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Sex Differences in Video Game Play: *A Communication-Based Explanation*

In this study, we examined gender differences in video game use by focusing on interpersonal needs for inclusion, affection, and control, as well as socially constructed perceptions of gendered game play. Results of a large-scale survey (n = 534) of young adults' reasons for video game use, preferred game genres, and amount of game play are reported. Female respondents report less frequent play, less motivation to play in social situations, and less orientation to game genres featuring competition and three-dimensional rotation. Implications for game design are discussed.

Keywords: *video games; sex differences; FIRO; uses and gratifications*

Although there exists an understandable fascination with the relationship between violence and video games among scholars and the general public, video games do not produce only negative effects. Video games have been linked to several positive benefits such as acquisition of computer literacy (Greenfield et al., 1994; Greenfield & Cocking, 1996; Griffiths, 1991b), improvement of cognitive and attention skills (Green & Bavelier, 2003; Subrahmanyam & Greenfield, 1994), development of positive attitudes toward technology (Canada & Brusca, 1991), and entry into jobs in high-tech fields (Cassell & Jenkins, 1998; Margolis & Fisher, 2002). As such, children who do not have access to or interest in video games are believed to be at a disadvantage compared to their peers who have exposure to video games (Cassell & Jenkins, 1998). One group that is of particular concern in regard to not reaping the benefits of video games is girls.

Despite considerable debate regarding the effects of video games, one finding that has been stable throughout the past decades of research is that video

games are liked more and played more by males than by females (e.g., Griffiths, 1991b; Kaplan, 1983; Phillips, Rolls, Rouse, & Griffiths, 1995; Wright et al., 2001). This difference may be due partially to access. According to the annual Annenberg Public Policy Center survey on family media use, 76% of homes with at least one boy own video games as compared to 58% of homes with at least one girl (Woodard & Gridina, 2000). Others argue that the gender gap in game use and derived benefits may have less to do with access than it does with play preference and game design. For example, video games have been criticized for having either highly sexualized or weak female protagonists that can turn away potential female players (Dietz, 1998). Others believe that the emphasis on competition and violence deters girls from playing (Funk & Buchman, 1996b). Regardless of the source of differences in game ownership and use, girls simply are not enjoying the advantages that boys do in terms of early socialization to computer technology.

Although many researchers have explored the consistent gender differences in video game preferences and play patterns, to date, the origin of the differences remains unexplained (Funk & Buchman, 1996b). This article offers one such explanation. Rather than viewing the gaming experience as an individual cognitive experience, we argue that the gender differences evidenced in video game play can be explained best by examining the gaming experience as a multilevel communicative phenomenon. We draw on mass and interpersonal communication theories to explain gender differences and how those processes interact to reinforce video game playing as part of the male domain. To support our argument, we first provide a theoretical account for gender differences in video game play patterns and preferences, specifically centering on communicatively focused theories. Second, we present empirical support of our theoretical framework, particularly results of a study that analyzed the differences between young women and men in regard to the video games they prefer and the uses and gratifications they derive from playing these games. Finally, we offer suggestions for how video games can be designed to encourage increased video game playing by young women, so that they, too, can garner the potential benefits that video games offer.

Video Game Play as Communication

As reflected in the impressive body of literature that has amassed in the past decades, video game play primarily has been studied within the discipline of psychology (Federman, Carbone, Chen, & Munn, 1996). Much of the research has focused on effects of video games, particularly in regard to aggression and arousal levels (for meta-analyses, see Anderson & Bushman, 2001; Sherry,

2001). Other major areas of concern include addiction, skill development, health consequences, and learning. These perspectives certainly have generated valuable information and insight into the phenomenon of video game playing. Although it has not produced nearly as much scholarship in this area as the discipline of psychology, the communication discipline is uniquely positioned to offer new insight that can further our collective understanding of video game playing in general, and gender differences in particular.

