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PSYCHOLOGY OF MEDIA USE

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Interdisciplinarity is one of the hallmarks of research on media content, use, and effects. With regard to use, the preceding chapter focused on the sociology and anthropology of media use, that is, who uses which media, how much, where, when, and so forth. Scholars in communication studies often do such research. One of their theoretical perspectives on media use focuses on its functions and gratifications. Another communication studies perspective on media use and its effects, known as cultural studies, emphasizes the role of sociological factors—especially gender, class, and culture—in determining the different meanings, readings, and interpretations that people find in and take away from media communications. Like the preceding chapter, this one focuses on media use but from another social science perspective—that of psychology. The distinctions amongst sociological, communication studies, and psychological perspectives in media research are blurred rather than distinct, and all three types of scholars take an interdisciplinary approach. It is, nevertheless, useful to keep their varied theoretical and methodological approaches in mind when reading and evaluating media research.

From a psychological point of view, what processes are involved in media use? What is the research evidence regarding attention to, comprehension of, and memory for media products? What theories have been offered to explain these processes? These and related questions are the focus of this chapter. Rather than providing an exhaustive review of the relevant media research, examples are provided, most of which involve television, the most-studied medium. Let's begin by considering the theories.

◆ *Psychological Theories and Processes Relevant to Media Use and Effects*

SOCIAL LEARNING THEORY

The social psychologist Albert Bandura conducted his pioneering laboratory studies of the effects of watching filmed aggression on children's behavior (e.g., Bandura, Ross, & Ross, 1963) to illustrate his then-new theory that children could learn merely through observation, without reinforcement (reward or punishment), which had been the hallmark of earlier learning theories involving classical or operant conditioning. This process of vicarious learning through observation of models, in real life or the media, involves

1. noticing/attending to the modeled behavior (including, for example, verbal or facial expressions),
2. coding the behavior in memory visually or verbally,
3. enacting the behavior, and
4. motivation, that is, evaluating the consequences (Bandura, 1977, 1983, 1994).

In this process of social learning, Steps 1 and 2 comprise the acquisition phase and Steps 3 and 4 the performance phase. It is only when performance occurs, however, that learning can be demonstrated, even though behaviors may be acquired and not performed at all or not performed until much later. Whether an acquired behavior will be performed depends in part on observers' cognitions, including their perceptions of their own similarity to the model and their expectations that if they do imitate the behavior, they will be rewarded or punished. In short, the emphasis in social cognitive learning theory is on explaining the processes involved in the imitation of behavior observed in real life or through media use.

SCHEMA THEORY

Some cognitive psychologists (e.g., Abelson, 1981; Piaget, 1963; Schank & Abelson, 1977) emphasize that through their experience, humans construct and modify mental models, beliefs, and expectations, which govern their behavior. The term *schema*¹ (plural: schemas or schemata) is used to refer to a cognitive model or prototype, which could be relatively simple (e.g., a person's notion of the "average," or prototypical, dog) or complex (e.g., his or her gender schemas). The term *script* is used to refer to sequentially organized events, for example, going to a restaurant (Fiske & Taylor, 1984). The everyday notion closest to a schema is a stereotype. Schemas and scripts guide our information processing and social behavior. We try to fit incoming information into our existing models—that is, our schemas/scripts—and we notice, remember, and respond to information by making it consistent with those models. We tend not to notice information inconsistent with our stereotypes, and even if we do, we may forget it or distort it in memory, which is why schemas and scripts are so difficult to change and why stereotypes are so dangerous. For example, we make Fred, our hard-working friend, an exception to our belief that members of his group are lazy, when we should instead change our belief because the only person in that group whom we know doesn't fit the stereotype.

In the realm of gender, Cordua, McGraw, and Drabman (1979) found that 100% of a group of elementary school children who saw a film about a male physician and a female nurse correctly remembered their roles, but only 50% of those who saw a female physician and a male nurse did so. The other 50% presumably did not notice the role reversal when viewing or distorted the information in memory or at retrieval. That is, they either did not notice the mismatch between the film content and their gender-stereotyped schema(s) or changed the information to be

schema (stereotype) consistent and recalled incorrectly that they had seen a male physician and a female nurse.

Children and adults construct schemas and scripts through their interactions and experiences, both in the real world and through media. North American infants show interest in television and begin watching regularly as early as 18 months, so it provides an “early window” (Liebert, Sprafkin, & Davidson, 1982) on the world. Media, including television, books, and videos, provide information about a variety of social interactions, types of people, and places before children have analogous real-life experiences. Thus, media likely play an important role not only in the maintenance but also in the initial construction of children’s schemas. If so, these media-based schemas and stereotypes influence perceptions and behavior in the real world. For example, researchers who studied second and fifth graders’ beliefs about occupations (nurse, police officer) concluded that children form separate schemata for social information acquired from TV and from real-world experience, but those who perceive fictional TV as socially realistic are more apt to incorporate TV messages into their schemata and their aspirations (Wright et al., 1995).

Story schemas/schemata are particularly useful for processing media content. They are organized clusters of knowledge about stories and how they are typically structured, and children with a good understanding of story schemas have better memory of central story content with reduced processing effort (Meadowcroft, 1985; Miron, Bryant, & Zillmann, 2001). Children in the preoperational stage of cognitive development—that is, up to about 5 or 6 years of age—can only use story schemas when the content is structured simply with clear causal links (Mandler & Johnson, 1977). With achievement of concrete operational thinking, around 5 to 7 years, children are more readily able to use them as frameworks for encoding, storage, and retrieval (Miron et al., 2001).

PSYCHOANALYTIC THEORY

Several aspects of psychoanalytic theory are potentially relevant for the psychology of media use. Media content (e.g., violence or sex) might trigger aggressive or sexual impulses. Or it might, through the concept of *catharsis*, predict a decrease rather than an increase in the probability that the viewer would behave aggressively or sexually because he or she would experience the violence or sex vicariously and, as a result, would cathartically release her or his own aggression or sexually related impulses. However, there is little, if any, empirical support for catharsis with regard to media use and effects.

Another psychoanalytic concept relevant to media use is Freud’s distinction between *tendentious* and *nontendentious humor*. The current notion of being “politically correct or incorrect” is reminiscent of this concept. Zillmann (2000) discussed Freud’s (1905/1958) psychoanalytic theory in this context of incongruity in humor. In tendentious humor, someone or something is victimized (ridiculed, debased, or humiliated), whereas nontendentious humor is victimless. Freud argued that, for reasons of social censure, people cannot enjoy blunt, demeaning hostility unless it is embellished with innocuous “jokework.” The innocuous element camouflages the tendentious component of humor, so we can laugh and avoid social censure, but we also commonly misconstrue what we laugh about, making it possible to avoid self-censure.

