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Video Games and the Pleasures of Control

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Video games are remarkable new forms of entertainment. Video games import and customize many different forms of entertainment, from games related to jigsaw puzzles and chess simulations to games related to novels or to action films. Video games provide simulations of a series of aspects of reality, like racing, flying, or playing soccer, or simulations of complex social developments, from urban development to the evolution of civilization. The hallmark of most video games is that they transform these traditional forms of entertainment into an interactive form that enables the player actively to participate in shaping the games. Films or videos enable their viewers to interact only passively, by following the narrative and predicting possible outcomes, whereas video games provide the player with interactive means to change the course of the narrative. The interaction with such possible audiovisual worlds provides the player with an experience of being immersed in a "virtual reality," because our experience of reality is linked not only to the possible salience of what we see and hear, but is also centrally linked to whether we are able to interact with such perceptions. A key to explaining why video games have become very popular forms of entertainment is to explore those gratifications that are linked to the interactive form.

Most scholarly studies of video games have focused on the possible negative effects of video games, especially of the violent "shoot-'em-up" games. The perceptual salience of such games is very much inferior to that of, for instance, a gory movie played in a wide-screen THX-sound movie theater. However, the argument has been that the interactivity of the video games would make the player personally responsible for the atrocious acts and implicate the player in the moral-

ly dubious actions. In this chapter I supplement some of the findings of studies aimed at measuring possible negative effects of video games with an analysis of a series of gratifications derived from the interactivity of the video games in comparison with film (as a term covering film, TV, and video fiction).

This chapter concentrates on games that provide *narrative simulations*, that is, fictitious actions. The narrative games can be subdivided into two groups. One subgroup within narrative video games could be called *adventure-mystery games*. These games tend increasingly to emulate the more complex world of films in respect to themes, character complexity, and so on. In order to do so, some experiences are provided by inserting non-interactive film sequences. However, the time is often player-generated; that is, time progresses only when the player makes a move, and the game narration is often partly shown from an exterior, third-person point of view. The other subgroup consists of action games, centered on interactive realism, often shown in a three-dimensional world and by point of view. Games like *Wolfenstein*, *Mortal Kombat*, and *Quake* belong to this subgroup. They elicit strong arousal because of their combination of violent images, strong aggressive player reactions, and point-of-view editing. I use those games as material for my analysis, because they are the best matches to an interactive simulation of an "online" reality, and because those games have caused most public concern, due to their portrayal of violence. My prototype for the analysis will be *Quake*.

THE IMPACT OF VIOLENCE ON FILM AND IN VIDEO GAMES

The public debate about the possible impact of violent video games has had a precursor in the heated debate of similar features in film. Those in favor of violent or sexual films have used different arguments. One line of defense is the catharsis argument: Fictions serve as safety valves for aggression or sexual urges. A variant of this theory is an equilibrium theory, which claims that people use films in order to control their level of arousal, a position that could be explained by uses-and-gratification theories (Rubin, 1994). Another theory is that the fictional nature dissociates the film experience from real-life experiences. Those concerned by violent or sexually explicit films have other arguments. One is the desensitizing argument: Exposure to violence or strong sex will accustom viewers to such phenomena. Another argument is that such exposure provides social learning: People will learn violent behavior from films and copy the violent behavior in real life (Bandura, 1994). A variant of this argument is a priming argument: Violence activates and strengthens violence-related associations and emotional charges. A third argument is the arousal argument: Violent films raise the level of arousal and will therefore provide a basis for violent acts if they are put into a violent context.

Contrary to studies of the impact of film violence, several studies of video games have found either catharsis effects, equilibrium effects, or lack of any significant increase in aggressive tendencies (e.g., Calvert & Tan, 1994; Graybill, Strawniak, and Esselman (1985) found that children who played the violent video game showed fewer defensive fantasies than did children who played the nonviolent game. Other studies have found aggression, arousal effects, and social learning induced by playing violent video games more similar to those found in film and television studies (Ballard & Wiest, 1996; Hoffman, 1995; Shutte, Malouf, Post-Gorden, & Rodasta, 1988; Silvern & Williamson, 1987). No studies have proven any long-term effects.

