
Orientations to Video Games Among Gender and Age Groups

Simulation & Gaming


41(2) 238–259

© The Author(s) 2010

Reprints and permission: <http://www.sagepub.com/journalsPermissions.nav>

DOI: 10.1177/1046878108319930

<http://sg.sagepub.com>

 SAGE

**Bradley S. Greenberg¹, John Sherry¹,
Kenneth Lachlan², Kristen Lucas³
and Amanda Holmstrom¹**

Abstract

Questionnaires were completed by 5th-, 8th-, and 11th-grade public schools students in rural and suburban school districts and by undergraduates at two universities in the United States ($n = 1,242$). They were asked about their orientation to video games—the amount of time they played, their motives for doing so, and the game types they preferred—to better understand the context in which effects research might be organized. The conceptual schema for this research was the uses-and-gratifications perspective. The males in the sample played video games at twice the weekly average of the females, were consistently stronger in all measured motives than the females, and preferred physically oriented video games over the females' preference for more traditional, thoughtful games. Younger players opted for the fantasy motive in their playing and older players more so for competition. Preference for physical games declined among the older males, and generally motives were stronger in the middle years of playing for both males and females than in the youngest and oldest age groups. Regression analyses explained considerably more variance in game playing for males than for females.

Keywords

age differences, children, competition, game play, gender differences, imagination, leisure activities, motives, physical games, time, uses and gratifications, video games, video game genres

¹Michigan State University, USA

²Boston College, USA

³University of Nebraska-Lincoln, USA

Corresponding Author:

Bradley S. Greenberg, Department of Communication, Michigan State University, E. Lansing, MI, USA.

E-mail: bradg@msu.edu

This study examines how and why young people use video games from the conceptual background of the uses and gratifications perspective. It expands that perspective by giving equivalent emphasis to content (game type) preferences as it does to motives for game playing. In addition, it is the first study of this paradigm among different age groups and separately for young males and females. A justification for choosing this perspective follows a brief summary that identifies the basic need for progressive and innovative research on game-playing behavior. We hope that the results of this study provide valuable insights for game designers. That is, by assessing game feature preferences and patterns of use across different age groups, designers may be better able to custom-tailor game themes and content to their target markets.

When most of today's college undergraduates were born in the late 1980s, the world was entering the video game era. Early console machines had limited numbers of games and were replaced by more versatile and computationally powerful machines. These included Nintendo NES (1986), Nintendo Gameboy (1989), and Sega Genesis (1989), as well as PlayStation (1995) and Nintendo 64 (1996). More recent additions to the spectrum of available game consoles have included the PlayStation 2 (2000), X-Box (2001), X-Box 360 (2005), PlayStation 3 (2006), and most recently the Nintendo Wii (2006). The most recent generation of game systems (X-Box 360, PS3, Wii) has pushed interactivity and realism to previously unachieved heights, using processing speeds, graphics, sound, and interface devices far more sophisticated than earlier game systems. Further, unlike earlier generations of game consoles, more recent platforms have larger and ever expanding libraries of games. For example, Sony claims that more than 1,500 games have been created for PlayStation since the first release of the original platform in September 1995 (Sony Computer Entertainment America, 2005); and Imagine Games Network (IGN.com) has claimed it reviewed over 30,000 games between 1996 and 2005 alone (IGN Staff, 2005). The Entertainment Software Association, a professional organization for the U.S. video game industry, recently reported that 50% of Americans now play video games and that the average age of the American game player is 29 (Entertainment Software Association, 2007). Similar numbers of players exist in Europe and gaming is even more popular in Asian countries of Japan and Korea.

Video Game Research

Empirical video games research has focused largely on traditional media effects issues, particularly the effects of violent video games on aggression (see Anderson & Bushman, 2001; Funk, 1992; MediaScope, 1996; Sherry, 2001). However, researchers now are calling for research on aspects of the gaming entertainment experience in ways other than the traditional effects perspective. Gee (2003), for example, has frequently voiced the need for consideration of video games as a learning tool. He further notes that video games provide an environment in which game players learn decision-making processes in a virtual environment, and later carry those generalizations into more complex decision processes. Shaffer, Squire, and Gee (2005) add that these learning experiences may be especially powerful as games have the ability to convey context in a way traditional

media cannot. In a somewhat different approach, Bryant and Zillmann repeatedly have posited a need for further study of the entertainment experience of games (e.g., Bryant, 2004, Bryant & Miron, 2002; Zillmann & Vorderer, 2000). In response, considerable research now is focusing on the entertainment and/or learning aspects of video games, many examples of which are in a recent volume by Vorderer and Bryant (2006).

Historically, a prominent media entertainment issue has been the determination of the reasons why people use media and the gratifications they receive from that usage. This study explores the interface between the motives expressed for playing video games for entertainment purposes and the players' choice of different game genres to satisfy those motives, as they relate to the amount of time devoted to game play. Researchers who design games for children or adolescents, especially with the goal of arousing interest in games intended for educational purposes or simulated learning, may be interested in these preferences and motives and the way in which they vary across age groups and gender. Understanding these differences may help programmers and game designers determine the game types and game features that are especially appealing to boys and girls of different ages.

The Uses and Gratifications Paradigm

The uses and gratifications approach to understanding media use is more than 50 years old and originally concerned such media as newspapers and radio, and such content as soap operas and political news. It continues to provide a cutting edge approach for gaining insight into the impact of new communication technologies (Rubin, 1994; Ruggiero, 2000). Katz, Blumler, and Gurevitch (1974) first outlined the basic goals of this research by stipulating that the paradigm focus on

(1) the social and psychological origins of (2) needs, which generate (3) expectations of (4) the mass media or other sources, which lead to (5) differential patterns of media exposure, resulting in (6) need gratifications and (7) other consequences. (Katz et al., 1974, p. 20).

There is in this a presumption of an active audience, in contrast to passive reception (Fisher, 1978). Active individuals in the audience seek out specific media and content genres in those media in order to receive sought-after gratifications, such as learning, entertainment, and emotional sensation, among others. Rosengren (1974) stated that basic needs, individual differences, and contextual societal factors combine to result in a variety of perceived motivations. Gratifications are sought from the media based on these motivations, leading to differential patterns of media effects on both the individual and societal levels. We propose that an emphasis on content selection (game genre in this study) may be as critical as the choice of media, depending on what gratifications are being sought.