The bulk of video game research that has emerged from the communication discipline has taken a mass communication perspective, examining video game play as a form of mediated communication, similar to the study of film, television, or radio. This is a natural fit as video games are indeed a form of mass communication (i.e., they are mass-produced, mediated messages that have the potential to influence a large audience). However, examining the communicative aspects of video game playing solely from a mass communication perspective obscures potentially important contributions, namely, the contributions that can be made by examining the interpersonal dynamics among players during game play and in daily discourse as perceptions of gender are negotiated and learned.

Although not widely examined as such, video game play is clearly a forum for interpersonal communication. First, video games can serve as a central activity for interpersonal interaction, providing an activity for friends to share (similar to playing cards, board games, or engaging in physical recreation). Second, online video gamers, who may appear to others to be playing alone, can interact with others across the game network and establish new friendships (and in some cases, romantic relationships) through the computer-mediated communication offered by the game. Third, similar to the personal connections that some people feel toward television characters, video games and their characters can provide a source of parasocial relationships for the game player. Therefore, to explain the complex phenomenon of video game playing, it is necessary to draw on mass and interpersonal communication theories. As such, the two frameworks that we use to explain gender differences in video game playing are (a) the uses and gratifications perspective on media use and (b) Schutz's (1958) fundamental interpersonal relationship orientation (FIRO) theory.

Uses and Gratifications Theory

Theoretical overview. Uses and gratifications is one of the oldest continuous research programs in mass communication, having conceptual roots in the Payne Fund movie studies in the 1920s (Blumer, 1933) and a series of studies conducted at Lazarsfeld's Bureau of Applied Social Research in the

1940s (Berelson, 1949; Herzog, 1944). The model states, in part, that people perceive a variety of problems and possible solutions to those problems. Based on their perceptions, people develop different motives for gratification-seeking or problem-solving behavior, which they meet through media consumption or non-media-based activity. For example, some people may watch television sitcoms to meet their need for entertainment; others may watch the evening news to fulfill their need to keep updated on world events. In short, the focus of uses and gratifications research is centered on the reasons why individuals use media and the effects resulting from that use rather than effects that are experienced by passive recipients (Rosengren, 1974).

In contrast to mechanistic effects research that assumes direct influence of media on message recipients, uses and gratifications assumes (a) that each medium or message is one possible source of influence among other possible influences; (b) media audiences are not passive but rather variably active communicators (meaning that they are not necessarily always active, but that they possess the agency to make choices); and (c) mediated communication is socially and psychologically constrained (Rubin, 2002, pp. 525-526). The working philosophy of the paradigm is best summarized by Schramm, Lyle, and Parker (1961) who studied the uses and gratifications of television viewing: "In order to understand television's impact and effect on children, we have first to get away from the unrealistic concept of what television does to children and substitute the concept of what children do with television" (p. 169). This philosophy is particularly valuable for the study of video games given the active role that players have in determining the outcome of the game (Grodal, 2000).

Application to video games. The uses and gratifications paradigm continues to provide a cutting-edge theoretical approach for researching new communication media (Ruggerio, 2000) and, therefore, is a viable approach for studying video games. In the early studies that examined uses and gratifications of video game usage, researchers used television uses and gratifications as a model for understanding video game play. For example, Selnow (1984) added two dimensions to Greenberg's (1974) television uses and gratifications scale to survey 10- to 24-year-olds about the needs and gratifications met by video games. Research in the United Kingdom has touched on uses and gratifications of video game playing exclusively. Phillips et al. (1995) revealed several uses of video game playing: to pass time, to avoid doing other things, to cheer oneself up, and just for enjoyment. Furthermore, in his

research on identifying types of video game addicts, Griffiths (1991a, 1991b) intimated additional uses and gratifications, including arousal, social rewards, skill testing, displacement, and stress reduction.

Sherry and Lucas (2003) developed a comprehensive player-based video game uses and gratifications scale, using a methodology similar to the one used to develop Greenberg's (1974) original television uses and gratifications scale. Focus group sessions and structured interviews revealed six principal reasons why people play video games:

- *competition*—to be the best player of the game;
- *challenge*—to push oneself to beat the game or get to the next highest level;
- *social interaction*—to play as a social experience with friends;
- *diversion*—to pass time or to alleviate boredom;
- *fantasy*—to do things that you cannot do in real life such as driving race cars or flying; and
- *arousal*—to play because the game is exciting.