A series of studies have addressed computer games from the point of view of cognitive and perceptual development. This is, for instance, the case with two studies by Loftus and Loftus (1983) and Greenfield (1984). They each analyzed how video games enhanced perception, attention, spatial skills, memory, and motor performance. In a more recent collection of studies (*Journal of Applied Developmental Psychology*, 15, 1994) Greenfield and associates have come up with additional experimental evidence for the role of video games as part of learning processes.

However, most studies do not consider any positive gratifications from playing violent video games. Although most children and adolescents use a lot of time playing such games, this only causes concern, not any interest in the fascination. A reason for this lack of interest is that the fascination is regarded as one focused on violence and aggression per se. It might, however, be argued that the fascination consists of many different elements. A central fascination with violent games is linked to the strong arousal caused by the dangerous situations portrayed. The playful simulation of dangerous situations is often gratifying because such simulations allow the player to cope with strong aversive sympathetic reactions. Coping with situations linked to strong aversive arousal is not only linked to criminal behavior, firefighters, drivers, rescue workers, or victims of violence will often experience dangerous situations. Daily life is based not only on empathy, cooperation, and compromise, but also on aversive situations that demand assertiveness. Respectable forms of entertainment like chess or fairy tales are often centered on confrontation and aversion.

The arousal motivates a series of cognitive and motor responses, some of which are violent. Many of these responses are defensive, other responses are linked to violent reactions to fantasy creatures, yet other responses are directed at humans, although even games like *Mortal Kombat* portray the possible victims of violence in a rather exotic, stylized manner, very different from the realist portrayal of victims in, for instance, splatter films. It is reasonable to be concerned that strong video game violence may be harmful for players disposed toward violence by other factors. However, there is no conclusive evidence for the impact on normal players.

There are some clearly immoral games, like the car game *Carmageddon*, in which the player gets points for killing innocent pedestrians. Such games raise problems similar to those raised by comic fictions in which the pain and abuse of clowns and other comic figures cue pleasurable viewer reactions. The ability to get comic pleasure out of such reversals of normal empathic relations between viewers (or players) and fictitious characters is based on innate dispositions. Comic reversals presuppose some kind of moral maturity that prevents viewers and players from experiencing such reversals as normal interpersonal relations. The limits to such comic reversals clearly depend on moral evaluations of the limits for what kinds of themes are acceptable, and on commonsense assessments of to what extent some reversals may lead to moral confusion.

In general we may assert that we possess aggressive potential, which we have inherited because aggression had a clear survival value for our ancestors. Many reactions supported by such inherited mechanisms are clearly harmful in our present environment (murder and other violent acts). However, it is not clear whether other types of "aggressive" behavior that does not lead to physical abuse of other people serve possible beneficial mental mechanisms; for instance, assertiveness, need-persistence, and emotional control in confrontation with aversive stimuli. It is not obvious that the media society only supports lack of empathy due to an overload of violence; on the contrary, more people than ever are deeply concerned with the well-being of other people, and empathic concerns are increasingly also directed at animals and lower life-forms. Intuitively this seems partly to be an effect of the way in which modern audiovisual media increasingly make it possible to empathize with other beings. In this larger context the aggression displayed in some types of media products and the comic reversal of empathy might partly be explained as negotiations and regulations of the level of empathy.

In the rest of this chapter I explore the hypothesis that danger and violence in video games serve as part of cognitive and emotional learning processes. I will analyze some reasons why the interactivity of video games supports emotional control by linking the experience of strong emotion-eliciting stimuli to cognitive and physical interaction with the game world. I further analyze some of the gratifications that are elicited by the playful simulations of "live" interactive processes.

EMOTIONS IN REAL LIFE, ON FILM AND IN VIDEO GAMES

In order to provide a framework for understanding possible differences between the emotional impact of film and interactive video games I recapitulate some fundamentals in emotion theory (cf. Grodal, 1997) and relate these to film and video games. A precondition for eliciting strong emotions is to present some stimuli that are central concerns of living beings, for instance threats on life or health. Such

stimuli will elicit physical arousal. Arousal is a very general physiological process, and, as argued by cognitive labeling theorists of human emotions, in order to create emotions out of arousal you need cognitively to specify, to contextualize the arousal, in order to elicit emotions. The situational context cues a dominant action tendency by means of a cognitive analysis of the situation, resulting in a cognitive labeling of the arousal. As described, for instance, by the Dutch psychologist Frijda, emotions are "modes of relational action readiness, either in the form of tendencies to establish, maintain, or disrupt a relationship with the environment or in the form of mode of relational readiness as such" (1986, p. 71).