Zillmann and Bryant (1980) formalized Freud’s hypotheses in a *misattribution theory of humor* and tested it in an experiment involving comedy and misfortune. Their expectations were confirmed. “Amusement was exceedingly high when all the ingredients of good comedy were present: despised protagonists, their victimization, and humor cues that set the audience free to enjoy these characters’ demise” (p. 149). The presence of an innocuous humor cue allowed the onlookers to be “*malicious with dignity*” (p. 149). Zillmann (2000)

contended that comedy is the most popular genre of media entertainment for both the film and television industries in North America and cited research evidence in support of his *mood management theory* (Zillmann, 1988). Through trial and error, viewers acquire at least a tacit understanding of how to improve their affective state. They prefer comedy to drama when they are stressed or feel gloomy, frustrated, angry, and so forth (e.g., Anderson, Collins, Schmitt, & Jacobvitz, 1996; Zillmann, Hezel, & Medoff, 1980). There also is evidence, however, that they may avoid comedy when there is a reason to maintain negative emotions (O'Neal & Taylor, 1989) or when such emotions are very strong (Christ & Medoff, 1984). Other research addressing Zillmann's mood management theory in relation to empathy is discussed later in this chapter.

COGNITIVE SCIENCE

Behaviorism was, for many years, the preeminent psychological theory in North America. In part as a reaction to Freud's emphasis on the unconscious, the behaviorists argued that mental processes such as perception, memory, and emotion are not the concern of psychology, which must focus exclusively on predicting behavior. Indeed, they referred to all events between any sensory input and a behavioral response as a *black box*. Along with the development of computers and the field of artificial intelligence (AI) came the demise of behaviorism and the establishment of cognitive science, with its emphasis on the mind as an information-processing system. Cognitive scientists have subscribed to a *functionalist* doctrine that states that information processing and the functional organization of the mind can be studied and understood without reference to the underlying human hardware, that is, the brain (LeDoux, 1996). Moreover, they avoid the longstanding philosophical debate about the nature of consciousness and focus instead on the

mind's unconscious processes rather than on its conscious contents. These cognitive unconscious processes include perceptual analysis of the physical environment by our sensory systems, memory, speaking more or less grammatically, imagination, decision making, and so on, as distinct from Freud's darker conceptualization of the dynamic, emotionally charged unconscious. The cognitive unconscious processes "take care of the mind's routine business without consciousness having to be bothered" (LeDoux, 1996, p. 30). For most cognitive processes, mental operations, and computations, we are only aware of the outcome, not the operations themselves. "The inner workings of important aspects of the mind, including our own understanding of why we do what we do, are not necessarily knowable to the conscious self" (LeDoux, 1996, p. 32). Indeed, our conscious awareness consists primarily of the processes involved in our *working memory*, which consists of (a) a general-purpose temporary storage system used in all active thinking processes, (b) several specialized temporary storage systems (called *buffers*) used for specific kinds of information, and (c) *executive functions* that coordinate the working memory activities. Working memory creates and manipulates symbolic representations.

The cognitive science theoretical perspectives are particularly relevant for the media research on attention, comprehension, and memory, discussed later in this chapter.

EMOTION AND FEAR

LeDoux (1996) argues that subjective emotional states, like all other states of consciousness, are the end result of information processing occurring unconsciously. Cognitive scientists could have them fit into the cognitive framework, but instead, they made an artificial separation between cognition and the rest of the mind. LeDoux contends that the processes underlying

emotion and cognition involve unconscious information processing and, sometimes, the generation of conscious content based on that processing. He would prefer to include both under the term *mind science*.

Cognitive scientists use the term *cognitive appraisal* to describe the processes we use to assess our situation. For example, when we encounter an animal while walking in the woods, we integrate our perception (visual, auditory, etc.) with our long-term memory to conclude, in our working memory, that it is a rabbit or a bear. According to LeDoux (1996), what is needed to turn our cognitive appraisal (rabbit vs. bear) into emotions (fear of the bear) is the activation of the physiological system built by evolution to deal with danger, and the *amygdala* plays a crucial role. He describes in some detail the connections between the amygdala and other parts of the brain, as well as other somatic responses that play a role in making an experience emotional. The essential components of his model are as follows. Working memory is the gateway to subjective experiences, emotional as well as nonemotional, and is indispensable for the creation of a conscious emotional feeling. The activation of the amygdala is crucial for a complete feeling of fear, and the activation of arousal is essential for a sustained feeling of fear. Bodily or somatic feedback, or long-term memories based on real-life feedback from the body, also is essential for a sustained emotional experience. You can, however, have an emotional feeling without direct projections from the amygdala to the cortex and without being conscious of the stimulus that elicited the feeling. "If emotions are triggered by stimuli that are processed unconsciously ([i.e.], if working memory is not involved) you will not be able to later reflect back on those experiences and explain why they occurred with any degree of accuracy" (LeDoux, 1996, p. 299).

So conscious emotional feelings and conscious thoughts both involve symbolic representation in working memory of sub-symbolic processes carried out by systems

that work unconsciously. The difference is that thoughts and emotions are generated by different subsymbolic systems and that emotions involve many more brain systems. In other words, the neurological and physiological processes involved in thoughts and emotions differ in important ways, though both involve unconscious processes and systems, and for both, our conscious awareness, if present at all, is through our working memory. Moreover, within the emotional realm, processing of negative material is quick and automatic, and this is primarily what LeDoux (1996) has described. Processing of positive material is elaborated, difficult, discretionary, and more likely to involve cognition (see Reeves, Newhagen, Maibach, Basil, & Kurz, 1991, for a discussion in relation to television messages).

According to LeDoux (1996), the amygdala has a greater influence on the cortex than the cortex has on the amygdala, so emotional arousal dominates and controls thinking, rather than vice versa. Our thoughts can easily trigger emotions (by activating the amygdala), but we are not effective at willing ourselves to turn off emotions (by deactivating the amygdala). I find this useful in trying to understand why people continue to watch scary movies even though they know they may have a long-lasting fright reaction that may interfere with their lives, as Cantor (e.g., 1996) has so well documented.

There is abundant evidence that most children and adults have been frightened by something they have seen or heard in the media and that these media-induced fears are often severe and long lasting (see Cantor, 2001, for a recent review). For example, in one study of undergraduates, all reported vivid memories of enduring media-induced fear (Hoekstra, Harris, & Helmick, 1999), and in another, 90% did so (Harrison & Cantor, 1999). It is common for children and adolescents who have been frightened by media to say they *like* scary films and TV but also to say that they have *regretted* watching them. What's

the attraction? Why do people expose themselves to scary media? Zuckerman (1979) contends that sensation seeking helps people find their optimal arousal level. Apter (1992) argues that if danger is confronted in a “protective frame,” the experience can be exciting rather than anxiety provoking. Cantor (2001) takes the position that a frightening depiction may alleviate anxiety on occasion but only under the limited circumstance that the story induces only mild fear and the outcome reveals that danger can be counteracted effectively (Bryant, Carveth, & Brown, 1981; Cantor & Nathanson, 1997). The psychoanalytic concept of catharsis, in which scary images might reduce rather than increase anxiety in a safe context, put forth by Bettelheim (1975) with regard to violent fairy tales presented orally, has not been substantiated (Cantor, 1998).