Follow-up research using their scale revealed important patterns of game usage, perhaps the most notable of which was sizable differences between the men and women who participated in the study (Sherry & Lucas, 2003).

As conceived by Rosengren (1974), media use is a function of basic human needs, individual differences, and social influences (see Figure 1). Because different media are theorized to placate different needs (e.g., newspapers and information, film and emotional release, etc.), the model does not provide a specific account of which needs, individual differences, and social influences may lead to patterns of particular media use. Furthermore, the model does not account for the nature of the differences between men and boys and women and girls; that is, uses and gratifications acknowledges that differences such as social and biological sex differences can lead to different media usage patterns among and gratifications sought by men and women; however, it does not offer any indication of how those differences may be manifested. Instead, researchers are called on to fill in the basic needs, individual differences, and social contextual factors that lead to use of each medium (or genre within each medium). More important, no single factor (e.g., basic needs) is theorized to drive media use; it is the interaction among needs, individual differences, and social context that predicts use.

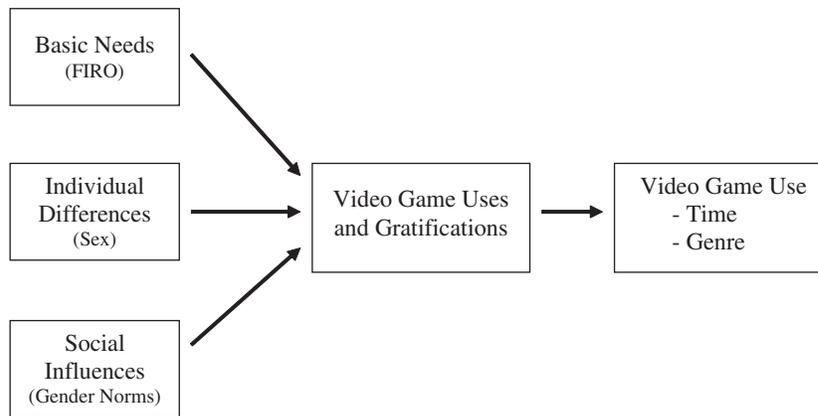


Figure 1. Uses and Gratifications Research Model

*Basic Needs: Fundamental Interpersonal
Relationship Orientation Theory*

Theoretical overview. In his explication of the uses and gratifications model, Rosengren (1974) argued that basic human needs “epitomize the biological and psychological infra-structure that informs all of human behavior” (p. 270). He noted that of Maslow’s (1954) five basic needs: physiological needs, safety needs, belongingness and love needs, esteem needs, self-actualization needs, the needs that are most germane to uses and gratifications research are belongingness and love needs, esteem needs, and self-actualization needs. FIRO provides a theoretical framework for understanding people’s interpersonal interactions (Schutz, 1958) in terms of Maslow’s third need—belonging and love. FIRO asserts that all people are oriented by three interpersonal needs: inclusion, affection, and control. The need for inclusion refers to an individual’s desire to interact with others. In short, it is the desire for a sense of belonging to a dyad or group. The need for affection refers to the level of closeness desired in relationships, sometimes thought of as the interpersonal warmth and love experienced. The need for control refers to the level at which an individual wants to have power over the actions of others. The concept of control has been expanded since Schutz’s original model to include also control over an individual’s environment (Adams & Galanes, 2003). Although Schutz contended that all people possess these three needs, he explained that these orientations vary in strength and direction across

people. Furthermore, people's individual orientations toward each of these needs (*deficient, excessive, or ideal*, to use Schutz's terms) can be used to predict people's interpersonal behaviors.