A simple example: If you suddenly meet a lion on a savannah it would create arousal. The context will determine how the arousal is molded into an emotion. If you are armed, you may feel aggression and shoot the lion, but if unarmed you might feel fright and look for escape, or you might feel that you are unable to cope with the situation and feel despair. If you are safely placed in a photo safari jeep, the arousal is transformed into delight. These emotions are phasic, that is, there is an eliciting cause of arousal, followed by an appreciation of what to do, which then leads to actions that will eventually transform the emotion by removing or transforming the causes of the emotions. The emotional experience will therefore consist of phases: a cause, an arousal, a cognitive appreciation and a labeling, followed by some actions that remove the cause of arousal. In order to elicit phasic emotions in relation to fiction we need a focusing character, because without such a character we cannot specify any coping strategies.

The emotional experience of a given situation will consequently be different according to whether it is cued by a film or by a video game. When viewing a film the labeling of the emotions felt is determined by the viewer's passive appreciation of the film character's coping potentials. But when the situation is part of a video game, it is the player's assessment of his own coping potentials that determines the emotional experience. The unskilled player may feel despair when confronted with the lion, but the skilled player will fuel the arousal into a series of courageous actions. Video games therefore simulate emotions in a form that is closer to typical real-life experiences than film. Emotions are motivators for actions and are labeled according to the player's active coping potentials.

THE INPUT-OUTPUT PROBLEM AND THE GAME PLAYER'S VIRTUAL REALITY SIMULATION

A film viewer has no control over the direction of his or her perceptions and no control over possible reactions to possible arousing events. However, the viewer can bridge the gap between perceptions and actions by several cognitive and affective strategies. The viewer can think up several coping strategies and hope for given outcomes. The terms *interest* and *suspense* often cover these passive viewer

expectations. Films shown in the cinema are especially, so to speak, input-driven: the salience and magnitude of the screen in combination with engrossing events ensure a strong input, and often whole genres like melodrama are constructed in order to overwhelm the viewer, eventually by cuing strongly passive emotional responses like crying or great fear. The viewer may thus experience the film from a third-person position of being a witness to events (Carroll, 1990). The passive third-person aspects of film viewing are often partly masked by providing close links between the point-of-view presentation of emotion-eliciting elements and the protagonist's concerns and possible or effected actions. If there are a close knit and fast-paced relation between these three factors, the viewer is led into simulating such sequences of perceptions, concerns and actions as if they were performed actively by the viewer (Grodal, 1997; Smith, 1995). However, the coping potentials of the viewer are mostly very general and are linked to mental simulations.

Compared with cinema films and even with TV screen-transmitted fictions, video games have a less salient input, although sound and graphics have improved significantly. But the games make up for this by providing more sophisticated devices for processing the input in relation to output. A video game provides an interactive interface, which enables the player to control actions and often perceptions by an ability to control the point of view, that is, to control the point from which, and the direction by which, the game world is represented. This leads to several dramatic changes compared to film viewing:

- The player needs to use attention in order to control perception, including the point of view.

- The player needs to make mental maps of the game-space as if it were a real three-dimensional world. He or she needs to notice landmarks, significant causal relations, and so on.

- The player needs to actively coordinate visual attention and motor actions (by mouse, joystick, or keyboard). The feedback from the activation of these procedural schemata will create additional arousal. The activation and coordination of the different mental functions and representations will compete with limited capacity in working memory and possibly cause mental overload.

- The emotional significance and labeling of a certain event-induced arousal are linked to the player's own ability to cope with a given problem. It will therefore vary over time (and vary from player to player).
- The player will get a continuous satisfaction from his performance. Therefore, the pleasure is derived not only from the global performance, but also from a series of local achievements, local sequences of arousal leading into coping actions.