Early research in this area focused on establishing typologies of the reasons people use various media, working under the assumption that users can articulate their own reasons for their media use (Katz et al., 1974). For example, research in the United

Kingdom (Greenberg, 1974), later replicated in the United States (Rubin, 1979), identified six basic motives for television viewing by children and adolescents. These included learning, to pass time, to escape, for arousal, to relax, and for companionship. Subsequent studies took up the development of gratification typologies for cell phones and the Internet, among other media (Greenberg & Charney, 2002).

Systematic progression of research in the uses and gratifications tradition over the next 30 years expanded the basic issues to include the following:

1. examination of the links between media use motives and media attitudes and behavior (e.g., Perse, 1990)
2. the comparison of motives across media (e.g., Lin, 1999)
3. different social and psychological circumstances of media use (e.g., Perse & Rubin, 1990)
4. the links between gratifications sought and obtained (e.g., Babrow, 1989). Rubin (2002) has synthesized these research areas.

Motives for Playing

Early research on motivations for game playing can be traced to work examining the potential for video games as an educational medium. Malone (1981), for example, identified challenge, curiosity, and fantasy as factors that may predict the extent to which game players found the interactive learning experience to be enjoyable and/or productive. The first study to exclusively study video game uses and gratifications surveyed 244 10- to 24-year-olds about the needs and gratifications met by playing arcade video games (Selnow, 1984). This exploratory analysis yielded five arcade video game play factors: game play is preferable to human companions, teaches about people, provides companionship, provides activity/action, and offers solitude/escape. These factors were significantly correlated with amount of game play. A second study (Wigand, Borstelmann, & Boster, 1985) also focused on arcade video game use. They looked largely at understanding reasons that adolescents used arcades, rather than why they played games. Factor analysis generated three elements: excitement, satisfaction, and tension-reduction. Using a Q-sort methodology, Myers (1990) later posited that challenge, social interaction, and mediation were the critical aesthetic determinants of game enjoyment, with challenge the primary determinant of enjoyment. Griffiths' (1991) research on video game addicts proposed these gratifications: arousal, social rewards, skill testing, displacement, and stress reduction. All these studies dealt with earlier generations of platforms, games, and game types.

A more systematic approach to develop and identify the motives that are specific to non-arcade, contemporary video games was implemented by Sherry and Lucas (2003). They conducted focus group interviews with adolescent players and non-players and pre-tested and validated scale items that emerged from those focus groups. The uses and gratifications scale consisted of six motivations: challenge, competition, fantasy, arousal, social interaction, and diversion. Their most important motivation was the self-challenge the individual feels to beat the game or to get to the next level. Competition, to beat

friends, was the second strongest motive, followed by playing for diversion and for arousal. Among the least popular motives were the fantasy of doing something that cannot be done in real life and for social interaction with friends. Later research added the attraction of good graphics, playing for the realism of the game, and for ego-related purposes (Sherry, Lucas, Greenberg, & Lachlan, 2006).

Gender Differences

Consistent with other studies, Sherry and Lucas (2003; see also Lucas & Sherry, 2004) also found that college males spent more time playing video games than females. At a young age, children attribute certain video games as more appropriate for boys than for girls (Funk & Buchman, 1996; Wilder, Mackie, & Cooper, 1985). Livingstone (2002), in a survey of British teenagers, found that about three quarters of the male respondents had a game system at home, compared to about half the females, indicating that game play may be more popular among males across several age levels. From previous research, we hypothesize that

Hypothesis 1 (H1): Males will spend more time playing video games than females.

Why do males play more than females? A substantial body of research has examined differences between boys and girls in terms of game play (see Casell & Jenkins, 1998). Funk and Buchman (1996) noted that, "The origin of gender differences in game-playing habits has not yet been established" (p. 27). Walkerdine (2004) has argued, for example, that games may present another forum in which gender roles may be projected, and that female game players may be forced to engage in interactive behaviors that are inherently masculine in nature while maintaining some feminine characteristics. Bryce and Rutter (2002) further argue that the physical context in which games are played is often a male dominated one, excluding females and socially constructing gaming as a male phenomenon. Social factors such as these may reduce girls' motivational strength to play games, or perhaps inspire different gratifications to be obtained from game play.

Among college students, for example, Lucas and Sherry (2004) showed that motivational patterns mirrored real world patterns of play differences between males and females. They found that most video games paralleled the types of games that boys typically play and highlighted game contexts that appealed more to boys because of the rules and structure of those games. For example, the majority of video games have direct competition, clear role definitions, and explicit goals—all stronger features of male play. Consistent with these findings, we posit that

H2: Video game motives will be stronger for males than females.

As a follow-up to different styles of play in different game genres, we expect

H3: Video game genre preferences will differ between males and females.

Developmental Differences

Despite the attention that gender differences have received, little research has addressed whether children of different ages demonstrate differences in time spent playing video games, genre preferences, and motivations for playing. Given well-documented developmental differences across different-age children, it seems critical to explore age differences to best inform game producers and designers.

For example, developmental differences in comprehension and information processing are an important consideration. Past research indicates that children under the age of 10 may be drawn more to the formal features of mediated information, while older children are better able to understand and process plot points and character attributes (Anderson, Mead, & Sullivan, 1986; Comstock & Scharrer, 2001). More attentive information processing typically continues until about the age of 12 (Comstock, 1991), after which interest in mediated information in general declines. This decline is attributed to a reduction in leisure time and an increase in social interaction, which may then become a critical motive for the use of any medium. Further, developmental research suggests that identity formation may be an especially important motive for early teens' media use (and other interactions) (Huston, Wartella, & Donnerstein, 1998; Larson, 1995; Roe, 1995; Steele & Brown, 1995).

These differences raise the question of how children at different stages of development—specifically under the age of 10, around 12 to 13, and older—might use video games, in terms of the amount of time they spend playing, their game type preferences, and the gratifications they obtain from game play. Despite the potential impact of these developmental differences, little empirical attention has been given to age differences in video game responses and preferences.

