THE NEXT LEVEL OF RESEARCH ON ELECTRONIC PLAY: POTENTIAL BENEFITS AND CONTEXTUAL INFLUENCES FOR CHILDREN AND ADOLESCENTS

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Abstract: *Most research on electronic play has focused on its possible negative effects for children and adolescents, and contextual factors such as socioeconomic status (SES) and culture are rarely considered. This article considers the potential benefits of electronic play from a psychological perspective, as well as individual and contextual factors that may shape the influence of electronic play for children and adolescents. Demographics of players and the games themselves are presented, and recommendations for research and policy are discussed.*

Keywords: *child development, context, culture, electronic play, video games.*

INTRODUCTION

Electronic games are a relatively new form of media—but they have already established themselves as an everyday phenomenon for the children who play them extensively around the world. Computer and video games have received increasing attention over the past few decades, from players and professionals alike. The first computer and video games were invented in the 1960s and 1970s, respectively, and their growing prevalence, first in arcades and then in homes throughout the industrialized world, began in the late 1970s (Kent, 2001). The first game that was considered to be controversial, *Death Race*, was published as an arcade game by Exidy in 1976 (Gonzalez, 2004). Computer and video games, and their possible effects on players, have been studied in many fields of scientific literature, with areas of focus including whether games with violent content increase aggression or violence (Anderson & Ford, 1986; Cooper & Mackie, 1986; Funk et al., 2002; Gentile, Lynch, Linder, & Walsh, 2004; Sherry, 2001); whether these games lead to desensitization (Funk, Baldacci, Pasold, & Baumgardner, 2004), real aggression, or violence; the physiological responses to playing computer and video games (van Reekum et al., 2004); addiction (Phillips, Rolls, Rouse, & Griffiths, 1995; Salguero & Moran, 2002); and the use and efficacy of computer and video game ratings (Haninger & Thompson, 2004).

So far, most of the research on computer and video games has focused on possible negative influences and the evaluation of policy designed to minimize risk to children and adolescents. While computer and video games have been a source of concern, they also have the potential to have positive influences on development. In addition to their recently proven effects on improving aspects of visual attention and perceptual-motor skills (Green & Bavelier, 2003), some researchers have begun to explore the possible influences of computer and video games on cognitive skills and development and the possible therapeutic or prosocial effects of computer and video games (Anderson & Bushman, 2001; Chambers & Ascione, 1987; Griffiths, 2003, 2004; Wiegman & van Schie, 1998). In addition, the importance of studying computer and video games as a form of play (Cassell & Jenkins, 1998; Gelfond & Salonius-Pasternak, in press; Goldstein, 2000; Penny Arcade, 2002; Scarlett, Naudeau, Ponte, & Salonius-Pasternak, 2004) and as educational tools (Din & Calao, 2001; Fontana & Beckerman, 2004; Kafai, 1995; Kankaanranta & Nousiainen, 2004; Merchant, 2004; Yelland & Lloyd, 2001) has been raised.

Electronic play is the first qualitatively different form of play that has been introduced in at least several hundred years, and because of its differences, it merits an especially careful examination of its role in the lives of children and adolescents. With most forms of play media, the essence of the game exists in the interactions between the players and the physical media—blocks, sticks, dolls, pinecones, paints, and so forth. Unlike most forms of play media, the essence of electronic play exists in the interactions between the players and the distinctly non-tangible potential for a wide range of experiences, in which the physical properties of hardware and software are less the essence of the game and more simply a means of accessing it.

Whether we are considering the potential benefits or the possible associated risks of electronic play, we must keep in mind that we are studying a complex phenomenon. This complexity is evidenced by the inconclusive and inconsistent nature of many of the studies that have been conducted so far, as well as by the debates and differing perspectives that exist in this growing field of research. In order to continue our inquiry and expand our understanding, it is important to consider both individual and contextual factors that may play a role in shaping the influences of electronic play on children and adolescents. Almost no computer or video game research to date has considered contextual factors such as socioeconomic status or culture.

This article will focus on the possible psychological benefits of electronic play for children and adolescents, as well as individual and contextual factors that may mediate both possible benefits and risks associated with this type of play. The demographics of players and the games themselves are presented, followed by a review of research and theories related to the possible benefits of electronic play. Possible mediating influences of the individual characteristics of contraindication and gender, as well as contextual factors of socioeconomic status and culture, are discussed. Based on this discussion, future directions for research and policy are proposed.