Because of its emphasis on interaction among group members, FIRO has been most frequently researched in the areas of family and group relationships. One area of interest has been the dynamics of at-risk families (Allen, Calsyn, & Fehrenbach, 1989; Parr, 2000; Subotnik & Petrik, 1991; Warren & Lanning, 1992). For example, in a longitudinal study of primary caregivers in at-risk families, Parr (2000) found significant relationships between FIRO domains and a variety of family function indicators. The theory has also been used to understand family dynamics that lead to child criminal behavior and family substance abuse. Ford and Linney (1995) found that juvenile child molesters have a higher need for inclusion and control than a normative sample. Doherty and Whitehead (1986) have offered a heuristic for understanding cigarette use in family systems as a function of inclusion and need for control. Finally, a FIRO has been used to understand group leadership dynamics in such diverse contexts as school administration (Schutz, 1976), coach-player relationships (Prapavessis & Gordon, 1991), and software product development teams (Fisher, Macrosson, & Walker, 1995).

FIRO's emphasis on dynamic interaction between basic needs and social factors makes the theory ideal for integration with the uses and gratifications model. Furthermore, there is growing consensus that variables such as the ones Shutz explicated may be the result of evolutionary adaptation and, as such, are essential for understanding human behavior (Cronin, 1992). Anthropologists have long known that humans have always been social beings and likely have an instinctual bias toward interpersonal grouping (e.g., Pinker, 2002; Ridley, 2003). Unlike solitary animals, humans have been social throughout 200,000 years of evolution, much of which took the form of hunter-gatherer societies. Such arrangements provided protection and sharing of food. Given the unusually long gestation period for human babies and the long time it takes before a human is independent (e.g., can eat, walk, etc. by itself), protection needs were key to survival of the species. Under such conditions, Schutz's set of interpersonal needs are likely evolutionary adaptations that were necessary for species survival and, as such, may well be essential to understanding the dynamics of human social behavior.

FIRO and video games. As explained earlier, the uses and gratifications paradigm outlines a process by which motivations for and patterns of media use are established based on a combination of basic human needs, individual differences, and social factors. To make predictions, however, it is necessary to find a way to theoretically bridge these three factors. One way to understand

the connections and, perhaps more important, to make predictions as to how the factors will be manifested in terms of gender differences in video game play is FIRO. First, FIRO deals directly with basic human need for interpersonal interaction, and, as described earlier, video game play fundamentally is a communicative phenomenon. Second, people's ability to meet their interpersonal orientations (i.e., inclusion, affection, and control) is affected by individual differences (e.g., sex differences) and social factors (e.g., the socially constructed, gendered nature of video game play). FIRO, supplemented by existing empirical evidence, offers a viable way to anticipate how those factors will interact with one another to explain and predict gender differences in the uses and gratifications derived from video game play, genre preferences, and play patterns.

Inclusion and affection, although qualitatively different, are theoretically linked to one another; that is, although these orientations may be different for individuals (e.g., someone can be strongly motivated by inclusion but only minimally motivated by affection), inclusion is a necessary precursor to affection. If someone is not included in an interpersonal group or dyad, that person will be unable to develop warmth and closeness, regardless of the strength of his or her respective interpersonal needs. On the other hand, a person can be included in a group yet not experience affection. This connection is important for understanding gender differences in video game play, particularly for understanding the uses and gratifications sought by potential players.

Young adult men and women appear to be equally motivated by desire for inclusion, affection, and control. In an early study examining sex differences, Schutz (1958) found no significant difference between Harvard (all men) freshmen and Radcliffe (all women) freshmen on desire for inclusion, affection, and control (though men were more likely to express these behaviors). A later study (Floyd, 1988) also found no significant differences in inclusion, affection, and control in a sample of 123 college-age men and women. Therefore, there is evidence that college men and women are equally likely to seek activities that increase their opportunity for inclusion in groups. Belonging to a group would not only meet the need for inclusion but also would create the possibility for their needs of affection to be met. Seeking activities based on anticipated outcomes (or knowledge of previous outcomes) is consistent with uses and gratifications paradigm (Rosengren, 1974); that is, basic needs (in this case, inclusion, affection, and control) initiate social and cognitive processes whereby decisions of media use (or nonmedia activities) are determined.