Historically, mass communication researchers have found that traditional media use differs by age in a manner consistent with these developmental stages, with younger teens typically spending the most time using different media (Rideout, Roberts, & Foehr, 2005). Two national surveys in the United States report that media use differs by age, but these survey results differed by how the age categories were grouped. Roberts, Foehr, Rideout, and Brodle (1999) found that children between 8 and 13 years spent more time playing video games than children in either the 14- to 18-year-old age group or the 2- to 7-year-old age group. In their newer study, Rideout et al. (2005) found that the youngest group in that sample, aged 8 to 10, are playing games more hours per day (1 hour, 5 minutes) than children 11 to 14 (52 minutes), who spend more time than children 15 to 18 years old (33 minutes). Unfortunately, the second study omitted the youngest (2-7) group. From this, several predictions are offered based on age differences:

H4: Video game playing time will differ among age groups, with younger children (but at least 8) giving more time to video games than older age groups.

H5: Video game motivations will vary with the ages of the gamers.

Because motive strength is anticipated to be linked to game involvement, it follows that

H6: Video game genre preferences will differ by age.

In addition, the opportunity to work with different age groups permits us to examine the following age-related research questions:

Research Question 1 (RQ1): At what age level does video game playing time peak?

RQ2: What motivations are stronger at different age levels?

RQ3: What genre preferences are stronger at different age levels?

Finally, uses and gratifications predict that video game play time emanates from both gratifications sought and from genre selections. Therefore,

H7: Video game motivations and genre preferences will be individual and joint predictors of playing time.

Methods

Participants

Data were collected from 692 5th-, 8th-, and 11th-grade students in six rural and urban public school districts and 550 university students in two Midwestern states in the United States between January and June of 2003. A total of 141 5th-grade students (70 boys and 71 girls, approximately 9-11 years old) participated. In addition, 227 8th-grade students from three school districts (102 boys and 125 girls, approximately 12-14 years old) participated, together with 324 11th-grade students (150 boys and 168 girls, approximately 15-17 years old) from three additional districts. A total of 229 male and 321 female students from a large research university and a comprehensive university with vocational technology training participated. Written parental consent was obtained from all minors; a candy bar was offered for returning the consent form and there was 90% participation. Written informed consent was obtained from the university students. Following the data collection, all participants were given a debriefing sheet explaining the complete nature of the study and the anticipated findings.

Instrument

A self-completion questionnaire assessed the respondents' preferences for different types of video games, time spent playing video games, gratifications derived from playing video games, and demographic information.

Game Genre Preferences

Items examined preferences for 14 different video game genres. These 14 were obtained from video game manufacturers, gaming Web sites and gaming magazines, and have been tested for mutual exclusivity (Lucas & Sherry, 2004). For each genre, respondents

were asked to rate their enjoyment of the game type on a 7-point scale, with response categories ranging from *strongly dislike* (1) to *strongly like* (7). The game types were Strategy, Fantasy/Role Play, Adventure, Shooter, Fighting, Simulation, Classic Arcade Games, Card/Dice Games, Quiz/Trivia, Board Games, Kids Games, Sports, Racing/Speed, and Puzzles. For each game type, two or three specific games were identified as examples.

To investigate whether game-type preferences clustered together and could be treated more parsimoniously, principal axis factor analysis was performed on the 14-game genre items across all participants. Three clean factors emerged and one genre cross-loaded. The first factor consisted of strategy, fantasy, and adventure genres and was called “imagination” games because of their emphasis on imaginary lands ($\alpha = .72$). The second factor included classic arcade games, card/dice games, quiz/trivia, board games, and puzzle game genres ($\alpha = .81$). This factor was labeled “traditional” because it emphasized games that have been around for a long time either in the gaming world (e.g., classic arcade games) or in non-video game versions (e.g., card/dice, quiz/trivia, classic board games). Sports, fighters, shooters, and racing/speed genres clustered on the third factor and were named “physical” games because they all imitated real world physical competition ($\alpha = .71$). The preference for simulation games was cross-loaded on all three named factors and was retained solely for the regression analyses. In addition, the preference for kids’ games was extremely low across all these age groups and was dropped.

Game Use

Respondents estimated the number of hours they play video games during each of four day-parts (e.g., before school, after school but before dinner, etc.) on the average weekday (Monday through Thursday), as well as on Friday, Saturday, and Sunday, specifically. Past research has demonstrated that this “grid” method of asking respondents to report behavior during different time slots on different days is a more accurate means of assessing autobiographical memory than other indicators, such as asking respondents to estimate a number of hours per day or week (see Menon, 1994). These scores then were summed into hourly totals for each day; a weekly total of hours spent playing video games was computed by multiplying the weekday total by four and adding the individual estimates for Friday, Saturday, and Sunday.

Gratifications of Game Playing

To determine the gratifications sought and/or obtained by respondents from video games, 36 items were used from Sherry and his colleagues (Sherry & Lucas, 2003; Sherry et al., 2006). The items consisted of a statement, followed by a 7-point scale with response categories ranging from *strongly agree* to *strongly disagree*. These items measured nine motivational factors: arousal, diversion, social interaction, fantasy, challenge, hi-tech, ego, competition, and realism. Confirmatory factor analysis (Hunter & Gerbing, 1982)

examined the measurement model of the gratification items. All the gratification factors in their original forms met the criteria for internal consistency; scale reliability is reported below.

Three items, such as “playing video games makes me excited,” were used to measure arousal ($\alpha = .83$). Five items, for example, “I play video games when I should be doing something else,” measured diversion ($\alpha = .81$). Four items, for example, “my friends and I get together to play video games,” measured social interaction ($\alpha = .92$). Fantasy was measured with four items, for example, “video games let me pretend I’m someone else” ($\alpha = .91$). The four items for the challenge factor included “I play the game until I get to a certain level” ($\alpha = .72$). Hi-tech items included “I like to play video games because they look really cool,” ($\alpha = .81$). Ego was measured with four items, including “I play video games because I can be strong” ($\alpha = .89$). Competition was measured with four items, for example, “When I lose to someone, I want to play them again and beat them” ($\alpha = .75$). Realism was measured with four items, for example, “I play video games because the characters in the games are a lot like real people” ($\alpha = .84$).