- The game processes are driven by the player's motivation for performing, and success and failure is partly attributed to the player, not to the game-world. The length of the home video game relates to the player's own motivation.

All these characteristics emphasize that video games are much more focused on the relation between input and output, the relation between perception, attention, emotion, and motor control, than films (Kubey & Larson, 1990). Therefore the arousal is not only derived from input but also experienced in relation to processing the input in a more profound way than just guessing the probable outcome. The player participates in a virtual reality stimulation of a possible real world. When a player accepts to play a given character in a game, it is done from the inside as a temporal fusion with a given world, with some game-defined perception capabilities and action capabilities. It is well documented that the interactions between persons and computers and with computers as platforms for video games are experienced as an involvement on a first-person level (Reeves & Nass, 1996; Shapiro & McDonald, 1992; Turkle, 1984). These studies emphasize that a naturalistic conception of the interaction with media, and especially with computer media, is the typical attitude.

The computer media experience underlines that actions and interactions are very strong components in our experience of reality. The fascination many players felt with the (by modern standards) often crude visual interfaces of the first video games of the early 1970s showed that the salience of the perceptual input was powerfully enhanced by feedback from the interactive output capabilities.

TYPES OF INTERACTION IN VIDEO GAMES

Our experience of our relations to reality may have three main forms. The first form consists of being a passive, perceptual witness to spaces, actions, and processes, as when we are viewing a film. Some video games have inserted such film-type sequences with which the player cannot interact. Because such sequences do not afford interaction, they are experienced as subjective (Grodal, 1997). The second form is based on an active exploration of spaces, actions, and processes that are fully self-controlled, as when we take a walk, whether this walk is taken in real life or in a virtual reality. Mystery games like *Myst* typically possess such a player-generated time, in which processes take off when the player performs some actions and stop when the player stops. Action-centered video games like *Quake* also have some sequences in which the player is in total control over the actions and processes. The third form is not only active, but also centrally interactive, because the player is confronted with other processes and agencies that are only partly under the control of the experiencing agency. The player has to perform actions at a certain pace, because otherwise he or she will "die," for instance, because he or she cannot prevent his or her vehicle from crashing. Furthermore, in centrally interactive sequences, it is not only the player who can seek out events, other agencies like monsters can seek out the player (or the player's character). The player has to cope with antagonistic forces and processes according to some game-world time. The sense of realism is enhanced because the player's control is not absolute, but relative to his skills.

Video sequences that are based on player-generated time support exploratory gratifications; for instance, curiosity and cognitive problem solving. The game proceeds at a speed that suits the player's sense of control. When a player has solved a problem, he can proceed to the next set of stimuli, the next problem. Game-world-generated time provides other gratifications because it evokes much stronger emotions. The problems need to be solved under severe time constraints similar to those in emotional peak situations in real life. The player has to integrate perceptions, cognitions, emotions, and actions fast in order to survive and is provided with a strong feeling of interaction. The closer a game experience gets to the player's optimal mental and motor capacity the less capacity is available for being conscious about the game being just a game: the game provides total immersion.

Such strong interaction will, however, also cause fatigue and eventually a sense of lack of control. Most action video games are therefore constructed in such a way that they provide the player with choices between playing in a player-generated and a game-world-generated time. Some spaces in the game-world are defined as player-controlled. In such spaces (zones) the player may "rest," perform strategic thinking, or carry out exploratory actions, by which he can control motion, and point of view, or explore objects. Other zones, other spaces, are defined as having game-world-defined times and processes; here the monsters can seek out the player-character and here the processes cannot be stopped, only mastered by some actions. If, for instance, the player falls into a pool of slime, he needs to get out "before he is out of air."

To control all the different activities of playing video games presupposes training by repetitive playing. Training will enable the player to transfer some of the activities from conscious control into a control by nonconscious procedures. The perfect mastering of such tasks will lead to the experience of mental flow, as described by Turkle (1984). The player who has perfectly learned all the different complex procedures can play in a highly active, but semiconscious, state. The performance demands total concentration in order to integrate a series of automated and nonconscious processes within a conscious framework. By having learned a series of procedural schemata the player will gain the necessary capacity for effortless voluntary control.

