anti-war themes. The current state of the GAM would hypothesize that this type of film would result in an increase of aggressive concept accessibility. If viewers are more primed for non-violent concepts than aggressive ones, though, would this still be the case? The GAM would benefit from including the processing of other types of constructs, besides just aggression, as it tries to explain and predict aggressive behavior.

Finally, the limited support for the priming of aggressive cognitions in the current study needs to be considered for its implications on media violence research. Previous aggression research has used isolated movie clips or static images to prime participants for aggression and has used measures of reaction times to individual concepts to assess accessibility of aggressive cognitions (Bushman & Geen, 1990; Leyens et al., 1976; Lindsey & Anderson, 2000). These studies have measured how quickly a person responds to a variety of single-word targets, both in the reading reaction time task and the lexical decision task, after being primed by another single concept. In the full movie context, however, there is not a single concept being primed. Additionally, the viewer is generally using controlled

processing of some level to follow the storyline (Lang, 2000). As automatic semantic priming, where the person is not using controlled processing, has been found to be very short-lived (Neely, 1991), these measures of short-term priming may not be appropriate for a full movie context. Instead, research may benefit from using measures of schema activation or attitudinal priming to better measure the increased accessibility of aggressive cognitions, or other types of concepts, after watching a movie (Bargh et al., 1996; Fiske & Talyor, 1991).

Conclusion

The current study was an investigation into how attention and level of processing may affect the magnitude of semantic priming of aggressive cognitions. Although many of the hypotheses tested were not significant, a few effects emerged that supported the theories that what the viewer attends to and how deeply they process it can have differential effects on what the viewer is primed for and how strongly they are primed for it. Specifically, the data supported the hypothesis that a deeper level of processing could potentially increase the magnitude of the effects.

More research is needed in the area of viewing styles, particularly in the development of a more concise operational definition. Whereas level of processing and attention are important considerations for how a person may watch a movie, the types of needs viewers use the media to satisfy may offer a more appropriate construct through which to define viewing styles (Blumler & Katz, 1974). Additionally, more research is needed in the area of semantic priming and the media. As single words can elicit spreading activation and create a cognitive preparedness for related concepts, the effects of images, ideas, symbols, and messages in movies on the activations of schemas needs to be more fully investigated. Is it the case that semantic priming decays at such a rapid rate that the increased accessibility of

certain concepts has faded by the time the credits fade, or is it possible that the contextual processing and meaningfulness of the movie create a stronger effect than a single word?

Finally, as semantic priming is one of the cognitive routes to aggression in the GAM, future research on viewing styles and schema accessibility has important implications in the media violence effects research. Better understanding of attention and processing of the media and how they can serve as inputs in the GAM is needed. Additionally, a comprehension of aggression in relation to other, non-aggressive concepts presented in the media would be beneficial. Knowing how level of processing and attention could influence the effects of media violence would help in being able to predict who is at greater risk for an increase in aggressive outcomes.

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