Results

Sex Differences

Table 1 presents weekly hours of videogame playing time for males and females in each age group. Overall, males average 18.6 hours per week, more than twice the weekly average of 8.2 for females ($p < .001$). This pattern of sex differences holds up in each age group studied (e.g., 5th-grade boys spend twice as much time with videogames as 5th-grade girls). Each gender comparison in the four age groups is statistically significant ($p < .001$). Consistent and strong support is found for the first hypothesis. For both sexes, game time peaks among the 8th graders. The 8th-grade boys average 23 hours and their female counterparts average 11.5. Among the males, this is significantly more than the 11th graders and the college students but comparable to the 5th-grade playing level. Playing time for the 8th-grade girls exceeds that of the 5th and 11th graders, but large variance inhibited a significant difference from the college women (11.5 hours vs. 8.6 hours).

Table 2 lists the gratifications for playing video games from strongest to weakest among males, with females in the adjacent column. Given a midpoint of 4 on the scale, six of nine gratifications exceed that level for males: competition, challenge, arousal, diversion, social interaction and fantasy. Only one—competition—does so for the females.

On all nine gratifications, the average score for males exceeds that of the females ($p < .001$), providing strong support for H2. Two additional findings merit reporting here and discussion later. First, the two primary gratifications for both sexes are competition and challenge. Second, the largest sex differences are playing video games for arousal and for social interaction.

Table 1. Weekly Hours of Videogame Playing by Gender and Age

Gender	Age	<i>n</i>	Hours/Wk
Male	5th	70	18.71
	8th	102	22.94 ^{de}
	11th	150	16.96 ^d
	College	202	15.63 ^e
All males		18.56^a	
Female	5th	69	6.70 ^g
	8th	125	11.54 ^{fg}
	11th	167	5.76 ^f
	College	170	8.62
All females		8.16^a	
Both	5th	139	12.71 ^g
	8th	227	17.24 ^{bcg}
	11th	317	11.36 ^c
	College	372	12.13 ^b

a. $F(1, 1,047) = 110.483, p < .001, \eta^2 = .095$.

b. $p < .004$.

c. $p < .001$.

d. $p < .03$.

e. $p < .002$.

f. $p < .001$.

g. $p < .10$.

Table 2. Mean Gratification Score by Gender

Gratification	Male	Female	<i>t</i>	<i>p</i> <
Competition	4.72	4.15	7.59	.001
Challenge	4.52	3.92	6.74	.001
Arousal	4.46	3.37	11.86	.001
Diversion	4.36	3.53	8.59	.001
Social interaction	4.30	2.55	17.90	.001
Fantasy	4.15	3.14	9.45	.001
Hi-tech	3.82	3.17	8.58	.001
Realism	3.13	2.63	6.90	.001
Ego	2.81	2.33	6.29	.001

Table 3 shows preference ratings by sex for the three categorical genres of video games: physical, traditional, and imagination games. For males, the most preferred genre is physical games (e.g., action, racing, sports). A close second for them are the imagination games, with traditional games a weak third. For females, the traditional games are their favorites (e.g., classic board games, puzzles). Preferences for the other two genres vary within age groups for the females.

Because different numbers of participants in different age groups could bias these results, we separated the game preferences by age group. The males' preference for

Table 3. Video Game Genre Preferences by Gender Within Age Groups

	Physical	Traditional	Imagination
5th Grade			
Boys	5.04 ^a	3.63 ^a	4.54 ^a
Girls	3.80 ^{de}	4.60 ^e	4.45 ^d
8th Grade			
Boys	5.55 ^f	3.55 ^{fg}	5.33 ^g
Girls	4.43 ^{hi}	4.91 ^h	4.86 ⁱ
11th Grade			
Boys	5.40 ^j	3.82 ^{jk}	5.21 ^k
Girls	4.40 ^l	5.00 ^{lm}	4.55 ^m
College			
Men	4.61 ⁿ	3.79 ⁿ	4.14 ⁿ
Women	3.78 ^q	4.91 ^{qr}	3.69 ^r

Note: Within rows, means with matching superscripts are significantly different at $p < .05$. Each Boy-Girl comparison within genre and grade is significantly different ($p < .001$), except for the 5th-grade imagination pair.

physical games is stronger than the females in each of the four age groups ($p < .001$). The females' preference for traditional games exceeds that of the males in each age group ($p < .001$). And the males' preference for imagination games is stronger among 8th, 11th, and college players but not among 5th graders. These findings support H3.

Age Differences

Age differences across both sexes display a pattern of maximum playing among the middle school (8th grade) students (17 hours/week), with fewer hours played by younger and older students. Playing time is not negatively related to age, as predicted (H4), but appears to build from early years, peaks in middle school or junior high school, and then regresses (RQ1).

Age differences were obtained for seven of the nine gratifications, but they are not related to age in a consistent linear fashion (H5). In Table 4, challenge is a stronger motivation for the 5th graders and college students than for the other age groups ($p < .001$). In its place, competition is key for 8th and 11th graders, in contrast with the others ($p < .001$), although competition remains a strong motivator for the college students. Fantasy is a key motivation only for the 5th graders ($p < .001$), whereas diversion is found least in that youngest group ($p < .001$). Although they are weaker gratifications on an absolute basis, the youngest respondents also profess stronger realism and ego gratification motives than the older participants ($p < .001$). The need for social interaction is strongest among the college students ($p < .005$).

To summarize an answer to RQ2, the strongest motivators for the 5th graders are the perceived challenge and arousal attributes of video games. For 8th graders, it is competition; for 11th graders, competition and diversion; and for college students, challenge,

Table 4. Mean Gratification Score by Age Group

Gratification	5th	8th	11th	College	F	<i>p</i> <
Challenge	4.66 ^{ab}	3.71 ^{ac}	3.72 ^{bd}	4.76 ^{cd}	48.00	.001
Fantasy	4.64 ^{abc}	3.43 ^a	3.24 ^{bd}	3.73 ^{cd}	22.66	.001
Arousal	3.94	3.88	3.84	3.97	0.48	n.s.
Hi-tech	3.75	3.44	3.46	3.48	2.09	.10
Social interaction	3.50	3.21 ^a	3.24 ^b	3.66 ^{ab}	4.33	.005
Competition	3.41 ^{abc}	4.68 ^{ad}	4.81 ^{be}	4.36 ^{cde}	50.91	.001
Diversions	3.39 ^{abc}	3.85 ^b	4.17 ^a	4.00 ^c	8.09	.001
Realism	3.35 ^{abc}	2.89 ^a	2.70 ^b	2.87 ^c	9.86	.001
Ego	3.22 ^{abc}	2.44 ^a	2.39 ^b	2.54 ^c	15.94	.001

Note: Within rows, means with matching superscripts are significantly different at $p < .05$.