Taking past empirical research into consideration, interpersonal orientations of inclusion and affection suggest predictions about video-game-play

differences. First, video games have long been considered part of the “boy domain.” Regardless of the roots of the labeling of video games as boys’ toys, the sex stereotyping is problematic because it has been shown that parents and teachers reward gender-typical play and punish gender-atypical play (Etaugh & Liss, 1992). As children seek positive feedback from the adults in their life, boys may be directed toward and girls steered away from video game playing, regardless of intrinsic interest and possible benefits. However, sex stereotyping of play is not limited only to adults. As early as preschool, and increasing throughout adolescence, children identify so-called gender appropriate play for boys and girls (Carvalho, Smith, Hunter, & Costabile, 1990). Consequently, children who engage in sex-typed play are accepted more and receive more positive encouragement from their peers (Etaugh & Liss, 1992; Moller, Hymel, & Rubin, 1992; Pellett & Harrison, 1992). Moller et al. (1992) explained that “children who do not exhibit gender-appropriate behavior are viewed as not fulfilling their gender role and are considered an anomaly. Such children may be actively rejected and alienated from their peers” (p. 333). As early as kindergarten, children have identified video games as more appropriate for boys than for girls (Wilder, Mackie, & Cooper, 1985). As such, girls who play video games—particularly boyish games such as fighters and shooters—are likely to be rejected by their peers for playing with what is considered by their classmates to be a cross-sex stereotyped toy. Consequently, their needs for inclusion and affection will not be met by engaging in video game play.

Cooper, Hall, and Huff (1990) showed that adolescent boys and girls had increased levels of stress when playing cross-sex stereotyped video games. However, this effect only occurred when schoolmates were present, pointing to the important role that peer disapproval has in play choice. Funk and Buchman (1996a) also indicated that social approval was an important component of video-game-play choice, placing children whose play patterns deviated from socially acceptable norms in a high-risk group for social sanction by their peers.

Because young men are encouraged and young women discouraged from engaging in cross-sex stereotyped activities by way of social reward and sanction—that is, playing video games creates opportunities for young men to meet their needs for inclusion and affection and precludes young women from meeting those needs—we predict that

Hypothesis 1a: Young women will be less likely to be video games players than young men will.

Hypothesis 1b: Young women will play video games fewer hours than young men will.

Furthermore, because video game playing is seen as appropriate play for men and boys, but not for women and girls, young men will be more likely to engage in video game playing with other peers, as it will increase their likelihood for inclusion. In contrast, young women who play video games will be less inclined to play video games with peers, as inclusion and affection are more likely to be gained through engagement in other more “feminine” activities. As such

Hypothesis 2: Young women will be less motivated by the gratification social interaction than young men will.

Inclusion and affection are only part of the picture, however. The motivation of control is also important for understanding gender differences in video game play. Grodal (2000) explained that much of the fascination with video games can be attributed to the ability of players to control the game in terms of outcomes (e.g., deciding how the plot will unfold), the speed at which the game progresses, and mastery of the game or mastery of other players. Grodal further argued that video games are a tool for emotional control, whereby desired arousal levels can be maintained through playing. As such, video games are enjoyed the most when the level and speed of the game match players’ respective optimal mental and motor capacity. Based on Grodal’s work, male and female motivation for control would predict

Hypothesis 3: Young men and young women will be highly motivated to play video games by challenge (which is defined as the ability to beat or control the game).

Individual Differences: Neural Sex Differences

Not all players possess equal mental and motor capacity. Therefore, what is optimally challenging for one player may be either too tedious or too overwhelming for another player. Thus, video games offer different satisfaction of the interpersonal orientation of control to different people based on their individual ability to master the game. Unfortunately, in terms of differential ability to control a video game, games are designed to capitalize on the strengths of male players instead of female players. For instance, Kimura (1999) reported that research on biological sex differences indicates that men and boys are better than women and girls at such tasks as mental rotation of three-dimensional objects, navigation through a route or maze, and target-directed motor skills (e.g., guiding or intercepting projectiles). In contrast, women and girls are better at landmark memory (remembering details of

objects seen along a route), object displacement (identifying if an object is missing or has been moved), and perceptual speed (rapidly identifying matching items based on visual cues). One need to take only a cursory look at popular video games to confirm the male bias in game design. Among some of the most popular games are action/adventure games where the player navigates a character through a three-dimensional world, dodging bullets, and shooting bad guys. Consequently, girls and women are at a systematic disadvantage in terms of their ability to control the gaming environment and meet their interpersonal need for control.