DEMOGRAPHICS OF PLAYERS AND GAMES

The prevalence and popularity of electronic play provide further reasons for in-depth study. While it is difficult to give exact figures, most studies indicate that the majority of American

school-aged children are playing electronic games—on home computers, console game systems (e.g., Nintendo, PlayStation, X-Box), or both (Annenberg Public Policy Center, 2000; Kaiser Family Foundation, 2002; Walsh, Gentile, Van Overbeke, & Chasco, 2002). This is true for European and Japanese children as well (Beentjes, Koolstra, Marseille, & van der Voort, 2001). A recent study of Finnish children, ages 8- to 10-years-old, showed that their most common use of computers and mobile phones is playing games (Suoranta & Lehtimäki, 2004). In these industrialized countries, the older a child gets, the more likely the child is to play computer and console games and to play them for longer periods of time. By adolescence, the most common pattern is playing electronic games for half an hour to an hour daily (Kaiser Family Foundation, 2002; Phillips et al., 1995).

Boys outnumber girls in terms of who is playing computer and console games. This is true throughout the industrialized world. However, the reasons for and implications of this gap are not yet well understood. It may be simply that more games are designed especially for boys (Cassell & Jenkins, 1998).

Currently, the most popular types of electronic play are console and hand-held games. Console games are played through a special game console used with a television, for instance, X-box, PlayStation, and the Nintendo Game Cube. Hand-held games are played on Game-Boys, personal digital assistants (PDAs), and mobile phones. However, this division becomes less distinct as the technology supporting each type merges, and as the same games are frequently produced for each type of technology.

As for the games themselves, there are several category systems for describing different types of games. No one system has emerged to provide a common language. The following categories are used by game designers, and they incorporate the language often used by the players themselves: Real Time Strategy (RTS), First-Person Shooters (FPS), Empire Builders, Simultations, Role Playing Games (RGP), Massively Multiplayer Role Playing Games (MMRPG), Sports, and Puzzles (see Scarlett et al., 2004).

Computer and console games played in a stationary setting are what we traditionally think of when we consider electronic play, but electronic play has become increasingly portable—especially with the advent of Nintendo's Game Boy, and, more recently, with the inclusion of games that can be played on mobile phones and PDAs. The Nokia N-Gage, a combination mobile phone, FM radio, MP3 player, and game deck with high-resolution graphics, increases the potential even further for mobile game play.

Graphics and realism are two elements of computer and video games that make them attractive to players. Sports games not only provide opportunities to play soccer, basketball, or any other sport a player can imagine, they also provide realistic representations of well-known sports arenas, real-life "color" commentators (e.g., American football commentator John Madden plays himself in *John Madden Football*), and all the little gestures that help define a player as being linked to a particular sport (soccer players throwing up their hands when receiving a yellow card, tired-looking basketball players leaning over and gripping the bottoms of their shorts, etc.). This level of detail exists in other types of games as well. Simulation games and RPGs draw children into fantastic worlds that momentarily feel quite real, and they turn children into bona fide city planners, wizards battling evil empires, and a host of other roles that children are eager to try on.

It is important to remember that the concept of realism does not refer to the degree to which a game accurately represents real life—in fact, many games that include realism are quite fantastic in their content. Realism describes how real the game feels to its players, how

vivid the depicted world seems to be. One aspect of technology to power realism (and interaction as well) in games is "real-time 3-D," which allows images to be created instantaneously as players progress through a game, unlike the "pre-rendered" images of earlier technology, whose limited range of possibilities rarely allow players to forget even for a moment that it's only an illusion. The enhanced graphics and freedom of movement of real-time 3-D can promote physiological responses, such as motion sickness or even vertigo, to perceptions of realistic movement (Keegan, 1999).

Another aspect of games' realism is enabled by haptics technology, through which players can experience some of the force and vibration that matches the depicted play. The development of this kind of force feedback, which translates information from the game system into commands for motors or vibrators in the game controllers, draws on neurological research in order to convey, as closely as possible, the sensations that players would experience if the depicted play occurred in real life. Currently, haptics technology is not as advanced as other aspects of game technology, but it may reach that level in the future (Kushner, 2003).

In addition to graphics and realism, another attractive feature of computer and video games is their having levels or graded challenges. The goals of the sports game *Grand Turismo*, in which players immerse themselves in the world of auto racing, include passing several driving tests by racing around a track in a certain amount of time, participating in races to earn money, and handling the business aspects such as buying new cars and improving existing cars. At first, players begin the game at a basic level, without a lot of strategy involved. Players pick their cars based on subjective judgments of how fast they might go, using trial and error to figure out how to make the car move. To succeed at the highest level, players must use complex strategies and think abstractly in order to systematically evaluate different options and to carefully plan their approach to the game. At this level, players must figure out subtleties such as the best timing and speed of braking for particular track conditions so that their cars get around curves quickly and without crashing.