Table 5. Video Game Genre Preferences by Age Groups Within Gender

	5th Grade	8th Grade	11th Grade	College	F	<i>p</i> <
Males						
Physical	5.04 ^{abr}	5.55 ^{ac}	5.40 ^{dr}	4.61 ^{bcd}	26.94*	.001
Traditional	3.63	3.55	3.82	3.79	1.44	n.s.
Imagination	4.55 ^{ef}	5.33 ^f	5.20 ^e	4.14 ^{ef}	45.81*	.001
Females						
Physical	3.79 ^{jk}	4.43 ^{jl}	4.40 ^{km}	3.78 ^{lm}	10.10*	.001
Traditional	4.60 ^r	4.91	5.00 ^r	4.91	2.18	n.s.
Imagination	4.45 ^{nq}	4.86 ^{oq}	4.56 ^p	3.69 ^{noq}	28.47*	.001

Note: Within rows, means with matching superscripts are significantly different at $p < .05$ except for the superscripts r and q ($p < .10$).

* $p < .001$.

competition and diversion. Further, the overall strength of the motivations is more curvilinear than linear; motives are strongest for the youngest and/or the oldest age groups for eight of the 10 motives examined.

Among the males, physical games are most preferred by 8th and 11th graders, more so than among 5th graders and least by college students ($p < .001$). Traditional game preferences do not vary by age among the males, and imagination games are preferred more by 8th and 11th graders, and less so among 5th graders and college students ($p < .001$) (see Table 5).

Among the females, physical games are preferred more by 8th and 11th graders and less by the other age groups ($p < .001$). Traditional games do not differ by age group, and imagination games are preferred most by 8th and 11th graders, less so by 5th graders, and least by college students ($p < .001$). Among males and females, age patterns of game preference differences are remarkably similar. This is support for H6 and answers RQ3 as to which genres are more or less popular at different age levels.

Regressing Genres and Gratifications

Further analyses regressed genre preferences and motives for each of the sex/age groups on weekly playing time (see Table 6). The multiple correlations range from .38 to .69, all $p < .01$. All relationships contributing to the final regression outcome are positive, except that of the challenge motive for 5th-grade girls, offering general support for H7.

What do we find in common? Diversion is the most common motivator contributing to playing time, identified among 8th- and 11th-grade boys and girls, and college males. Social interaction also is important among 8th, 11th, and college females. As for game genres, the imagination games are important to 8th grade and college females, traditional games for 5th grade females, and the physical games to 5th-grade boys and, surprisingly, 11th-grade females.

What is uncommon? Noteworthy is the absence of any significant motives for 5th-grade boys, with their focus on physical video games as the lone predictor of their playing time. Their female peers liked the competition, disliked the challenge, and supported their ego in favoring traditional video games. Perhaps more important, the variance accounted for decreases substantially in the college group: averaging 35% among younger males, it is 24% at the college level; averaging 39% among younger females, it is 14% among the college females.

Hierarchical regressions were calculated separately for males and females (not tabled). Overall, age, motives, and genre references account for 34% of the variance in the males' video game playing time, and 14% for the females. Age is a significant negative predictor of playing time for both males and females, although twice as large for the males, the ego motive is a significant positive factor for both, as is challenge for the males only. Genre adds little to the final multiple correlation for either gender.

The final analyses (see Table 7) regressed the set of nine gratifications on the three game genres. For each genre, a subset of the gratifications was significant ($p < .01$). For the Physical genre, competition is the strongest single motivator, with arousal, social interaction, and hi-tech as additional incentives; challenges are a negative incentive. For the Traditional genre, challenge is the lone positive motivator, whereas social interaction and fantasy components are non-motivators. For imagination, competition, fantasy, arousal, hi-tech, and social interaction have significant positive betas, whereas challenge and realism are negative motivators.

Discussion

These findings provide a social tableau of the different orientations of video game players. Game designers attempting to reach specific target audiences, whether for commercial or educational purposes, should find the gender and age group differences informative. The findings also bear relevance to conceptual questions regarding potential social effects associated with game use, and potential outcomes that may be associated with game play.

In these groups, playing time alone, at least for the boys, now matches or exceeds their weekly television activity, before taking into account age differences. This raises

Table 6. Regression Analysis of Gratifications and Genre Preferences on Playing Time

Grade	Gender	Gratifications	Beta	Genre	Beta	Multiple R	R ²
5th	Male (n = 71)	Competition	.33	Physical	.30	.61	.37
	Female (n = 70)	Challenge	-.41	Traditional	.35	.65	.43
8th	Male (n = 102)	Ego	.69				
		Diversion	.28				
	Challenge	.36					
	Female (n = 125)	Social Interaction	.41	Imagination	.19	.69	.47
11th	Male (n = 150)	Diversion	.33				
		Arousal	.24			.59	.35
	Female (n = 168)	Diversion	.28				
College	Male (n = 202)	Social interaction	.23	Physical	.19	.53	.28
		Diversion	.21				
	Female (n = 170)	Diversion	.31	Imagination	.19	.49	.24
		Social interaction	.16			.38	.14

Note: Beta = Standardized regression coefficient. All reported betas are significant at $p < .05$. All Multiple Rs are significant at $p < .01$. Nine gratifications and three genre categories were entered simultaneously, regressed on total hours of video game play per week.