This certainly is not to say that women and girls simply lack the skill necessary to master video games. In fact, research has shown that preexisting sex differences, including cognitive skills such as mental rotation and maze navigation, are attenuated through practice (e.g., DeLisi & Cammarano, 1996; DeLisi & Wolford, 2002; Lawton & Morrin, 1999). However, the male bias in game design is problematic in that it systematically places female players at an early disadvantage in terms of their ability to control the gaming environment, which creates a vicious cycle in terms of reinforcing an inclusion-affection-control pattern that discourages female players from playing video games.

Because they initially may have less control over their performance in the game (as their scores may indicate), female players' need for control is not being met by video games as well as male players' need for control is being met. Therefore, as would be predicted by the uses and gratifications paradigm, women and girls are likely to turn elsewhere for meeting their need for control. The combined evidence of boys performing better than girls and girls turning away from video games further perpetuates the stereotyping of video games as so-called boy toys. As such, girls are even more strongly steered away from video games by way of social sanction by peers; that is, girls' interpersonal needs of inclusion and affection are denied if they continue to seek out the cross-sex stereotyped activity of video game playing.

Of course, this is not an absolute pattern. Video games remain an integral part of the adolescent culture, regardless of sex (Greenfield, 1994). Girls may be turned away to some extent from games—especially more “masculine” games; however, they do not abandon the video game experience altogether. Although female players may be discouraged from video game playing in public situations, the lure of a good challenge may be enough to draw female players back to video games at least to a small extent. However, female players may be drawn to games over which they feel they have more control. Specifically, drawing on Kimura's (1999) research on biological sex differences (i.e., women and girls are less skilled than men and boys at mental rotation, maze navigation, and projectile directing/intercepting), we predict that

female players will feel more control in games that center on skills other than mental rotation:

Hypothesis 4: Young women will enjoy non-mental rotation games more than mental rotation games.

Likewise, being equally driven by challenge, young men will be drawn to games that provide an optimal challenge based on their cognitive strengths. As such

Hypothesis 5: Young men will enjoy mental rotation games more than non-mental rotation games.

Hypothesis 6: Young men will enjoy mental rotation games more than young women will.

Another wrinkle that is added to meeting the interpersonal need for control is the socially evaluative nature of video game playing; that is, many games are played in an environment where two players go head-to-head to beat one another at the game. This focus on competition (unlike challenge, where the competition is against the player's personal best or the game itself) places players in a position of being evaluated by at least one other peer. For those who excel at the game, competition can be a strong motivating factor for playing. However, for those who may struggle some with the game, competition can be a strong deterrent. As described earlier (assuming equal levels of prior experience or lack thereof), female players are at a disadvantage compared to male players based on the design of the games. However, female players may also be at a disadvantage in terms of gaining a sense of control, even when playing against other female players. Lenney (1977) reported that women and girls are less self-confident in situations when the task is sex inappropriate and when it is socially evaluative or comparative. Therefore, even competing against an equally skilled player can cause lower performance expectancies and lower efficacy. Based on this research, we predict that female players will feel less sense of control than male players will when they compete against peers. Consequently

Hypothesis 7: Young men will be more motivated by competition than young women will.

Hypothesis 8: Young women will be more motivated by challenge than by competition.

Method

Data were collected from 593 college students. Surveys were distributed at two midwestern, public universities to broaden the representation of young adults. One was a large, Ph.D.-granting university whose student population lives predominantly on campus and that has strong programs in engineering and science. The other was a midsized, regional university with a large commuter population and strong programs in education, nursing, art, and vocational training geared primarily to associate and bachelor degree programs. Participants were recruited from classes and in common gathering areas, such as residence hall cafeterias and popular on-campus hangouts where a broad cross-section of students are found.