The increasing potential for interactivity is another reason why players are drawn to computer and video games. Most console game systems provide ways for more than one person to play at the same time, and the Internet encourages much more for computer games as well. Although the first online game was created in 1969, it was not until the early 1990s and widespread use of the Internet that online gaming became popular (Mulligan, 1999). As broadband Internet connections become increasingly common, the potential of online gaming grows as well, as higher bandwidth facilitates greater online complexity and sophistication in games (PS3Land.com, 2004). Right now, children on different continents who have never met can simultaneously play computer and console games together through several different types of games. Players often find that the game experience is richer when playing with or against people rather than the computer (PS3Land.com, 2004). In addition, the Internet also has created the virtually unlimited potential for players to trade tips and strategies, access demo versions of new games, and form friendships based on their shared interest.

POTENTIAL PSYCHOLOGICAL BENEFITS OF ELECTRONIC PLAY

Researchers have documented numerous contributions of play to areas of children's socioemotional, cognitive, and physical development, including emotion regulation, peer and

familial relationships, attention, problem-solving, creativity, fine and gross motor skills, and overall physical health (Scarlett et al., 2004). Sutton-Smith (1995) calls this the "rhetoric of progress," that play contributes to children's development through at least short-term, if not long-term, benefits.

However, Sutton-Smith (1995) notes an increasing amount of control and supervision of children's free play, in the forms of more structured activities, moving play inside, and replacing play and recess in school curricula with an emphasis on more academic goals. These changes may be an impediment to the essential functions that freer, less structured play serves in supporting children's emotional, social, cognitive, and linguistic development. Electronic play may have the potential to restore some of the critical elements of children's play that have been compromised due to the increased supervision and control of children's free time and imaginations (Gelfond & Salonius-Pasternak, in press).

Computer and video games offer unique opportunities for a child to play with rules within a make-believe setting. In the video game *Tony Hawk's Pro Skater 4,* for example, the child, by identifying with the main character, is able to transcend the rules of physical reality by leaping higher and turning faster on a skateboard than she ever could in reality. Not only does the child playing this game transcend the ordinary rules of physics, she also experiences a sense of mastery—if only symbolically—over the physical world and her body in it. In other games, the children can play with breaking other types of rules—societal laws. This is likely to appeal to an older child who appreciates that laws govern society and who is just beginning to negotiate the expectations of adult society to follow such rules.

While the world of computer and video games allows a child to break the rules of ordinary daily life, he or she must still *follow* the rules of the game. Thus, there are limits and boundaries to this kind of play. It is not that there are no rules. It is simply that the nature and boundaries of these rules are rearranged. This rearrangement of reality can be adaptive in a child's development (Leslie, 1987; D. G. Singer, 1985; Singer & Singer, 1990). In other words, not only is it pleasurable for children to have a chance to break rules that are continually imposed on them, but make-believe play—including breaking the rules of the ordinary world in this make-believe setting—serves the important function of helping children to understand *more* about reality and thus the laws that make it up (Leslie, 1987; Singer & Singer, 1990). That is, make-believe play, which allows a child to compare varied possibilities of the natural and social world, helps children to *clarify* reality while they are experimenting with altering it.

As discussed previously, Sutton-Smith (1995) believes that the over-structuring and organizing of children's time, while there are certain benefits, can have deleterious effects upon children's play, including taking away important time spent with one's own imagination—what Jung (1937) calls "dream space," or what Winnicot (1977) refers to as an "intermediate space," where children can create a dialogue with themselves. The advent of particular video games, on the other hand, has taken an opposite approach. McNamee (2000) describes the video game world as a "heterotopia" using Foucault's term, where "...the playing of video games by children can be seen as a strategy for contesting spatial boundaries" (p. 484) within the real world. McNamee further argues that as children's leisure is increasingly supervised, "…playing video games may, then, provide those who play them with the adventures that they are no longer allowed to have, in spaces which they do not inhabit in any real sense" (p. 485).