Table 7. Regression Analysis of Gratifications on Genre Preferences

Game Genre	Gratifications	Beta	Multiple R	R ²
Physical	Competition	.30*	.51*	.26*
	Arousal	.15*		
	Social Interaction	.14*		
	Hi-Tech	.14*		
	Challenge	-.17*		
Traditional	Challenge	.28*	.26*	.06*
	Social interaction	-.23*		
	Fantasy	-.11*		
Imagination	Competition	.22*	.48*	.23*
	Fantasy	.18*		
	Arousal	.17*		
	Hi-tech	.11*		
	Social interaction	.10*		
	Challenge	-.16*		
	Realism	-.10		

Note: Beta = Standardized regression coefficient. All reported betas are significant at $p < .01$. All Multiple Rs are significant at $p < .01$. Nine gratifications categories were entered simultaneously, regressed on each of the three genre clusters.

a number of questions. First, there is the possibility that game play displaces other media use or time devoted to other activities. However, it may also be the case that no displacement occurs, and that boys simply add video games to their armada of mediated entertainment resources. Both academics and members of the game industry would do well to further investigate the possibility of displacement to get the most accurate determination of the amount of time young people spend playing, as well as the degree to which they may be actively processing information.

Alternatively, it may be the case that game play is more susceptible to overestimation when self-reported. However, the autobiographical memory measure used here is the only approach to measuring frequent behavior that has been experimentally verified to best tap these types of memories. Most often, survey researchers will ask for a gestalt estimate of use that has been shown to be highly inaccurate for reporting frequent behaviors. The grid style measure leverages the techniques people use to remember these behaviors to increase the accuracy of their estimates. For more on autobiographical memory strategies see Schwarz and Sudman (1994).

Playing time peaks when the youngsters are about 13 or 14 years old, for both genders. This is consistent with the developmental literature we reviewed, which suggests that general media use increases up until about this age and then tapers off during early

teen years, due to less availability of free time and the choice of more social interaction time. For game designers, this finding also raises the question of whether older teens are the ideal target market for game makers. Boys in their early teens might be the most attuned to games from a developmental standpoint, since they are both consuming more game time and doing so more actively (Comstock, 1991). Alternately, it could be the case that existing games simply appeal to this level of cognitive development, and that future development of different game types and genres will appeal to multiple stages of development (including adults), thereby washing out these differences. These questions are raised, but not completely answered by the current study's findings, and suggest the need for an ongoing program of research that more deeply examines differences in use across levels of development.

The Importance of Competition

The finding that competition is the primary motive for game playing is not surprising. In retrospect, competition would seem to be the primary motive for playing most games, whether doing so with another person or against one's own standard. Nonetheless, that motive sets video game play apart from other media activities. Typically, we do not compete to see who can watch the most television or read the fastest. The closest parallel we can identify from other media would be the type of parasocial interaction that occurs when we watch TV quiz shows (e.g., *Wheel of Fortune*) and mentally compete with the contestants or identify with specific contestants on reality shows (e.g., *The Apprentice*). Even then, we may be observing more of a personal challenge than a competition against others. One potential implication of this finding is that gaming serves to increase one's level of competitiveness, that more avid game players become more competitive in other social activities, and that winning becomes an even more important social goal for them. Notably, 11th graders (approximately 16-17 years of age) reported the highest competition scores. This makes sense in light of developmental research suggesting that teens often use media to facilitate social interaction (e.g., "My friends and I get together and play video games with each other") and often use media as a means of identity formation or ego enhancement (e.g., "I know I can beat anyone at MADDEN 2007"). Game designers might do well to focus in on what appear to be particularly strong motivations when developing games designed for audiences in their mid- to late-teens. Further, an interesting follow-up question for game researchers and designers alike might be to determine the responses that come from those players who consistently lose, either by their inability to upgrade their own skill level or meet the challenges of their peers.

Somewhat offsetting this emphasis on competition is the finding that competition is a particularly prominent motivator for two of the game genres—physical and imagination—but not for traditional games, where challenge is the single dominant positive incentive. Further, for imagination-based games, the challenge—largely a challenge to one's self—is a negative motivator. It appears that these players are sensitive to subtle motivational differences in their choice of genres.

Gender Differences in Time and Gratifications

Gender is the dominant differentiating trait in playing time, in strength of motivation, and in genre preferences. Rather than seek a biological or social explanation (see Lucas & Sherry, 2004), we propose that recent generations of video games have been designed by males for males. The phenomenon of girls being forced to create multiple gender roles during game play, as outlined by Walkerdine (2004), may result from these production conditions. Rather than arguing that females are less competitive or even less interested in video games, the present findings (and those likely found in commercial market research efforts) will remind the industry to design games that better fit the preferences of young females. When females play games that are more attuned to their interests, game designers can determine if the players' motives are truly weaker and if the girls are less competitive, or if those findings are artifacts of the nature of the vast majority of currently available games. Females clearly are the market segment that will be highly sought in the next generation of video games, given their comparatively low, current participation levels. Perhaps an increase in the availability of games designed for females will reduce apprehension that may be induced by the construction of game play as a male realm, as noted by Bryce and Rutter (2002) and Lucas and Sherry (2004).

Age Differences in Time and Gratifications

Age differences yield a non-linear relationship with game playing time. Did the 8th graders have more time available, or is it that 8th graders covet developing hand-eye coordination skills more? Or are self-challenges and winning more important for young teens? Noteworthy also is the progression of motives by age group: the individual challenge of the game and its fantasy are most attractive to 5th graders, social competition is key for 8th and 11th graders, and the college group reports both the challenge and competition motives as primary. This raises two concerns. First, challenge may be a central component of learning processes. Gee (2003) posits that the most effective learning situations—virtual or otherwise—occur when decisions and actions take place on the edge of someone's competence. In other words, games may be especially potent learning tools if they are challenging yet doable. Further, if challenge is a motive for 5th graders, then this may be a group for whom virtual learning will be particularly attractive. Game designers may wish to consider this target audience and its key motivation when creating interactive learning experiences and games for the classroom.

The second major concern associated with this finding is that it exemplifies the possibility that gratifications are dynamic, rather than static, a notion not expressed in the uses and gratifications literature. The traditional lore of uses and gratifications appears to promote the idea that gratifications are relatively constant, perhaps because studies fail to examine their flexibility over time. Here is evidence that gratifications differ across the life frames of different age groups, although this study cannot differentiate whether they change over time or are different across age cohorts.