Thus video games are structured according to a principle of uses and gratifications similar to that of real life: We can seek out stimulating spaces when bored and take shelter in some other spaces when overstimulated and in need of rest. The video game enables the player to control his or her perceptual, emotional, and enactional activation. The feeling of being able to customize one's control over the relation between challenge and personal control is further enhanced by three additional features of most video games: the existence of a pause button, the possibility of saving intermediate results, and the existence of different levels of difficulty. Thus the player can choose the level of difficulty in relation to skill that the player considers to be optimal.

REPETITIVE GAME-PLAYING, CURIOSITY, SURPRISE, AND SUSPENSE

The typical film is viewed one time only, whereas the typical video game is played many times, and the cognitive and emotional differences between these two modes of reception accounts for central differences in the experience of the two media.

In a film there is a big difference between the first viewing and the following viewing(s) (Brewer, 1996). For most viewers the first viewing is the central film experience. The first-time viewing of a narrative takes place with an uncertain narrative future. This cues curiosity, surprise, and suspense. As the narrative proceeds, the film will make the narrative factual. When the film viewing is finished, the viewer has received the final and irreversible version of the narrative. Our cognitive, emotional, and enactional experience of a film will therefore be determined by the fact that any given film sequence presents a final version of events. Mutilations or deaths during the film are mostly final and unchangeable facts.

In contrast to this, a video game is played many times and many events can be altered by the player's interactions. Thus a given sequence in one game performance of a given video game-world by a given player is different from a similar sequence in the following game. A given game not only exists as a factual event, related to a given game, but also provides important feedback in the following games. Or phrased differently: Video games are learning processes. A given game will typically not lead the player through the whole game; only a series of games will provide the player with the necessary skills to complete the game. Even when completing the game the game-world will be a series of spaces, objects, and actions, a virtual reality, with many possibilities for making linear narratives from beginning to end. Because video games are repetitive learning processes, the emotional experience is different compared with the film experience. I explain this difference in relation to the experience of three central arousal-evoking elements: curiosity, surprise, and suspense. I mostly follow the definitions of curiosity, surprise, and suspense provided by Brewer (1996).

A film will often elicit curiosity, because a viewer is aware that vital information concerning narrative past or present events is withheld. The film will induce arousal until the information is disclosed and then the information will lose its interest. In a video game the satisfaction of curiosity is part of a process of learning and mastery. The player needs to remember the disclosed information in order to use it in a second game. A central factor in playing video games is to remember information from previous games, slotting the information into cognitive maps. Because curiosity in action video games (as opposed to mystery video games) is mostly prospective, curiosity is often linked to properties of the game-world as possible elements of future actions. I discuss curiosity in relation to suspense later in this chapter.

A film will create surprise by sudden events. It will create a momentary arousal jag, which will then disappear. But when playing video games, what was sur-

prising in the first game is transformed into a suspense-like coping anticipation in the following games. When the player advances toward the space/time in which the surprising event has previously occurred, say the sudden appearance of a fierce antagonist, an increased arousal is induced. The arousal will diminish over time as the player learns some coping mechanisms, for instance, fast routines for shooting the monster despite the surprising speed or the surprising location of the monster. When hearing horrible dogs growling from behind, the player will learn to turn quickly. Because of capacity constraints imposed on the brain when playing games, it is not at all certain that a player is able to understand and remember the cause of a given surprise; only consecutive games will provide the necessary knowledge and motor skill (for instance, to control point of view in such a way that the circumstances of a surprising event can be discovered).

A film will create arousal related to the viewer's expectations of what will happen to the central protagonists. The expectations can be linked to knowledge of dangers or positive events disclosed to the viewer but not to the protagonists. Some theorists (Brewer, 1996) use the word *suspense* exclusively to describe such emotional concerns for protagonists if they are derived from knowledge not shared by protagonists. For good reasons such suspense does not exist in video games, because the game character and the player are fused. In everyday use of the term in respect to film, however, suspense also applies to strong concerns about the future destiny of the protagonists. I will therefore use suspense in this broad sense. (Zillmann [1996] provides a broad definition of suspense that is similar to mine, but he does not consider the role of the viewer's simulation of the characters' coping potentials.) Video games certainly evoke suspense related to the outcome of local sequences as well as the final outcome of the game. But just as we saw in relation to interest and surprise, suspense in video games is inter-

woven with the interactive and repetitive nature of the game. Because of the interactive aspect of the game, the outcome in a given game is in principle just as uncertain the second time as the first time. The player might in the first game by chance shoot an important antagonist or by chance stand in a protected area, or the player may make a perceptual or motor mistake. The player will only by training achieve such an expertise that the game will lose its suspense, and thereby its ability to arouse and stimulate the player.