Zillmann (1980) proposed that *excitation transfer* might occur during media use; that is, media exposure may generate excitational states that intensify postexposure emotional responses. The physiological arousal experienced may be transferred or labeled by the viewer or reader in an effort to ascribe meaning to the experience. Zillmann has argued that what people like about being frightened by media is the suspense associated with threatened negative outcomes, which produces physiological arousal that, in turn, intensifies the enjoyment of a “happy ending” or resolution within the story as episodes induce and then reduce suspense (Zillmann, 1980; Zillmann, Hay, & Bryant, 1975). Different conceptualizations of arousal and some research relevant to each are discussed later in this chapter.

Johnson (1995) studied adolescents’ motivations for viewing graphic horror and found that their reasons varied (gore watching, thrill watching, watching to deal with their own problems, watching to master fears), as did its impact. It is self-evident but worth mentioning that whereas some media-induced fears occur when an individual chooses to watch or read something known to be scary, others, some of which

may be very traumatic, are experienced unwittingly. This includes violent/frightening scenes in a film or story in which they were not expected, as well as events depicted in news that provide graphic images, whether in a print headline or story or on film.

BACKSTAGE BEHAVIOR, PARASOCIAL INTERACTIONS, MEDIA FRIENDS, AND SLIDING SIGNIFIERS

His experiences with television as a child led Meyrowitz (1985) to argue that his primary response to TV was neither to imitate behaviors seen on it nor to be persuaded that he needed to own products advertised. Instead, social interactions he saw on television, especially amongst adults, affected his willingness to accept other people’s behaviors and claims at face value. He responded to television as a “secret revelation machine” that provided access to people’s *backstage behavior*, that is, behavior not normally exhibited in public, including various aspects of adults’ personal lives. Access to backstage behavior provides viewers with a sense of closeness/intimacy with authority figures (i.e., familiarity) but often with a loss of respect (i.e., contempt). This occurs both for real-world people seen on TV (e.g., politicians) and for occupations and professional roles depicted by actors in fiction (e.g., lawyers, teachers, police).

According to Meyrowitz (1985), different media foster different patterns of information flow about social behavior. For example, television is likely to have a stronger impact than print on respect for authority figures because it provides more detailed images about behavior, including nonverbal behavior.

Media provide *parasocial interaction* (Horton & Wohl, 1956) to their users, that is, the illusion of knowing and interacting with characters depicted, whether real or fictional. These *media friends* (Meyrowitz, 1985) are especially important for people who are, in their own lives, socially isolated,

socially inept, aged and/or invalid, or timid and rejected. Media convergence (e.g., Web sites and “chat” rooms for radio and television programs) undoubtedly intensifies the role of those media in our social world (Ward & Greenfield, 1998).

Just as Meyrowitz (1985) asked whether media, especially television, affect our understanding of the social world, Kinder (1991) asked whether growing up with television and other electronic media changes comprehension of the relationship between real-life things (e.g., elephants), that is, what is signified, and their signifiers (e.g., a photograph or video, or film). Meyrowitz finds Horton and Wohl’s (1956) parasocial framework particularly useful for explaining why it is that when a “media friend” dies, millions of people may experience such a great sense of loss. He points out, as well, that the media provide the most ritualized channels of mourning, with the final irony that the parasocial performer does not die because the *only* means through which people came to know him or her (films, records, photographs, books, videotape) are still available. Does early experience with television encourage “the sliding of the signifier, so that by the time one first encounters, say, an elephant in the zoo, the living animal is merely another signifier of the image already seen on TV in documentaries and animated cartoons, that is, merely part of the paradigm of elephant signifiers?” (Kinder, 1991, p. 35). Ward and Greenfield (1998) asked what the impact of such media priority may be on our understanding of relations with real people, especially those for whom we have little real-world interaction, and how this influences our attitudes, beliefs, expectations, and stereotypes regarding age, gender, occupation, ethnicity, and nationality.

MOOD MANAGEMENT, EMPATHY, AND SOCIAL COMPARISON

With regard to emotional responses to media, Zillmann’s mood management

model (Zillmann, 1988; Zillmann & Bryant, 1985) predicts that people choose media that are likely to affect their mood positively. One of the ways that media can affect the viewer’s mood is through empathy, which Zillmann (1991a) defines as an experience in response (a) to information about circumstances presumed to cause acute emotions in another, (b) to the facial and bodily expression of emotional experiences of another, and/or (c) to another’s behaviors presumed to be caused by acute emotional experiences, and this experience (d) is associated with an appreciable increase in excitation that (e) someone interprets as feeling with or feeling for another. Mood management theory predicts that if empathy occurs, media users will prefer positive to negative portrayals and will feel better after exposure to positive material. It also specifies that when in a negative mood, people are drawn to media with a positive hedonic tone in the hope of improving their mood, whereas people in a good mood are less likely to select media content for its hedonic nature (Zillmann, 1988; Zillmann & Bryant, 1985). Results obtained by several researchers are consistent with these predictions. For example, people who report negative feelings early in the afternoon are more likely to report later that day that they watched a lot of TV, whereas those who report feeling better in the afternoon are more likely later to report a light evening of viewing (Kubey, 1984; Kubey & Csikszentmihalyi, 1990). These and other results (e.g., McIlwraith & Schallow, 1983) show that mood influences viewers’ amount of TV viewing, but they do not speak directly to the impact of mood on type of content chosen.

Mares and Cantor (1992) studied elderly viewers’ (mean age 75 years) responses to televised portrayals of old age. Participants in this study scored either in the top or bottom 20th percentile on a loneliness test but did not live in nursing homes. In an initial session, they were given descriptions of television programs. The lonely group showed greater interest in watching negative portrayals, and the nonlonely group showed

greater interest in positive portrayals. In a second session, they were randomly assigned to watch a negative portrayal (an unhappy, isolated old man) or a positive one (a happy, socially integrated old man). The lonely elderly reported feeling better after watching the negative portrayal than they had felt before watching it, but there was no change in the mood of the lonely participants who saw the positive portrayal. The lonely also expressed less interest in the first session in watching a program about happy young people than in watching programs about unhappy elderly people. For the nonlonely, their mood became more negative after viewing the negative portrayal, but it did not change pre- to postviewing if they saw the positive portrayal of the integrated man. The only way in which these findings support the mood management theory is that the elderly participants did make choices in the first session that were found in the second session to have a beneficial effect on mood. But the choices they made contradicted mood management theory's predictions and, instead, were more consistent with social comparison theory.