That problem notwithstanding, we have identified age differences in gratification prominence, in game-type preferences, and in playing time. Both scholars and professionals in the game industry may wish to re-examine how all these factors fluctuate with subsequent changes in video game design, new game platforms, and competing technologies (e.g., the new Wii controller). Change is inevitable as new media seek to expand their markets and older media renew efforts to compete. Thus repeated monitoring, testing, and retesting of these factors an important consideration for game designers. Tracing those changes and tying them to design elements and game development will remain a significant task for years to come.

As with most studies, the ability to explain a limited amount of variance in the final analyses (34% for the males and 14% for the females) requires speculation as to what is missing from this paradigm. First, entering gender into the equation would have accounted for significantly more variance. However, it would have lost the important nuances found by separating the sexes. Future studies might include such variables as access to older siblings and young parents who play, playing peers and/or competitors, money available to purchase games, some sense of how “cool” it is to play video games, and one’s self-efficacy level.

Limitations

Because the phenomenon studied is a developing medium, a portion of this work is time-bound, as is any survey, to the period when data were collected. It is also tied to the selected participant groups. Clearly a longitudinal study using a national sample would be more generalizable. However, because the core of these results examines relationships among playing time, motives, and content preferences, important connections have been described. As the medium of video games undergoes continuing significant changes, there is need to replicate such work over time and to continue to address the many significant issues that remain unexamined, much as the course of television research has progressed over 50 years. New game technologies and faster processors will continue to change gaming; the research challenge is to explain better the underlying processes of game use without simply describing new game experiences.

References

- Anderson, B., Mead, N., & Sullivan, S. (1986). *Television: What do national assessment tests tell us?* Princeton, NJ: Educational Testing Service.
- Anderson, C., & Bushman, B. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science, 12*, 353-359.
- Babrow, A. S. (1989). An expectancy-value analysis of the student soap opera audience. *Communication Research, 16*, 155-178.
- Bryant, J. (2004). Critical communication challenges for the new century. *Journal of Communication, 54*, 389-401.

- Bryant, J., & Miron, D. (2002). Entertainment as media effect. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (pp. 549-582). Hillsdale, NJ: Lawrence Erlbaum.
- Bryce, J., & Rutter, J. (2002). Killing like a girl: Gendered gaming and girl gamers' visibility. In F. Mayra (Ed.), *Computer games and digital cultures* (pp. 243-255). Tampere, Finland: Tampere University Press.
- Cassell, J., & Jenkins, H. (1998). *From Barbie to Mortal Kombat: Gender and computer games*. Cambridge, MA: MIT Press.
- Comstock, G. (1991). *Television and the American child*. San Diego, CA: Academic Press.
- Comstock, G., & Scharrer, E. (2001). The use of television and other film-related media. In D. G. Singer & J. L. Singer (Eds.), *Handbook of children and the media* (pp. 47-72). Thousand Oaks, CA: Sage.
- Entertainment Software Association. (2007). *Facts and research: Game player data*. Retrieved August 16, 2007, from http://www.theesa.com/facts/gamer_data.php
- Fisher, B. A. (1978). *Perspectives on human communication*. New York: Macmillan.
- Funk, J. B. (1992). Video games: Benign or malignant. *Developmental and Behavioral Pediatrics, 13*, 53-54.
- Funk, J. B., & Buchman, D. (1996). Children's perceptions of gender differences in social approval for playing electronic games. *Sex Roles, 35*, 219-231.
- Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. New York: Palgrave/Macmillan.
- Greenberg, B. S. (1974). Gratifications of television viewing and their correlates for British children. In J. G. Blumler & E. Katz (Eds.), *The uses of mass communication: Current perspectives on gratifications research* (pp. 71-92). Beverly Hills, CA: Sage.
- Greenberg, B. S., & Charney, T. (2002). Uses and gratifications of the Internet. In C. Lin & D. Atkin (Eds.), *Communication, technology and society: Audience adoption and uses* (pp. 379-407). Cresskill, NJ: Hampton Press.
- Griffiths, M. D. (1991). The observational analysis of adolescent gambling in U.K. amusement arcades. *Journal of Community and Applied Social Psychology, 1*, 309-320.
- Hunter, J. E., & Gerbing, D. W. (1982). Unidimensional measurement, second-order factor analysis, and causal models. *Research in Organizational Behavior, 4*, 267-320.
- Huston, A. C., Wartella, E., & Donnerstein, E. (1998). *Measuring the effects of sexual content in the media: A Report to the Kaiser Family Foundation*. Menlo Park, CA: Kaiser Family Foundation.
- IGN Staff. (2005). *30,000 game milestone*. Retrieved August 16, 2007, from <http://games.ign.com/articles/592/592856p1.html>
- Katz, E., Blumler, J., & Gurevitch, M. (1974). Utilization of mass communication by the individual. In J. G. Blumler & E. Katz (Eds.), *The uses of mass communication: Current perspectives on gratifications research* (pp. 19-32). Beverly Hills, CA: Sage.
- Larson, R. (1995). Secrets in the bedroom: Adolescents' private use of media. *Journal of Youth and Adolescence, 24*, 535-550.
- Lin, C. A. (1999). Online service adoption likelihood. *Journal of Advertising Research, 34*(6), 30-38.