The suspense is often based on a series of different factors, such as the ability to perform spatial mapping, to detect the different capabilities and locations of antagonists, and to guess what weapons to use or what strategy to use. The player's exploration of the game-world by means of trial and error as well as by means of constant assessments of causes and effects is linked to a suspenseful curiosity. Contrary to a film narrative, which shows all aspects of the narrative world in the first viewing, because its narrative is based on a linear space-time, a video game often supports many different ways of proceeding through the game-world. A characteristic aspect of video game suspense is the way in which it is molded by the player's coping motivation, including the wish for achievement. A film

will go on irrespective of the viewer's degree of curiosity or suspense, but a video game is actively driven by the viewer's explorative activities. A term like *explorative coping* might therefore be a useful supplement to the terms curiosity, surprise, and suspense in order to describe video games. In video games, curiosity, surprise, suspense and explorative coping are not fixed entities, causing fixed types of arousal and fixed emotions as a consequence of cognitive labeling linked to affordances. On the contrary. The experience of given situations will change over time, due to learning processes that will change arousal and will change the cognitive labeling of the arousal. The emotional experience is not primarily input-driven, but driven by the wish for an active control, and thereby also driven by a wish for emotional control. The aggressive game-induced arousal is therefore possibly more closely linked to the player's own activity and less directed at the hostile others than in film. When a player has been shot by an enemy, he can press a button to play a new game. Therefore, that arousal is fueled into further play is a more adequate coping reaction than aggression toward the "enemy." In video games, the antagonists are often a mixture of hostile others, and there are therefore no focusing antagonists (except maybe the computer itself as host for the hostile software).

VIDEO GAMES AND SELF-ESTEEM

In video games the blame for defeat is predominantly directed at the players themselves, because the players are well aware of the fact that the evil forces act according to encoded software scripts and that other, better-skilled players are able to succeed. The variable is the player's skill. To link defeat with personal humiliation is therefore a more adequate reaction than hate toward all the different evil forces. In many games a player can choose different skill levels and thus choose a level that provides an adequate balance between challenge and personal performance. These structural factors in violent video games accord with theories that hypothesize that entertainment serves as a means for controlling the level and the variation of arousal. The arousal is increased by exposure to adverse situations but reduced and relabeled as the learning processes enhance coping. Aggression is primarily linked to coping. And the player's exposure to arousing phenomena might—from a uses-and-gratification point of view—be seen as part of mood management (cf. Rubin, 1994; Zillmann & Bryant, 1994). But on the other hand, the effects are very much linked to the player's assessment of his or her own performance, and the effect on aggression could therefore be linked to individual differences. In films the viewer gets a vicarious satisfaction in seeing a protagonist succeed. The degree of satisfaction is—besides the narrative factors—probably linked to the degree to which the protagonist matches values of concern for the viewer's self-appreciation. The vicarious self-esteem derived from films may depend on the viewer's ability to empathize with characters and thematic values as

well as on the display of mastery by violence. But the viewing process as such in a mainstream film does not demand any special skills and is therefore not a self-test. Exceptions are very violent films, which can test the stamina of the viewer.

In violent video games there are only rudimentary links to social themes. The player-character is mostly defined as a relatively unspecific warrior. The central factor for self-esteem is linked to the player's skill in mastering the game. It could therefore be hypothesized that playing video games would have very different effects on different players. Good players should get more self-esteem out of playing video games than bad players. Even if game playing is part of a learning process, in which more time spent on playing will lead to better results, there would still be significant individual differences (contrary to viewing films). But the possibilities for choosing an adequate level of difficulty in relation to the player's skills should lead to a diminishing of differences in self-esteem as a consequence of playing video games. It is furthermore not clear whether video games would attract people with self-esteem problems because of the possibility for creating an alternative way of mastery, as suggested by Dominick (1984) or attract people with strong self-esteem who are motivated by an additional way of coping. Fling et al. (1992) found no correlation between the amount of playing time and self-esteem. A study by Funk and Buchman (1996) found no effects on self-esteem on boys playing violent video games, but some correlations between girls playing violent video games and a lowered self-esteem.