In his social comparison theory, Festinger (1954) contended that people (a) compare themselves to others to evaluate themselves, (b) prefer to compare themselves to similar others, and (c) choose upward comparisons, probably because they want to feel similar to superior others or because this provides information about how to improve. More recently, it has been argued that comparison with a more successful person may produce negative affect because it highlights the individual's poorer situation or characteristics and that self-esteem may be enhanced in some situations through downward comparison with a less fortunate other (e.g., Brickman & Bulyer, 1977; Suls, 1977; Wills, 1981; Wood, Taylor, & Lichtman, 1985). The otherwise counterintuitive findings obtained by Mares and Cantor (1992) for elderly viewers fit this social comparison model better than the mood management one.

COGNITIVE NEOASSOCIATION THEORY

Leonard Berkowitz, (1984, 1986), another eminent social psychologist known for his research on the impact of media violence on aggressive behavior, has reframed his earlier version of social learning theory in terms of the cognitive neoassociationist theories of Anderson and Bower (1973) and Landman and Manis (1983). He contends that aggressive *thoughts, feelings, and actions* are linked within an associative network, with the pathways amongst these thought, feeling, and action nodes strengthened by similarity and semantic relatedness. Thus, media violence might *prime* other aggressive ideas, feelings, memories, and action tendencies, as might other cues (e.g., a gun) to one or more components of the *associative network*. Another psychologist, Rowell Huesmann (1986), also emphasizes cued imitation as important for understanding the role of media violence for viewers' behavior.

Josephson (1987) conducted a field quasi-experiment (MacBeth, 1998) in which she randomly assigned boys in Grades 2 and 3 to watch either a violent or a nonviolent, but equally exciting, television excerpt. In the violent excerpt, some snipers used walkie-talkies to communicate just before a SWAT team attacked them. After viewing their excerpt, the boys were taken to the school gymnasium, where a referee did a "pregame interview" using either a microphone and tape recorder or a walkie-talkie. Then they played floor hockey. Their teachers had previously rated them on trait aggression, that is, their characteristic level of aggression. During the floor hockey game, the boys who behaved most aggressively were those who had seen the violent excerpt, had been interviewed with a walkie-talkie, and were rated by their teachers as high in trait aggression. The walkie-talkie apparently served as a cue to activate their network of associations amongst aggressive thoughts, feelings, and actions.

Individuals who are characteristically more aggressive—that is, higher in trait aggression—are presumed to have more extensive associative networks of aggressive thoughts, feelings, and actions, so exposure to violence should have its strongest effect on such individuals. Experimental evidence from studies conducted with adults (e.g., Bushman, 1995; Bushman & Geen, 1990) and children (e.g., Josephson, 1987) using film/TV as well as video games (Anderson & Dill, 2000) supports this hypothesis. Immediately after exposure to media violence, people higher in trait aggression have more aggressive thoughts and ideas, feel angrier, and behave more aggressively than do those who are characteristically not aggressive.

Functional magnetic resonance imaging (fMRI) has been used in recent research to study 8- to 13-year-old boys' and girls' brain responses when viewing violent and nonviolent video images (Murray, 2001). TV violence viewing appears to activate brain areas involved in arousal and attention, detection of threat, episodic memory encoding and retrieval, and motor programming. These findings are consistent with the concept of associative networks involving aggressive thoughts, feelings, and actions, as well as LeDoux's (1996) cognitive models regarding emotion and fear (described earlier in this chapter).

COGNITIVE JUSTIFICATION

Research evidence indicates that the relationship between exposure to media violence and aggressive behavior, thoughts, and attitudes is *transactional* (Rosengren, Roe, & Sonesson, 1983). In a transactional model, one behavior (e.g., exposure to violence) increases the probability of another (e.g., aggression), which in turn increases the other, and so on.

Huesmann (1982) argues that people who are more aggressive watch violence in part because it allows them cognitively to justify their own beliefs and attitudes as

normal. In their research on the effects of TV/film (Bushman, 1995) and video game (Anderson & Dill, 2000) violence, researchers have found that adults who are high in trait aggression report usually watching more violent fare and liking it more. As well, given a choice of what to view in a research setting, they are more likely than adults low in trait aggression to choose a violent movie or video game.

AROUSAL

A number of researchers working from a variety of perspectives have emphasized the importance of the viewer's arousal level for attention to, comprehension of, and memory for media products. Learning, which involves all three processes, is best when arousal is optimal, that is, in a middle range rather than too high or too low (Berlyne, 1960).

Some media researchers have focused on *physiological arousal*. For example, Krull and Watt (1973) talked about the independent contributions of the excitatory and violent components of television for viewers' aggressiveness. Both Berkowitz (1986) and Huesmann (1988) have emphasized the importance of viewers' preexisting emotional states, in terms of both their relatively stable physiological predisposition and their recently induced arousal just prior to viewing.

Vigilance is one aspect of selective attention; the viewer experiences it as alertness to expected stimuli (Miron et al., 2001). In terms of arousal, vigilance is performed by the cortical (reticular activating) system, as distinct from emotional (limbic or autonomic system) arousal. This distinction between cortical and autonomic arousal (Routtenberg, 1968, 1971) is useful because it separates arousal processes involved in attention, perception, and behavioral response preparation from those associated with affective/emotional reactions (Zillmann, 1991b). Zillmann (1991b) contends that for media research, the realm of cortical

arousal is attention, alertness, and vigilance, on one hand, and information processing, acquisition, and retrieval, on the other. The realm of autonomic arousal, in contrast, is affective and emotional reactions that are induced, changed, or neutralized by media exposure or that occur shortly after exposure. Alpha wave blocking is most often used to measure cortical arousal, whereas heart rate, blood pressure, blood pulse volume, skin conductance, and skin temperature measure autonomic (limbic) arousal (Zillmann, 1982, 1991b). In television research, cortical arousal has been treated as a hypothetical construct (Zillmann, 1991b). Blood pressure is the least reliable of the measures of autonomic arousal (Zillmann, 1979). Miron et al. (2001) reviewed research evidence that contradicts the “zombie-viewer” line of research contending that TV viewing is associated with dominant alpha activity, that is, low cortical arousal.

As Zillmann (1991b) pointed out, for most North American viewers, television sometimes serves as an “unwinder.” On such occasions, they choose content that will diminish their noxious states of hyperarousal. Kubey’s (Kubey, 1984, 1986, 1996; Kubey & Csikszentmihalyi, 1990) research evidence documents the effectiveness of television for inducing relaxation. But viewers also, on other occasions, use television for excitement; exposure can be highly arousing. Zillmann discusses the circumstances under which television serves as an unwinder versus for excitement. The same is undoubtedly true of other media.