One of the most popular and controversial games of recent times, *Grand Theft Auto III* (*GTA III*), may owe some of its popularity with children (and perhaps adults as well) not to the antisocial behaviors and violence for which it has become known, but rather for its lack of rigid structure and the opportunity for exploration in its form of play. In *GTA III*, released as a *PlayStation* console game at the end of 2001 and also released as a computer game midway through 2002, the main plot of the game involves "…walking around the city mugging, maiming, killing, and car jacking" (Armchair Empire, 2002, ¶4). However, a unique and particularly appealing aspect of the game is its "fully realized and dynamic" free-form design. This design allows players to entirely disregard the main plot lines and instead explore the virtual city complete with a plethora of interactive details, including delivering pizza and driving the injured to the hospital in an ambulance, that make the game one of the most realistic games currently available. Furthermore, unlike many other games, disregarding the violent plot line does not result in play ending through a character's death. Since *GTA III's* release, other games that incorporate these characteristics have been published, including *GTA Vice City*, *True Crime: Streets of LA*, *Driver, Simpsons Hit & Run, Jak II, Tony Hawk Pro Skater 4, Tony Hawk's Underground, Mafia,* and *The Getaway.* The next game in the *Grand Theft Auto* series, *Grand Theft Auto: San Andreas*, was released in October 2004 (Rockstar Games, 2004).

Through the incorporation of their imaginations, children who immerse themselves in electronic play assume the role of spies, wizards, policemen, skateboarders, and a host of other characters. In addition, there are other aspects of certain popular video games, those allowing the player to explore the environment, that support a more free and unstructured space for play where imagination can flourish.

In addition to providing children with opportunities to negotiate society's rules and roles, electronic play may facilitate children's developing their self-regulation of arousal. Adventures within computer and video games allow children to confront danger and the concomitant feelings of fear and anxiety, mastery and defeat, power and powerlessness, all in a world that arouses fear but that is ultimately safe. As with other types of play, it is the very aspect of safety, emerging from the fact that the danger confronted is only pretend or make-believe, that allows the child to self-regulate and calm those feelings of fear and anxiety associated with such danger. Goldstein (1995) explains, "One characteristic of rough-and-tumble play, war play, and other forms of potentially dangerous or frightening entertainment is that they occur within a framework of safety and comfort" (p. 138). Goldstein goes on to suggest that these types of play give children the opportunity to self-regulate their states of arousal, and that their switching between feelings of fear and safety may in fact be an aspect of play that children find enjoyable.

One function of make-believe in play is to facilitate children's making sense of the world around them. According to Scarlett et al. (2004), the fantastic abilities of characters in children's play are actually based on motives and conditions that exist in the real world, for example, dragons being able to fly because of wings or superheroes fighting the bad guys to resolve an injustice. When children incorporate frightening or perverse themes into their imaginary play, for example, aspects of violence or sexuality, these themes sometimes arouse concern in the adults who care for them, fears that these themes in play imply that children will carry them out in the real world. However, J. L. Singer (1995) argues that "...even some of the more outrageous forms of make-believe play may have an adaptive role in clarifying for child players some of the necessary distinctions they must make in confronting the

genuine difficulties of daily living" (p. 196). Thus, in the context of normative development, frightening or perverse themes provide children with opportunities to further distinguish between fantasy and reality, and to make sense of real world rules, and to gain a sense of mastery over difficult issues.

Aggression is one potentially difficult issue that children can make sense out of in the context of electronic play. Electronic games with violent content can be viewed as a form of aggressive play, which is inherently different from actual aggression because of its lack of intent or attempt to injure a living person (Bensley & Van Eenwyk, 2001; Goldstein, 2000). This can be seen as analogous to Pellegrini's (2003) clarifying comparison of rough-and-tumble play (R&T) and aggression in school-age children: While R&T may resemble real fighting, its play tenor clearly differentiates it for its participants.

Pellegrini (2003; Pellegrini & Bartini, 2001) discusses the changing role of R&T for adolescents, who begin to use it as a way to learn about aggression through socialization processes, establishing peer status through dominance but without causing physical harm to participants. It may be that electronic play with aggressive or violent themes may serve a similar purpose for adolescents. From this perspective, rather than promoting aggressive or violent behavior, playing electronic games with violent content may be a healthy way for children and adolescents to safely experiment or grapple with the complicated issues of war, violence, and death, without any real world consequences (Bensley & Van Eenwyk, 2001; Goldstein, 1998). Of course, as with physical aggression, some children and adolescents will deviate from normative uses of electronic play with aggressive or violent themes, or they may extend behavior inappropriately to other non-play contexts. However, this is likely more to do with the interactions between the individual characteristics of the players and the games themselves, so while some children and adolescents will have no difficulty resulting from their electronic play experiences, others may.