We were particularly interested in studying young adults, as their age cohort (ages 18 to 24 years) was the first generation to grow up during the era of mass-marketed, multigame home-console video game systems (e.g., Nintendo/Super Nintendo, Sega Genesis, Sony Playstation, etc.). Of the 593 surveys administered, 21 were excluded because the respondents were older than 24 years. Of the remaining surveys that met the age criterion, 544 were complete and usable (95.1%). The mean age of the respondents was 19.71 years, with a range from 18 to 24. The gender distribution of the respondents was 57.5% young women ($n = 313$) and 42.5% young men ($n = 231$).

The survey consisted of three instruments which measured (a) respondents' preference for various video game genres, (b) uses and gratifications of video game play, and (b) amount of hours played in designated day parts during the typical week.

The genres for the first component of the survey were identified by consulting previous research (e.g., Funk, 1993; Myers, 1990), video game magazines, popular gaming Web sites, and video game departments of retail stores and video game rental stores. Thirteen genres were identified: strategy, puzzle, fantasy/role playing, action/adventure, sports, simulation (sims), racing/speed, shooter, fighter, arcade, card/dice, quiz/trivia, and classic board games (see Table 1 for a description and examples of each genre). The game categories and accompanying scale were pretested by a sample of 120 college students to ensure clarity of the instrument and the mutual exclusivity of the genres. Respondents indicated their liking of each genre by circling a Likert-type response from 1 (*strongly dislike*) to 6 (*strongly like*). An additional response choice of 0 (*don't know*) was included to prevent respondents from estimating their liking of a game genre with which they were unfamiliar.

Table 1
Video Game Genres and Descriptions

Genre	Description	Examples
Strategy	Games that use strategic planning skills	<i>Command & Conquer, Civilization, Age of Empire</i>
Puzzle	Games that can be solved, no element of chance	<i>Tetris, Free Cell</i>
Fantasy/role playing	Games that let you assume a character role	<i>Final Fantasy, Legend of Zelda, Diablo</i>
Action/adventure	Games where you go on an adventure	<i>Resident Evil, Tomb Raider</i>
Sports	Games based on athletic teams and events	<i>Tony Hawk's Pro Skater, NBA Jam</i>
Simulation	Games where you create a simulation	<i>Rollercoaster Tycoon, SimCity</i>
Racing/speed	Games that focus on going fast	<i>Super Mario Kart, Grand Turismo, Need for Speed</i>
Shooter	Games where you shoot other characters	<i>Quake, Duke Nukem</i>
Fighter	Games that focus on martial arts or hand-to-hand combat	<i>Mortal Combat, Tekkan</i>
Arcade	Games based on original arcade games	<i>PacMan, Frogger, Pinball</i>
Card/dice	Games that have an element of chance	<i>Solitaire, Vegas Fever 2000</i>
Quiz/trivia	Games that test your knowledge	<i>Jeopardy, Who Wants to be a Millionaire</i>
Classic board games	Video game versions of old-time favorites	<i>Monopoly, Checkers</i>

The uses and gratifications instrument was the 23-item scale developed by Sherry and Lucas (2003). Participants indicated their agreement with the scale items by circling their response on a Likert-type scale (1 = *strongly disagree*; 7 = *strongly agree*). The scale measured six video game uses and gratifications: competition ($\alpha = .86$; e.g., "It is important to me to be the fastest and most skilled person playing the game"); challenge ($\alpha = .79$; e.g., "I find it very rewarding to get to the next level"); social interaction ($\alpha = .81$; e.g., "My friends and I use video games as a reason to get together"); diversion ($\alpha = .89$; e.g., "I play video games instead of other things I should be doing"); fantasy ($\alpha = .88$; e.g., "I play video games because they let me do things I can't do in real life"); and arousal ($\alpha = .85$; e.g., "I find that playing video games raises my level of adrenaline").

Respondents reported the amount of time they spent playing video games during a typical week. To facilitate autobiographical memory (Menon, 1994),

respondents completed a grid that divided each day of the week into four dayparts (“from when you wake up until noon,” “from noon until dinner,” “after dinner, but before midnight,” and “after midnight”). The total number of hours played during a typical week was calculated by summing all daypart figures.