METACOGNITION

As Miron et al. (2001) point out, *metacognition* (Flavell, 1979; Flavell & Wellman, 1977) plays an important role in comprehension and memory. This term refers to an individual’s knowledge about his or her own cognitive capabilities, including strategies to enhance performance (e.g., if I need to remember this

phone number, it will help to repeat it in my head or, better still, write it down).

If we consider vigilance during television watching from a metacognitive perspective, a child’s attentional self-regulation would involve awareness of his or her ability to sustain attention to television, assessment of how much attention is needed to understand a program (and eventually to learn from it), and the use of skills and strategies for maintaining attention. (Miron et al., 2001, p. 164)

Some media researchers have focused on conscious awareness of cognitive *arousal*, in a metacognitive sense. Salomon (1981, 1983), for example, emphasized the role of attentive involvement, which he called *amount of invested mental effort* (AIME), for learning from media. He found that in the United States, 12-year-olds believe both that it is easier for them to learn from TV than from print and that they are better at learning from TV (Salomon, 1984), which may lead them to invest less mental effort when watching TV than when reading. In a similar vein, Langer and Piper (1988) have distinguished between “mindful” and “mindless” viewing. References to using media as a “couch potato” or being “mesmerized” seem to reflect the distinctions made by these researchers. Unfortunately, if people habitually approach some media in a relatively mindless way and more often to relax/unwind than to learn, this will make it difficult for media designed to be educational to be effective. It is encouraging, therefore, that producers of TV programs such as *Sesame Street* have found ways to do so (Anderson, Huston, Smith, Linebarger, & Wright, 2001; Bickham, Wright, & Huston, 2001; Fisch & Truglio, 2001).

DESENSITIZATION OR HABITUATION

With repeated exposure to any particular type of media content, users may become

habituated or *desensitized* to similar content, and this may have an impact on attention, comprehension, and memory. Thus, use of media with particular content such as violence or sex, or their combination, may influence subsequent media use as well as the impact of such content on the viewer's attitudes and behavior (see Zillmann, 1991b, for a review of relevant research).

DISINHIBITION

Through various socialization processes, we try to help children learn to inhibit anti-social and other negative behaviors. To the extent that such behaviors are portrayed in various media, especially if they are portrayed as justified, successful, and not penalized, previously acquired restraints against such behaviors may be *disinhibited*. This is likely to occur most readily for those with the fewest inhibitions—that is, those highest, for example, in trait aggression. Recall that in Josephson's (1987) field experiment, the boys who were most aggressive in the floor hockey game were those who were interviewed with a walkie-talkie, saw the violent excerpt, and were rated by their teachers as high in trait aggression. And in his laboratory experiment with adults, Bushman (1995) found that those high in trait aggression scored higher in anger/hostility and behaved more aggressively after watching a violent excerpt than did adults low in trait aggression, even after previewing anger/hostility was controlled.

Disinhibition probably occurred in the natural experiment my colleagues and I studied in Notel, Unitel, and Multitel (Joy, Kimball, & Zabrack, 1986; MacBeth, 1998, 2001). Aggressive behavior on the school playground was significantly higher 2 years after than before a town (Notel) acquired TV reception, and this was true for both physical and verbal aggression, girls and boys, and children initially low and high in aggressive behavior. In contrast, aggression in the comparison towns, Unitel

and Multitel, which had television reception in both phases of the study, did not change appreciably over the same period.

Note that if media are shown to have the negative effect that exposure leads to an increase in some antisocial behavior, the effect must be strong enough to overcome the child's or adult's inhibitions against behaving that way. For this reason, it may be easier to demonstrate a prosocial than an antisocial effect. Ethical constraints also play a role. Researchers cannot ethically expose participants in their studies to the levels of violence found in many films and other media.

GENDER AND MEDIA USE

As the popular phrases "chick flick" and "football widow" indicate, use of different media varies by gender, both in childhood and beyond (for reviews summarizing viewing patterns, see Huston & Wright, 1998; Comstock & Scharrer, 2001; see also Chapters 8 and 9, this volume). Oliver (2000) summarized this gender gap across genres—"The romantic yet heart-wrenching world of the melodramatic tear-jerker belongs to females, whereas the more action-packed and explicit world of sports, violence, and pornography belongs to males" (p. 222)—while making the important point that variations exist within same-gender groups. She went on to ask *why* females and males experience the world of entertainment in different ways, the question most pertinent to the focus of this chapter, the psychology of media use. She concluded that characteristics of both the media content and the viewer interact in complex ways.

Content characteristics that may contribute to gender differences in media use and exacerbate differences in reactions include the widely documented overrepresentation of male characters in most dramatic fiction (with soap operas the exception), as well as the greater coverage of male-oriented entertainment (e.g., in sports).

Oliver (2000) also reviewed evidence that more females than males enjoy dramatic content featuring issues about relationships, whereas more males prefer themes related to aggressive conflict. She distinguished between conflict and violence, pointing out that many females seem to have a strong distaste for the latter but not the former, which is featured prominently in soap operas. Females also enjoy the experience of suspense elicited by frightening films, but not if this is achieved through explicit, gruesome violence (Zillmann & Weaver, 1996).

What theories have been offered to explain the gender differences in preference for and response to media content (Oliver, 2000)? Sociobiologists and evolutionary psychologists say that males' lesser investment in rearing their offspring and greater concern for maximizing their genes in the next generation would predict a greater male interest in media content that provides many potential female "partners," even if only at a fantasy level (Malamuth, 1996). Evolutionary theorists use the same arguments to explain females' greater appreciation of pornography that more prominently features affectionate displays.

Cognitive-developmental, social learning, and schema theory perspectives emphasize the role of culture and socialization for gender differences in attitudes and behavior. Once children know the two gender categories and can label their own (there are girls and boys, and I am a _____), they seek self-relevant information, so attend selectively more to their own gender, which explains greater attention to same-sex models both in real life and in the media.

◆ *Attention, Comprehension, and Memory*

CHILDREN

Cognitive Development. Children's attention to the comprehension of and memory

for events they encounter, in both the real world and through media, is constrained by their cognitive development. To the extent that their knowledge is faulty, their processing of information will be affected. For example, if their knowledge of time (e.g., tomorrow, today will be yesterday) is not yet fully developed, this will limit their ability to comprehend sequences of actions. They may not, for example, link the punishment at the end of a TV program or story to the crime committed at the beginning. Or, if their knowledge of money and related phenomena (payment for work, income, etc.) is not fully developed, they will be incapable of understanding their parent's response, "We can't afford it," to their request for something advertised. Instead of understanding that their parents haven't enough money for the purchase, such children may wonder why their parents don't just use their credit card and may think it's because their parents don't love them as much as do parents who buy such items for their children. Working from the perspective of Piaget's (1963) theory, Furth (1980) found that children's understanding of money, income, finances, and so on is surprisingly poor.