Perhaps the more active role that children and adolescents take in electronic play, as opposed to other kinds of media, could enable them to develop a deeper understanding of the depicted violence through the exploration of characters' motivations, moral dilemmas, and consequences of action. This could result in greater reflection about violence than exists in typical television watching, given players' active role in the game. Jenkins, in an interview with the online forum Penny Arcade (2002), points out violence in humankind has been represented in all forms of story-telling media, and we should take advantage of the opportunity to think and learn about the nature of violence in these stories. While they are not yet widespread, increasingly games are being developed that encourage and sometimes require players to consider the meaning and consequences of their actions, violent or otherwise, in order to succeed in the game. These games include *Neverwinter Nights, Morrow Mind, Black & White* (Penny Arcade, 2002)*, Swat 3,* and *Combat Mission* (Osborne, 2001). Jenkins suggests that games like this could help us as a society to understand the nature of aggression and violence (Penny Arcade, 2002).

In their review of the empirical literature of video game violence, Dill and Dill (1998) describe the game *Killer Instinct* as "...a game that pits two macabre characters (or, more to the point, its two young players) against one another in harsh, bloody combat to the death" (p. 408). This presentation implies that the game's "two young players" would not understand that the depicted characters do not exist in reality, outside the game—that they would see themselves, and not just the depicted characters, as engaging in a real "harsh, bloody combat to the death." This is not an implication that should be hastily presented, for it is precisely the

players' understanding of reality versus fantasy in the game that is likely to influence whether they will be more likely to display aggression or violence after playing such a game.

Computer and video games may also be beneficial in the context of therapeutic play and play therapy. Studies have shown that electronic play may also contribute positively in the contexts of physiotherapy; occupational therapy; pain management; facilitating the development of social skills in children and adolescents with learning disabilities, mental retardation, and autism spectrum disorders; reducing impulsivity in children and adolescents with attention-deficit disorders; and improving problem-solving strategies, self-regulation of arousal, cooperative behavior, and self-esteem (Demarest, 2000; Gardner, 1991; Griffiths, 2003, 2004; Spence, 1988). Electronic play may be a particularly effective method to develop relationships and facilitate cooperative activities with adolescents in clinical settings (Griffiths, 2003).

When we consider therapeutic play, we are referring to play that occurs naturally or spontaneously, or that is facilitated by clinicians; in either case, therapeutic play is naturally beneficial or is designed to be beneficial in some way, by following the child's agenda. Play therapy is a more formalized approach that takes advantage of the inherent benefits of play in a clinical setting, with established goals of treatment (Scarlett et al., 2004). Electronic play has the potential to be therapeutic without clinicians' facilitation, in naturally occurring, normative play experiences. The responsibility of supervising play in these cases rests with parents, and, in some cases, teachers. When clinicians use computer or video games in the context of therapeutic play or play therapy, it is crucial to carefully devise a treatment plan that appropriately matches the themes of the games, player interface, duration of play, and other relevant characteristics of the games and the play experience with the child's or adolescent's particular issues, needs, or condition (Griffiths, 2003).

INDIVIDUAL AND CONTEXTUAL FACTORS

It is expected that any benefits or risks associated with electronic play will be influenced by both individual and contextual factors. These include gender, cognitive and socioemotional development, trait aggression, socioeconomic status, and culture. While it is important to consider these factors, acknowledging their presence and studying their association with benefits and risk does not bear any explanatory value. As we continue to further our understanding in this area of study, we must begin to study the processes and mechanisms that underlie these factors, for it is at this deeper level that we can begin to address how positive and negative influences occur.

Gender

Differences exist in how boys and girls play computer and video games. Boys, on average, play video games more frequently and for longer periods of time than do girls. Furthermore, they choose different games and playing strategies than girls choose (Kafai, 1995). The main differences follow gender stereotypes. Boys are more likely to play games that feature action (shooting, running, etc.), individual prowess, and winning through competition. Girls are more likely to play games that feature in-depth social interactions and character development through story telling; these games often feature aspects of fashion or dating. There are also

differences in girls' and boys' game playing that influence how sessions continue and end. Girls, more often than boys, can name characters, describe storylines, and accurately articulate relationships between characters. Girls tend to work together and socialize while playing games, while boys tend to focus on the competitive aspect of electronic play. Girls also tend to prefer games that have more than one way to win. Regarding the ending of game-playing sessions, girls are more likely to simply stop playing when they get bored, whereas boys are more likely to stop playing when they either win or lose the game, or when their depicted character runs out of lives (Cassell & Jenkins, 1998; Swanson, 2001).

It is possible that these variances in how boys and girls play computer and video games may result in differential effects or influences from this play. However, while gender differences in game interest, use, and performance do exist, they are not universal, nor are they consistent. Games such as fantasy and role-play tend to show equal appeal for boys and girls, and gender differences in performance disappear over time (Kafai, 1995).