VIDEO GAMES AND EMOTIONAL CONTROL

Following is a summary of some of the points discussed earlier.

1. The interactive interface between player and game-world makes the coping reactions to arousing events into concrete coping procedures. Therefore, video games elicit fluctuating emotional labeling procedures in relation to coping potentials in the given situation. This labeling will change over time as a function of the player's learning. They will activate a series of mental and bodily functions: attention, arousal, cognitive appraisals of arousal, cognitive mapping, procedural schemata, and motor performance. A given arousal-eliciting event will continuously be relabeled. A panic-evoking situation can, by learning processes, be transformed into a fear-evoking or aggression-evoking event, or eventually be totally controlled and be interpreted as a cause for playful mastery.

Contrary to film, video games are output-driven. Furthermore a game is meant to be played several times, and therefore a given outcome is not final, but part of cognitive and emotional learning processes similar to everyday learning. The input-mastering by coping reactions will influence the experience of curiosity, surprise, suspense, and explorative coping in the player's different performances in a given video game.

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2. The games are constructed to make it possible for players to gain control over the elicited arousal by means of the learning processes. Besides the central interface that controls perception and action, the games typically possess a series of additional control devices, from being able to choose several levels of difficulty, to time out features and the possibility of saving a positive intermediate result. Video games are therefore often "mood managers;" that is, they allow the player to participate in a self-controlled arousing experience. The time spent on a given game is player-controlled, and therefore it may be suggested that the player will continue to play until he or she has achieved an optimal arousal equilibrium. The game is emotionally, cognitively, and physically demanding, and may cause fatigue.

3. The point-of-view video games activate the player on a first-person basis and are experienced as part of a self-testing, which links the player's performance to his personal self-esteem. As a consequence, the video game experience may be more individualized than film viewing because of a greater variation in a player's ability to master a game than to view a film, especially because video play mastery is objectively evaluated (by degree of scores, kills, number of secrets found, etc.), whereas a film viewer has no such objective evaluation of performance.

4. The violent action game is often experienced as a simulation of interacting with an online reality, because the player's mental flow of perceptions that cause emotions and cognition that causes action that again causes perceptions, is very similar to real-life interaction.

Seen from one perspective, violent video games look very much like a playful enactment of skills and dispositions central to our gatherer-warrior-hunter ancestors. The players cope with a hostile environment by quick perception and by spatial and motor skills, they notice landmarks and gather objects that may be useful. However, seen from another perspective, video games are ways in which players learn to master facets of computers. Video games thus mold the biological inheritance in a way that accords with present-day cultural needs. As pointed out in several studies (Greenfield, Brannon, & Lohr, 1994; Greenfield, Camaioni, et al., 1994, for example), computer games are important playful tools for learning to interact with the computer medium and its graphic interface, just as the games enhance spatial skills and eye-hand coordination. Those studies also show that boys on average perform significantly better in action-oriented computer games, partly because of better spatial skills, but also for motivational reasons, because boys have a stronger preference for violent games than girls, maybe for biological reasons (Kubey & Larson, 1990). This accords closely with evolutionary theories of sex differences in spatial abilities due to division of labor in gatherer-hunter societies (Silverman & Eals, 1992) and to motivational features that supported hunting. It is deplorable that the video game industry has not yet invented games that cater to those gatherer skills and motivations that are attractive to girls (verbal skills, object memory, location memory, and a series of social skills and pro-social motives).

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out the way in which video games rely on cultural stereotypes. These arguments, however, beg the question of why so many children choose such games, why they play with a Barbie Doll computer game instead of playing with the physical doll, or why they choose to fight galactic wars on computers instead of playing with physical blocks or all kinds of physical guns and tanks. Provenzo's portrayal of the impoverishment of the game leaves something out. Most video games or fairy tales are certainly more impoverished than a complex social melodrama or a novel by James Joyce, but the interaction with science fiction worlds or audiovisual re-makes of fairy tale worlds may be more gratifying than passively viewing a cops and robbers show on TV.