With regard to concepts of time, money, taking the perspective of another, hypothetico-deductive reasoning, reversibility of actions (concrete operational thinking in Piaget's [1963] theory) and ideas (formal operations), and many other important aspects of knowledge, children must construct that knowledge gradually through their interactions with people and objects. Unlike facts (e.g., "Ottawa is the capital of Canada"), such knowledge cannot be learned or memorized. And until such knowledge has developed to its mature form, children's attention, comprehension, and memory will be driven by their incomplete/inaccurate knowledge in any given domain. But, until their *schemes*¹ (the word Piaget used for the cognitive "building blocks" that others call *schemas*, *schemata*, or *scripts*) are able to process information in a mature way, the child

will not (a) notice or attend to discrepant information, (b) comprehend their experiences fully, or (c) remember them accurately. Through the twin processes of assimilation (taking in relevant information) and accommodation (modifying the scheme, schema, or script in line with the new information), these cognitive structures gradually develop from their earliest to their most mature form.

Collins (1983a, 1983b) found that prior to middle childhood (Grade 4 or 5), most children watching adult programs (e.g., situation comedy, action adventure) could not make inferences or connect logically and causally related plot elements that were separated by subplot events, incidental content, or commercials. The separators commonly used in Saturday morning children's programs do not improve comprehension (Palmer & McDowell, 1979).

Attention. Most of the research on children's attention to media has focused on television, and in that research, attention has been most often defined as visual orientation to or looking at the screen. In their work in this area, Dan Anderson and his colleagues (e.g., Anderson & Burns, 1991) have found that the longer an individual either does or does not look at the TV screen when in the room with a set on, the greater the probability that the look (or nonlook) will continue. They call this resistance to change *attentional inertia*, in contrast to the more usual phenomenon in visual perception research in which an infant or child *habituates* to or tires of looking at something that was initially of interest and, with repeated presentations, looks for increasingly shorter periods. In the latter case, the same visual stimulus is presented repeatedly, whereas in the case of television, the visual material continually changes (Anderson & Burns, 1991). Some researchers have suggested that attentional inertia maintains looking during the less interesting moments or across content boundaries, for example, between different segments of *Sesame Street* during longer

viewing periods (Anderson & Lorch, 1983; Anderson, Choi, & Lorch, 1987; Calvert, Brune, Eugia, & Marcato, 1991; Meadowcroft, 1996).

Rolandelli, Wright, Huston, and Eakins (1991) measured children's auditory attention to television by periodically degrading and distorting the soundtrack and observing how quickly children would manually respond to clear the soundtrack. Longer latencies imply listening less carefully. They found that auditory attention predicted auditory comprehension (recall of the verbal soundtrack) and that visual attention predicted recall of visual content, leading them to conclude that looking and listening contribute separately to understanding. They also found that for boys, there is less dissociation in attention to the audio and visual TV tracks, and that girls more often listen without looking but still retain as much information as boys.

In the preschool years, much of children's attention to television involves auditorily monitoring for sound signals associated with content they will likely find interesting or, more important, comprehensible, at which point they look at the screen and continue to do so until the content becomes incomprehensible (Lorch, Anderson, & Levin, 1979; also see summaries by Anderson & Burns, 1991; Huston & Wright, 1998). But attentional inertia serves to keep them attending longer and thus increases, up to a point, the probability that they will comprehend something. Children are likely to turn toward the screen at the sound of children's, non-human, and women's voices but to turn away from male adult voices, which tend to signal adult content (Anderson, Alwitt, Lorch, & Levin, 1979; Calvert, Huston, Watkins, & Wright, 1982).

These and similar findings form the basis of Huston and Wright's (1983, 1998) *feature-signal hypothesis* that the formal production features (e.g., animation, sound effects) are the recognizable constants of program genres and, like the superordinate story scripts underlying content, are its markers.

Children can, after a moment's glance at a new channel determine from form, rather than content, the genre of the program—whether it is for adults or children, whether it is funny or serious, whether it is informative or entertaining in intent, and whether it is worthy of their further investment of attention. (Huston & Wright, 1998, p. 1018)

The fact that young children use formal program production features as signals to attend to content that they are more likely to comprehend suggests that their TV viewing is an *active* rather than a *passive* process. But many television critics imply the opposite, describing the child as a passive, possibly addicted, victim. The either/or character of this debate is misleading. Sometimes, children monitor auditorily and selectively attend to content they comprehend. On these occasions, they often are time-sharing TV viewing with some other activity (e.g., playing with toys). Which one is the primary activity and which is secondary may shift. On other occasions, children may attend more constantly and be less physically actively involved with other objects or toys. For example, even Anderson (personal communication, April 1984), a leading proponent of the “child as active viewer” position, has found that young children’s Saturday morning TV viewing is more likely to follow this latter model. That programming is typically cartoons intended for children, thus relatively easy for them to understand.

Anderson and Lorch (1983) differentiated between automatic viewing or processing, which probably is more characteristic of cartoon viewing, and strategic viewing, which involves active attention. The latter is usually schema dependent and schema driven—that is, by some prior knowledge, a story schema, or some other cognitive organizer that makes thoughtful processing possible (Meadowcroft & Reeves, 1989). An example given by Huston and Wright (1998) is the greater attention by boys to male characters in the media, once

they understand that gender is a constant and permanent attribute (Luecke-Aleksa, Anderson, Collins, & Schmitt, 1995). They proposed (Huston & Wright, 1983; Wright & Huston, 1983) that at very young ages or for very shallow, superficially humorous, or stereotyped material, the perceptual salience or “formal features” of the production techniques would determine selective attention and level of processing and that, with cognitive development, children’s attention would become more internally governed and goal directed, based on their interest in the content.

In the context of this discussion of level of processing and the passive versus active child-viewer debate, it is important to remember that (a) there is considerable evidence that watching age-appropriate educational programming intended for children has a positive impact (e.g., Anderson et al., 2001; Bickham et al., 2001; Fisch & Truglio, 2001), (b) this is not the case for noneducational children’s programming (indeed, there is evidence of negative effects; see MacBeth, 1996 for a review), and (c) most TV programs watched by children are intended for adults, so their comprehensibility will vary with the child’s cognitive development.

A model describing the changes with development for children’s attention to and comprehension of television, which in my opinion applies to other media as well, was proposed by Rice, Huston, and Wright (1982). This *traveling lens model* (see also Bickham et al., 2001) is based on Berlyne’s (1960) notions of optimal levels of complexity, novelty, and so forth. In the traveling lens model, arousal, interest, and attention increase from low to high up the ordinate (*y*-axis) of a graph. Comprehensibility increases on the abscissa (*x*-axis) from low (boredom) up an inverted U-shaped curve to a maximum and then decreases again down the other side of the inverted U to incomprehensibility. An individual child’s attentional lens travels with age and experience from left to right along the *x*-axis, with interest increasingly focused

on previously incomprehensible media content.