Cognitive and socioemotional development

Currently, there is a paucity of studies that consider electronic play from a developmental perspective (Kirsh, 2003). It is expected that aspects of cognitive and socioemotional development are likely to shape the possible influences of electronic play. Kirsh (2003) highlights aspects of adolescent development, including psychosocial factors and biological changes, which make individuals more likely in early adolescence, and less likely in late adolescence, to engage in aggressive behavior and conflict. At various points in development, some children may be more at risk for negative effects that may be associated with violent media, including those who are unpopular, less intelligent, or who experience low parental supervision of their media engagement (Huesmann & Skoric, 2003).

However, these associations may indicate that children who are already experiencing cognitive or socioemotional difficulties are drawn to computer and video games. One study showed that, contrary to researchers' hypotheses, playing video games did not limit the sociocognitive abilities of empathy, cognitive complexity, or cognitive abstractness in elementary school children. Rather, the results suggested that video game use was influenced by children's sociocognitive abilities: Boys who displayed lower sociocognitive abilities reported more frequent use of video games (Sakamoto, 1994).

Trait aggression

Some researchers have explored the potential for the amplification of possible negative effects of computer and video games with violent content in individuals who have trait aggression or an aggressive personality. Anderson and Bushman (2001) have proposed the General Aggression Model (GAM), a theoretical model that takes this hypothesis into account. The GAM posits that electronic play with violent content play may promote aggression and violence in children through the "…learning, activation, and application of aggression-related knowledge structures stored in memory (e.g., scripts, schemas)" (Anderson & Bushman, 2001, p. 355). According to this model, situational input variables, for instance exposure to violence through violent computer or console games, can promote aggressive behavior by impacting players' current internal states, which are represented by cognitive, affective, and arousal variables. The GAM suggests that individuals with a higher level of trait aggression or

aggressive personality may be at a higher risk for displaying aggressive or violent behavior than individuals with a lower level of trait aggression. This theory is compatible with earlier theories applied to aggression (Kirsh, 2003), including social learning (Bandura, 1986), the cognitive neoassociation model of aggression (Berkowitz, 1984), and hostile attribution bias (Dodge, 1980).

Research exploring trait aggression or aggressive personality has focused on studies that demonstrate that electronic play can increase players' arousal, as players manipulate controllers, assume the role of the hero character, fight enemies, or compete for higher scores. Lab studies have shown that computer and console game players have increased heart rate, blood pressure, and oxygen consumption after playing. In addition, these effects are greater after engaging in electronic play than they are after engaging in more traditional activities such as watching television, reading, or listening to music (Fleming & Rickwood, 2001). Since heightened arousal can amplify predisposed responses, it is possible that even subtle effects of electronic play could have a greater impact on behavior than other types of play, for individuals who display trait aggression or aggressive personality. However, there is currently no conclusive evidence to support these claims.

Socioeconomic status

Research has demonstrated that socioeconomic status (SES) often has a significant influence on children's development, and this influence may have implications for the possible effects of electronic play. There is evidence of the influence of SES both in terms of individual families' SES, as well as overall neighborhood SES.

Children in poor families have a higher risk for behavioral and cognitive problems than children in nonpoor families (Kim-Cohen, Moffitt, & Caspi, 2004).

Family economic hardship is associated with parents behaving with less responsiveness, patience, and nurturance toward children and adolescents (Lamb, Hwang, & Ketterlinus, 1999). It may be that the risk of behavioral and cognitive problems for children in families with a low SES may exacerbate possible negative effects of electronic play.

Results from a longitudinal study of children in Rochester, New York, demonstrate that it is not socioeconomic level itself that is associated with negative outcomes, but rather the number of associated risk factors, with multiple risk factors leading to cumulative effects (Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987). Children in families with lower SES not only experience more negative life events than children in families with higher SES, but their stress appraisal is higher for any given event, which can lead to higher incidences of depression and anxiety. In addition, a higher stress appraisal in the context of a dangerous neighborhood may also lead to a lack of trust in others, greater hostility, and less optimism about the future (Chen, 2004). A study of high school students showed that lower SES is associated with a greater interpretation of threat in ambiguous situations; this finding was partially explained by a lack of positive life events, rather than specific negative life events (Chen, Langer, & Raphaelson, 2004). It is possible that children who are predisposed to have a greater interpretation of threat in ambiguous situations may be at increased risk for aggression or violence after engaging in electronic play with violent content.