- Livingstone, S. (2002) *Young people and new media: Childhood and the changing media environment*. London: Sage.
- Lucas, K., & Sherry, J. L. (2004). Sex differences in video game play: A communication-based explanation. *Communication Research*, 31, 499-523.
- Malone, T. W. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Science*, 4, 333-381.
- MediaScope. (1996). *The social effects of electronic interactive game: An annotated bibliography*. Studio City, CA: MediaScope.
- Menon, G. (1994). Judgments of behavioral frequencies: Memory search and retrieval strategies. In N. Schwarz & S. Sudman (Eds.), *Autobiographical memory and the validity of retrospective reports* (pp. 161-172). New York: Springer-Verlag.
- Myers, D. (1990). A Q-study of game player aesthetics. *Simulation & Gaming*, 21, 375-396.
- Perse, E. M. (1990). Involvement with local television news: Cognitive and emotional dimensions. *Human Communication Research*, 16, 556-581.
- Perse, E. M., & Rubin, A. M. (1990). Chronic loneliness and television use. *Journal of Broadcasting and Electronic Media*, 34, 37-53.
- Rideout, V., Roberts, D., & Foehr, U. G. (2005). *Generation M: Media in the lives of 8-18 year olds*. Menlo Park, CA: Kaiser Family Foundation.
- Roberts, D., Foehr, U. G., Rideout, V., & Brodle, M. (1999). *Kids and media at the new millennium: A comprehensive national analysis of children's media use*. Menlo Park, CA: Kaiser Family Foundation.
- Roe, K. (1995). Adolescents' use of socially disvalued media: Toward a theory of media delinquency. *Journal of Youth and Adolescence*, 25, 617-629.
- Rosengren, K. E. (1974). Uses and gratifications: A paradigm outlined. In J. G. Blumler & E. Katz (Eds.), *The uses of mass communications: Current perspectives of gratifications research* (pp. 269-286). Beverly Hills, CA: Sage.
- Rubin, A. M. (1979). Television use by children and adolescents. *Human Communication Research*, 5, 109-120.
- Rubin, A. M. (1994). Media uses and effects: A uses-and-gratifications perspective. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (pp. 417-436). Hillsdale, NJ: Lawrence Erlbaum.
- Rubin, A. M. (2002). The uses and gratifications perspective of media effects. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (2nd ed., pp. 525-548). Hillsdale, NJ: Lawrence Erlbaum.
- Ruggiero, T. E. (2000). Uses and gratifications theory in the 21st century. *Mass Communication & Society*, 3, 3-37.
- Selnow, G. W. (1984). Playing videogames: The electronic friend. *Journal of Communication*, 34, 148-156.
- Shaffer, D. W., Squire, K. R., & Gee, J. P. (2005). Video games and the future of learning. *Phi Delta Kappan*, 87(2), 105-111.
- Sherry, J. L. (2001). The effects of violent video games on aggression: A meta-analysis. *Human Communication Research*, 27, 409-431.

- Sherry, J. L., & Lucas, K. (2003, May). *Video game uses and gratifications as predictors of use and game preference*. Paper presented at the annual conference of the International Communication Association, San Diego, CA.
- Sherry, J. L., Lucas, K., Greenberg, B., & Lachlan, K. (2006). Video game uses and gratifications as predictors of use and game preference. In P. Vorderer & J. Bryant (Eds.), *Playing computer games: Motives, responses, and consequences* (pp. 213-224). Mahwah, NJ: Lawrence Erlbaum.
- Sony Computer Entertainment America. (2005). *About SCEA*. Retrieved August 16, 2007, from <http://www.us.playstation.com/Corporate/About>
- Steele, J., & Brown, J. (1995). Adolescent room culture: Studying media in the context of everyday life. *Journal of Youth and Adolescence*, 24, 551-576.
- Schwarz, N., & Sudman, S. (1994). *Autobiographical memory and the validity of retrospective reports*. New York: Springer-Verlag.
- Vorderer, P., & Bryant, J. (Eds.). (2006). *Playing video games: Motives, responses, and consequences*. Mahwah, NJ: Lawrence Erlbaum.
- Walkerdine, V. (2004). Remember not to die: Young girls and video games. *Papers: Explorations into Children's Literature*, 14(2), 28-37.
- Wigand, R. T., Borstelmann, S. E., & Boster, F. J. (1985). Electronic leisure: Video game usage and the communication climate of video arcades. In M. McLaughlin (Ed.), *Communication yearbook 9* (pp. 275-293). Beverly Hills, CA: Sage.
- Wilder, G., Mackie, D. & Cooper, J. (1985). Gender and computers: Two surveys of computer-related attitudes. *Sex Roles*, 13, 215-228.
- Zillmann, D., & Vorderer, P. (Eds.). (2000). *Media entertainment: The psychology of its appeal*. Mahwah, NJ: Lawrence Erlbaum.

Bios

Bradley S. Greenberg, PhD, is University Distinguished Professor Emeritus of Communication, Telecommunication, Information Studies & Media at Michigan State University (MSU). As past chairperson of two MSU departments, his research focus has been on the social influence of the mass media and interactive media, its content and its impacts. He is past president and a Fellow of the International Communication Association. Ongoing projects include the assessment of parental influence on Internet activities of teenagers, the portrayal of healthy and unhealthy foods in television programs, and the impact of media reports of race on perceptions of criminality. Contact: Department of Communication, Michigan State University, 569 CCAS, E. Lansing, MI 48824 USA; +1 517-353-6629 (t); bradg@msu.edu.

John L. Sherry, PhD, is an associate professor in the Department of Communication at Michigan State University. His primary research interest is media effects; focusing on neurophysiological reactivity to media which explain the etiology of the media use and the effects those media have. Recent studies have explored cognitive mechanisms that underlie video game use. He currently teaches courses in the effects of mass communication and in research methods. Contact: Communication Department, Boston College, 21 Campanella Way 544, Chestnut Hill, MA 02467 USA; +1 617-552-3083 (t); lachlan@bc.edu.

Kenneth Lachlan, PhD, is an assistant professor in the communication department at Boston College. His research interests center around the psychological effects of both linear and interactive media. He has published research dealing with video game content, psychological responses to game experience, the influence of user attributes on game content, and telepresence. Currently, he is directing a series of studies exploring variability in game player responses over time, and the possibility that different psychological processes may be at work during varying points of game play. Contact: Communication Department, Boston College, 21 Campanella Way 544, Chestnut Hill, MA 02467 USA; +1 617-552-3083 (t); lachlan@bc.edu.

Kristen Lucas, PhD, is an assistant professor in the communication studies department at University of Nebraska–Lincoln. In addition to her interest in media effects, her primary research interests focus on organizational communication, career discourses, and blue-collar work. Contact: Department of Communication, University of Nebraska–Lincoln, 433 Oldfather Hall, Lincoln, NE 68588 USA; +1 402-472-2070 (t); klucas3@unl.edu.

Amanda Holmstrom, MA, is an instructor in the department of communication at Michigan State University. Her research focuses broadly on relational communication. In particular, she is interested in the contributions of emotional and esteem support interactions to indices of mental, physical, and relational health and well-being. Other areas of research interest include family communication, gender differences in social support interactions, and the provision and reception of online social support. Contact: Department of Communication, Michigan State University, 556 CCAS, E. Lansing, MI 48824 USA; +1 517-432-1286 (t); holmstr6@msu.edu.