Does attention to television vary by gender? Yes, and it does so fairly consistently. As was mentioned earlier, boys' visual attention to the set is greater than girls' (e.g., Alvarez, Huston, Wright, & Kerkman, 1988; see Miron, et al., 2001, for additional references). This gender difference in attention is not, however, associated with differences in comprehension or recall (Alvarez et al., 1988). Girls listen without looking more than do boys but remember equally well.

Comprehension. Just as comprehension does not guarantee recall, though it probably facilitates it, the link between visual attention and comprehension is not clear-cut. Anderson and his colleagues have argued that the correlation between the two occurs because comprehension increases subsequent attention (Anderson & Lorch, 1983), and they have shown that although children with toys available looked at the TV screen less than did children without toys, their comprehension was equivalent (e.g., Landau, Lorch, & Milich, 1992). In another study of children's programming, both visual attention to and comprehension of educational messages increased for 5- and 6-year-olds when humorous inserts were included, even though the inserts were not related to the educational messages (Zillmann, Williams, Bryant, Boynton, & Wolf, 1980).

In contrast, when adult-oriented rather than child-oriented formal production features were used (Campbell, Wright, & Huston, 1987) or narration was added (Rolandelli et al., 1991), comprehension varied, indicating that mental effort rather than just attention to the set was affected. Putting these and other findings together, Bickham et al. (2001) concluded that "looking and listening make separate and sometimes identifiable contributors to understanding, while perceptions of comprehensibility and interest strongly contribute to the decision to attend" (p. 103).

Some formal production features have more complex meanings that are acquired with experience with the medium in interaction with the viewer's level of cognitive development. For example, *montage* is used to indicate change in location, time passing, and other contextual information. Anderson and Field (1983) found that implied time changes were the most difficult and implied character actions the least difficult for children to draw inferences from, but both 4- and 7-year-olds could use and comprehend montage, although the older children were better at doing so. On the other hand, children younger than age 6 thought that an event had occurred twice if they were shown an instant replay (Rice, Huston, & Wright, 1986). As mentioned earlier, preschoolers have difficulty in distinguishing program from advertising content, even with separators (Palmer & McDowell, 1979). Younger children also have difficulty in distinguishing central from incidental information, but that difficulty is reduced if salient features are used to mark the central content (Calvert et al., 1982; Campbell et al., 1987; Kelly & Spear, 1991).

There is some evidence that playing interactive electronic games may facilitate the development of certain information-processing skills such as speed of mental rotation (spatial skill) and iconic representation (see Subrahmanyam, Kraut, Greenfield, & Gross, 2001).

Comprehension of various media, particularly for children but also on occasion for adults, is related to its perceived reality. Huston and Wright (1998) reviewed the evidence and proposed a three-dimensional structure for this issue with regard to television. The first, *factuality*, corresponds to what Hawkins (1977) called the "magic window" issue, which can be subdivided as follows:

Did the portrayed events actually happen in the real world pretty much as shown on TV? Did the TV show those events or part of them when they actually happened (as opposed to a reenactment of

the factual event)? A yes answer to the main question establishes the content as factual. A yes answer to the second enhances the factuality, while a “no” answer diminishes it. (Huston & Wright, 1998, p. 1024)

Their second proposed dimension of perceived reality, *social realism*, refers to plausibility, that is, similarity to real life. It includes an actuarial judgment about the social realism of events/situations and a personal judgment based on identification by the viewer with one or more major characters portrayed. The third dimension, which Huston and Wright (1998) proposed more tentatively, is called *videotypy*, which refers to the degree to which the program’s formal features, including editing and production techniques, dominate to remind viewers that “this is a television program” (e.g., sports and quiz shows, animated cartoons vs. most dramas and soap operas). Their three-dimensional model was proposed for television, but it also fits reasonably well to other media. The content of most other media, however, tends to be more homogeneous: Books are fiction or nonfiction with regard to factuality (but some, e.g., *Midnight in the Garden of Good and Evil*, fall in between); most movies are not factual, but some documentaries are; and most newspapers purport to be factual, but interactive games do not, and so on. The Internet, like TV, is mixed.

Memory. Children’s memory for adult programs is better if it matches some of their prior knowledge, that is, their social schemas/scripts. For example, Newcomb and Collins (1979) showed a situation comedy about either a middle-class European American family or a working-class African American family to children from middle- and working-class families who were European or African American. Their recall was better if they saw the program that matched their family’s social class, but ethnic group was not related to recall.

In studies conducted with elementary school children in the Netherlands, recall was better for television than for newspaper presentations, even after controlling for reading proficiency and whether the children expected to be tested (Walma van der Molen & van der Voort, 1997, 1998, 2000). The pattern of findings supported a dual-coding explanation in which the superior recall of television is due to the highly redundant audiovisual information in the children’s television news stories used in these three studies. These results stand in contrast to those for recall by adults (described below) for adult news, which typically is much less redundant in its audio and visual characteristics. By comparison with North America, a much higher proportion of all TV programming, but especially children’s TV, in the Netherlands is educational and informative, so viewers there may watch more attentively, mindfully, or with greater AIME. It also is true, however, that very few elementary school children in the Netherlands and North America regularly read newspapers.

ADULTS

With regard to adults’ processing of media information, the work of Bryon Reeves and his colleagues is central to the intersection of psychology and mass communication (see Reeves & Thorson, 1986, for a review of their experiments on attention, mental effort, and memory for television content).

Attention. Whereas there has been considerable research on children’s attention to television, in research with adults, attention has not often been studied directly. Instead, it has been inferred that if memory is enhanced, attention must have been high (Reeves et al., 1991). One example of research in which attention was measured assessed the impact of positive versus negative public service announcements (PSAs) (Reeves et al., 1991). While doing a secondary task, adults had to

press a button on a game paddle when they heard a periodic tone while watching a videotape; the quicker the reaction time, the greater their attention. Negative PSAs were not attended to as closely as positive ones but were remembered better.

The PSA results are consistent with other evidence (Reeves, Lang, Thorson, & Rothschild, 1989) that positive and negative scenes in TV entertainment programs produce brain hemispheric differences in electroencephalograms (EEGs) (in the frontal region for the alpha frequency) identical to differences for nonmedia stimuli. Positive scenes evoke greater left hemisphere arousal and greater overall arousal (lower alpha values). Negative scenes evoke greater right hemisphere arousal.