While studies of SES have primarily focused on its associated risks for children in poor families, children in affluent families may also have increased risks associated with their SES, including substance abuse, anxiety, and depression. Possible mechanisms for these

associations include an overemphasis on achievement and isolation from parents (Luthar, 2003). SES may have a curvilinear relationship with parental supervision, which may indicate that a lack of supervision of children's electronic play would be likely to occur in families with either a low or a high SES.

In their national study of children's media use, Roberts, Foehr, Rideout, and Brodie (1999) found that children in the lower income subgroup, as well as the lower education subgroup, experienced greater total exposure to media than children in the higher income and education subgroups. While the differences in exposure to video games were more subtle than the differences in total media exposure between the groups, these differences do raise questions about the possible effects of greater versus lesser exposure, especially regarding the quality of the children's experiences as well as families' perceptions of the role of media, and video games in particular.

Culture

Research has demonstrated that culture influences individuals' perspectives on aggression and violence, in terms of what constitutes aggression and violence, what is acceptable, and how it is handled. This variation occurs in the context of both broad and nuanced cultural differences. Both cultural values and experiences influence individuals' perspectives on aggression and violence. These influences of culture are likely to extend to electronic play as well, not only in terms of how children respond to computer and video games with violent content, but also in terms of how others respond to children who engage in this kind of play.

Jenkins (Penny Arcade, 2002) pointed out that games that incorporate attitudes and beliefs already dominant in the player's culture may encourage the acting out of game content in the real world. For instance, the amateur games that were circulated around the Internet after the terrorist attacks of September 11, 2001, in which players could shoot depictions of Osama bin Laden, could have been more likely to promote aggression or violence, particularly against Arab-Americans, because the games mirrored other aspects of American culture that were promulgating fear of and negative attitudes toward Arab-Americans after the attacks (Penny Arcade, 2002).

According to a study of moral reasoning in children in Bosnia and Herzegovina, children's preferred moral orientations (care and concern or justice and fairness) reflected Bosnian children's experiences of being displaced and their concerns about the role of physical power in conflict resolution (Garrod, Beal, & Jaeger, 2003). Cultural variation in moral orientations, as well as in perspectives on whether weak individuals should be protected in a given society, has influenced the selection and training of peacekeepers in conflict situations around the world (Thakur & Schnabel, 2001). Moral orientation and perspectives on appropriate versus inappropriate circumstances for aggression or violence are likely to influence children's responses to electronic play with violent content.

A study of college students, preschool teachers, and preservice early childhood teachers showed that individuals' gender, experience with children, and personal experience engaging in war play may influence perceptions of whether children's play is aggressive. In turn, these perceptions may cause differences in whether individuals will intervene and stop children's play that has been deemed to be aggressive (Connor, 1989). Certainly electronic play would be subject to these judgments.

FUTURE DIRECTIONS

Research

Currently, there are more questions than there are research-based answers—questions about the potentially beneficial versus potentially harmful aspects of electronic play, and how individual as well as contextual factors may shape these influences. Further research is needed in order to develop a better understanding of the complicated issues that seem to be involved in this area.

Especially when studying a complex phenomenon such as electronic play, it is necessary to carefully establish methods and operational definitions. So far, there have been few well-designed, well-executed experimental studies of electronic play that employ solid operational definitions of independent and dependent variables. This lack of clearly defined variables calls into question the construct validity of both the independent and dependent variables (Sherry, 2001), making it impossible to demonstrate causality. For example, studies often do not distinguish between aggression and aggressive play as outcome variables (Bensley & Van Eenwyk, 2001). In addition, as the pace of development of new technology for computer and video games accelerates, it is crucial for researchers to pay close attention to these developments in order to maintain a sense of current relevance with regard to research questions and designs (Griffiths, 2000).

So far, the possible long-term effects of electronic games have not been studied. It has been supposed that negative long-term effects may be more significant and more influential than short-term effects, and consequently may warrant greater concern, but as of yet, there is no evidence to support these claims.

There is also a lack of research with any subsets of the population that may bear particular predispositions toward aggression or violence. Again, hypotheses point toward groups of people that may be especially vulnerable to any negative effects of games with violent content, yet we do not have any empirical basis for assessing these effects or for taking appropriate action to handle them (Bensley & Van Eenwyk, 2001). The different ways in which young children and adolescents understand the distinction between fantasy and reality is one example of a developmental factor that is likely to influence how young players respond to electronic play. In addition, adolescents display great interest in electronic play as well as a greater propensity for aggression in general. Studies that adopt a developmental perspective are necessary to further our understanding of groups that may be at particular risk (Bensley & Van Eenwyk, 2001; Kirsh, 2003).