Optimists can argue that video games fulfill positive functions that mold our biological inheritance to fit present-day needs. I have argued for the pleasures derived from video games as tools for emotional control, which adds a new cultural artifact to those means of mood management that have been developed by the entertainment industry, for instance, film and TV (Grodal, 1997; Zillmann & Bryant, 1994). Video games are learning processes that develop a series of cognitive skills (Loftus & Loftus, 1983), just as video games enhance mastery of the computer (Greenfield, Camarioni, et al., 1994).

The themes and actions of most video games are updated versions of fairy tales and Homer's *Odyssey*, enhanced by modern audiovisual salience and interactive capabilities. Central themes are the fights with dragons and evil monsters in combination with quests through dangerous and exotic scenarios. It is furthermore important for many games that the hero rescues damsels in distress. That there are only a few basic narrative patterns in video games is not surprising because there are not many basic narrative patterns in fiction. Of those basic narrative patterns only action-adventure and mystery plots are suitable for interactive narratives, whereas romances, comedies, and tragedies rely centrally on passive recipients for the emotional build-up (Grodal, 1997). Certainly there are degrees of freedom in the way in which action-adventure narratives are provided with themes; in principle it is easy to imagine games in which women save men in distress, or games that provide scores for feeding hungry children in Africa. Criticism that points out stereotypes, prejudices, and antisocial behavior in video games puts a healthy pressure on the industry to come up with better themes.

Video games do not replace the traditional forms of entertainment but rather provide a supplement to, for instance, reading, watching film and television, and participating in sports. The pleasure derived from an interactive immersion in a virtual reality competes with pleasures derived from other types of entertainment that emphasize passive pleasures, like film and television. Interactive media like video games create a further sophistication of media consumption by enabling consumers to switch between a passive control of their emotional and cognitive states (by actively selecting one-way media) and an active control of these states (by choosing interactive media). These interactive media are still in their infancy for reasons related to the kinds of stories that, for technical reasons, can be enacted. But interactive media have already provided quite new pleasures due to the

When most children and adolescents in the industrialized world spend considerable time playing video games, and very often violent video games, pessimists argue that this was a dangerous trap by a greedy video game industry to evoke primitive and antisocial features of our biological inheritance. They further question that those games provide real creative interactive experiences. They argue that the interactivity is only a surface phenomenon that veils indoctrination because "most games require the player to take part in developing the game scenario, but players are routinely rewarded for identifying and selecting the strategy built in by the game designer" (Funk & Buchman, 1996). However, this is also the case in most culturally produced games and fictions and does not show whether video games are putting narrower constraints on personal creativity than other games and fictions. Pessimists further argue that the scenarios and themes provide an impoverished experience. Provenzo (1991) states, "Compared to the worlds of imagination provided by play with dolls and blocks, games such as those reviewed in this chapter [popular Nintendo games] ultimately represent impoverished cultural and sensory environments" (p. 97). Provenzo further points

TABLE 11.1
A Feature Comparison of Film Viewing and Video-Game Playing

Entertainment Medium	Film	Video Game
Perceptual quality	High visual salience	Medium visual salience
Interactive control of:		
Visual input (point of view)	None	Controlled by player via interface
Story events	None	Controlled by player via interface in interaction with game agency
Temporal progression	None	Controlled by player's explorative coping and time-out devices
Emotional significance of events	Controlled by film and characters according to the player's action	Emotional arousal is labeled
Supports mainly:		
One viewing	Multiple games	repetitive interaction.
Mental and bodily simulations of	Concrete interactive simulations	based on extensive cognitive mappings of space and the learning of procedural schemas, leading to motor reactions via internal face
Vicarious simulation of characters	First-person simulation of roles, leading to immersion in game world	
Evaluation of viewer/player performance	None	Yes, by game success, and eventually by score mechanism

way in which they enable players to simulate an interactive control of human faculties and emotions in possible worlds.

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