Comprehension. In an attempt to explain the negative transactional relationship between television viewing and school achievement (see MacBeth, 1996, for a review), Armstrong and Greenberg (1990) studied first-year university students' performance on cognitive processing tests. They found that when TV was used as a secondary activity, significant performance decrements occurred for reading comprehension, spatial problem solving, and cognitive flexibility, suggesting that background television causes cognitive processing capacity limits to be exceeded on difficult and complex tasks.

Memory. Prior to widespread availability of news via the internet, about two thirds of adults in the United Kingdom and United States typically said that television is their main source of national and international news. As well, they said they trusted TV more than newspapers; if given conflicting TV and newspaper reports of the same story, they believed the TV one (Gunter, 1991). Given this preference for obtaining news via television, it is surprising how little of it people remember. For example, researchers who have conducted telephone interviews or experiments with adults who earlier that day watched a TV newscast

have found that spontaneous (unaided) recall was very poor, aided recall (e.g., providing the headline) was better but still poor, and the length of time between viewing and being interviewed (several minutes to 3 hours) made little difference (e.g., Faccoro & DeFleur, 1993; Findahl & Hoijer, 1985; Neuman, 1976). Moreover, distortion, misunderstanding, and confusions involving two or more stories (called *meltdown* by researchers) were common. Even when people subjectively believed that they had learned information, for example, about the weather, their recall, objectively speaking, was poor (Gunter, 1991).

Other researchers have compared recall rates from various forms of media. DeFleur, Davenport, Cronin, and DeFleur (1992) found that first-year university students in the United States remembered more from news stories when they were read in newspapers or off a computer screen than when seen on TV or heard on radio, and this was true for both unaided and aided recall. Faccoro and DeFleur (1993) conducted a cross-cultural version of that study in the United States and Spain. The results were identical to the previous study for students in the United States. Overall, across the four media and with aided and unaided scores combined, recall was similar for Spanish and U.S. students. But for Spanish students, computer recall was worst, newspaper was best, and television and radio were in the middle. The authors attributed this discrepancy to the more widespread use of computers at that time in the United States than in Spain.

Grimes (1991) conducted two laboratory experiments in an attempt to explain poor recall for news. He found that when the auditory and visual messages were highly redundant (which is not usually the case for TV news), adults perceived them as a single semantic unit, but when the two were mildly discrepant, they were perceived differently, which divided attention. In the latter case, typical of TV news, attentional capacity may often be exceeded, resulting in poor memory.

Two experiments with undergraduates provide some insight into the effect of prior

experience schemas on mental encoding and retrieval of media events (Shapiro & Fox, 2002). The results suggest that

the intrusion of schema-consistent information during memory reconstruction probably has as much to do with our judgments about memories as it has to do with our actual ability to retrieve the memory. Therefore, prior experience seems to strongly shape what we are willing to believe that we remember. (Shapiro & Fox, 2002, p. 131)

In these studies, memory was better for atypical than typical information even 1 week later, but the participants were less willing over time to believe that the atypical information was true if the topic was unfamiliar.

Graber (1990) found that for the adults in her study, recall of TV news stories was enhanced by visuals, especially those that were personalized through unusual sites and human figures. Her findings also indicated that schematic processing was a factor in faulty recall but less so for visual than verbal information.

◆ *Conclusions*

The main goals of this chapter have been (a) to provide a useful framework for understanding the psychological theories and processes relevant to media use and its effects and (b) to give examples of media research within that framework. Because of its preeminence to date, theories and research about television and, to a lesser extent, print and video games have been emphasized. Television is still the main leisure activity for children and adults in North America, but computers and other electronic media are increasingly heavily used as well (for reviews, see Montgomery, 2001; Subrahmanyam et al., 2001; Tarpley, 2001. Note that all three make the important point that use is strongly related to socioeconomic status, as is always the case

for new media). To date, most research on use of the internet and other new technologies has focused more on sociological than on psychological factors, but those media undoubtedly will be more prominent in future discussions of the psychology of media use and effects.

Where to from here? Looking back over the framework and examples of media research discussed in this chapter, what would be some interesting and potentially fruitful avenues to pursue in future research on the psychology of media use?

The availability of fMRI technology opens up a large and exciting set of possibilities for testing and validating or disconfirming many of our theoretical notions. Murray's (2001) work on children's brain responses when viewing violent and nonviolent video images provides a good starting point. For example, fMRI technology could potentially be used to explore the validity of the theoretical concepts of cognitive neoassociation theory, including linkages within associative networks of thoughts, feelings, and actions; priming of these networks by media violence or other aggression-related cues such as guns; and so forth. Bushman (1995) has shown that university students who score high on a measure of physical aggression—that is, high trait aggression individuals—are more likely than those low in trait aggression to choose to watch a violent videotape. Moreover, these students' moods (including anger) and behavior (aggression) were affected more by viewing violence than was the case for low trait aggression individuals. In a laboratory experiment that was analogous to Bushman's behavioral study but used video game rather than videotaped violence, Anderson and Dill (2000) found an increase in aggressive thoughts and behavior. What could fMRI or other technology tell us about the similarities and differences in the brain processes of high and low trait aggression children, adolescents, and adults in such situations?

Brain processing associated with preferences for different types of media content

(e.g., comedy vs. drama) in relation to preexisting and subsequent moods and emotions would be interesting to explore. Other topics discussed in this chapter, including vigilance and its relation to cortical and emotional arousal, as well as children's media-related attention, comprehension, and memory also come to mind.

Cross-media comparisons—including internet and Web use as well as television, video games, books, radio, and so on—with regard to use, content, attention, comprehension, memory, and effects strike me as important to pursue.

Our role as adults in keeping children and youth safe has become much more difficult and complicated with the advent of some of the new technologies. We cannot regulate the internet. The cognitive development of children and preadolescents, for example, prior to the development of hypothetico-deductive reasoning, places limitations on their ability to perceive some of the possible consequences of their internet use, and this is exacerbated by their parents' lack of knowledge about their use, those with whom they are interacting and exchanging information, and so on. Pedophiles, who typically are very skilled at getting access to vulnerable children, are finding the internet ideal for this purpose. As researchers, we have a social responsibility to do what we can to understand how best to limit such negative consequences and to enhance the many positive consequences of the use of all types of media.

◆ Note

1. The cognitive structures for which cognitive psychologists use the terms *schema* (plural *schemas* or *schemata*) and *script* are based on Piaget's (1963) theory. Piaget used the term *schème* (plural *schèmes*) for this type of cognitive structure, which is of crucial importance in his explanation of cognitive development. In his theory, he also said that for some but not all schemes, there is an allied sensorimotor image, a

figurative outline, and he used the term *schema* (plural *schemata*) for that concept. In this chapter, I have followed the cognitive psychology convention of using the terms *schema*, *schemas*, and *schemata*, as well as *scripts* for sequences, to refer to the concepts for which Piaget used the terms *schème* and *schèmes*.

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