Another significant gap is the lack of research on the influences context, including SES and culture (Griffiths, 2000). As was discussed above, it is likely that both SES and culture would influence the characteristics that players bring to the game experience as well as how the game experience fits into their lives. Families' SES may influence parents' availability and resources for supervising children's electronic play.

Policy

In Europe, Asia, and North America, policies regarding electronic play focus on limiting the potentially harmful aspects of computer and video games, through game rating systems, plans and goals to educate parents about games and their ratings, and limits on the advertisement of

games with mature content to children and adolescents, and by encouraging or mandating retailers to restrict the sale or rental of games with objectionable content to minors. While there is some variation of what constitutes "objectionable content," most cultures have focused on violence, sexuality, addictive substances and behavior, racial slurs, and offensive language. Currently, no policies exist in the USA, Australia, or Europe regarding the study or promotion of any potential benefits of electronic play (Entertainment Software Rating Board, 2004; Office of Film and Literature Classification, 2004; Pan European Game Information, 2004; Salonius-Pasternak, 2003).

In most countries, with the United States being the most notable exception, governmental agencies are responsible for establishing and implementing policies regarding electronic play. In the United States, policies regarding electronic play are independent of government involvement. Typically, governmental agencies, game developers and publishers, retailers, and parents are the most active parties in the context of policy, although their roles vary across cultures (Entertainment Software Rating Board, 2004; Salonius-Pasternak, 2003).

The questions of what kinds of policies should be implemented in order to handle issues related to the possible negative influences of electronic play, what parties should share responsibility for regulating children's exposure and access to electronic games with objectionable content, and what should be done to address the possible positive influences of electronic play are complicated. When players, parents, policy makers, and game designers make decisions regarding issues of aggression and violence relating to electronic play, value judgments often play a large role in influencing these decisions. This tendency is especially likely given the current status of research in this area: We have only just begun. In reading, researching, and discussing these issues, it is important to be aware of whether statements are based on value judgments or scientific research. Both are important to consider, but they each come from entirely different bodies of knowledge that influence their appropriate roles and applications.

In addition, as researchers publish their findings and as organizations involved in policy decision-making interpret these findings, it is critical to pay attention to the limits of generalizability that exist in every study and to use language that is direct and specific. In their 2001 policy statement that stipulates media violence as a public health threat, the American Academy of Pediatrics (AAP) stresses that the strength of the relationship between "media violence" and aggression is greater than the strength of relationships among commonly accepted associations, including tobacco and lung cancer (AAP, 2001). Backing up this claim, the AAP refers to research that examined the effect size of violent content in television on aggression, a study that does not include any other form of media other than television. So while the reference to the strength of the relationship between this particular type of media violence and aggression is valid, it is misleading to use it to back up a claim regarding media violence in general. In order to improve our understanding of and our ability to respond effectively to any public health threat that may exist regarding media violence, it is necessary to work toward a common ground of responsible communication that avoids misleading implications, however unintentional they may be.

CONCLUSIONS

While most of the research on electronic play has focused on its possible negative influences on children and adolescents, particularly the possibility of increased risk resulting from games with violent content, electronic play may also have potential benefits for young players. These include providing children with the opportunity to negotiate society's rules and roles, allowing children to experiment with aggression in a safe setting without real world consequences, facilitating children's development of self-regulation of arousal, and serving as an effective tool in clinical settings.

Further research is needed in order to assess the possible benefits of electronic play for children and adolescents. Future studies should consider both individual and contextual factors that may shape the influence of electronic play, including gender, cognitive and socioemotional development, trait aggression, SES, and culture. Researchers need to carefully design empirical studies with clearly operationalized variables in order to expand our understanding of the relationships that may exist among these variables.

The individuals who are concerned about the presence and possible influences of computer and video games come from a variety of backgrounds: children, parents, teachers, researchers, politicians, advocacy organizations, religious groups, and the designers and publishers who create the games. Even the heading of researchers includes individuals from a variety of academic disciplines: child development, education, psychology, psychiatry, pediatrics, communication, media studies, computer science, and public health, to name a few. Given the different cultures scientific backgrounds that are represented here, if we are to advance our understanding of the role of electronic play in the lives of children and adolescents, it is important to incorporate interdisciplinary cooperation in the design, implementation, and dissemination of our research.

As we continue to improve our understanding of both the possible benefits and risks of computer and video games for children and adolescents, it is important to ensure that this understanding is disseminated among those who actively work with children, particularly parents, teachers, and clinicians. Greater knowledge of and appreciation for the positive and negative aspects of electronic play can facilitate these individuals being better able to make effective decisions regarding the presence and use of computer and video games in their respective settings—at home, in school, and in treatment facilities.

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