Results

Hypothesis 1, that young women will be less likely to be video games players than young men will, was tested with a chi-square. Among the respondents, 68.9% ($n = 375$) were game players, meaning that they indicated playing at some point during a typical week. As predicted, young men were more likely to be players than young women: 54.6% of young women and 88.3% of young men were players. Therefore, Hypothesis 1 was supported, $\chi^2 = 67.28$, $df = 1$, $p < .001$. Hypothesis 1b, that young women will play fewer hours than young men will was tested with a t test. The mean amount of time played per week among all respondents was 8.54 hours ($SD = 12.25$), with a range of 0 to 72 hours. Among players, the median number of hours spent playing video games each week was 8 hours, with male players reporting a mean of 11 hours per week and female players reporting a mean of 4.25 hours per week. Hypothesis 2b was supported (Young women: $M = 8.58$, $SD = 10.45$; Young men: $M = 15.58$, $SD = 14.13$), $t(367.52) = 5.50$, $p < .001$.

Further data analysis was limited to respondents with personal experience playing video games. To be included, respondents had to meet one of the following criteria: (a) indicate that they play video games for at least 15 minutes during a typical week or (b) indicate that they have knowledge of more than one half of the different genres of video games (i.e., not circling “0 – *don’t know*” on the genre scale and indicating “5 – *like*” or “6 – *strongly like*” for at least one genre). These criteria were used to ensure that people who have little knowledge of or personal experience with video games were excluded from the analysis. Furthermore, it also excluded people who indicated disliking all video games. However, it included people who may not be regular video game players but report liking video games nonetheless. Moreover, nonplayers who indicated strong liking of only the card/dice, classic board games, quiz/trivia, and puzzle genres were also excluded in case they misinterpreted the survey and indicated their liking for the nonvideo game versions of those games. Applying these criteria, only 10 cases were excluded ($n = 534$), confirming the prevalence of video games in adolescent culture (Greenfield, 1994).

Hypothesis 2, that young women will be less motivated by the social interaction gratification than young men will, was tested with a t test. Social interaction was rated by young women ($M = 2.32$, $SD = 1.45$) lower than it was

Table 2
Reported Uses and Gratifications by Sex

	All (<i>n</i> = 534)	Young Women (<i>n</i> = 305)	Young Men (<i>n</i> = 229)	<i>d</i>	Partial η^2
Challenge	4.49	4.23*	4.82	0.46	.13*
Arousal	3.70	3.29*	4.24	0.70	.19*
Diversions	3.51	3.03*	4.15	0.62	.22*
Fantasy	3.46	3.04*	4.03	0.65	.15*
Competition	3.22	2.73*	3.87	0.80	.17*
Social interaction	3.17	2.32*	4.29	1.24	.35*

Note. Partial η^2 is the result of ANCOVA (2, 531) with hours of game play per week as the covariate.
 *Mean differences between men and women were significantly different ($p < .001$).

rated by young men ($M = 4.29$, $SD = 1.73$). The difference was significant, $t(439.71) = 13.96$, $p < .001$, and the effect size was large, $d = 1.24$. Because male player's means for all gratifications are higher than female player's and male players play significantly more hours per week than female players, there was the possibility that gratifications were confounded with amount of game playing. Therefore, we ran an ANCOVA test with total number of hours of game play per week entered as a covariate. The difference in social interaction gratification remained significant, $F(2, 531) = 142.30$, $p < .001$, and large, partial $\eta^2 = .35$, though the difference between means decreased (female adjusted $M = 2.49$, male adjusted $M = 4.07$). Furthermore, social interaction was the lowest gratification for young women but the second highest gratification for young men. Therefore, Hypothesis 2 was supported. See Table 2 for differences in male players' and female players' gratifications of video game playing and their respective effect sizes.

Hypothesis 3 stated that young women and young men will be highly motivated to play video games by challenge. This hypothesis was tested by examining the relative ranking of challenge compared to other uses and gratifications (Table 3). For young women and young men, challenge was the top-rated gratification. In addition, t tests were run to compare the difference between challenge and young women's and young men's next highest rated gratification. Compared to challenge ($M = 4.23$, $SD = 1.32$), young women rated their second highest gratification (arousal: $M = 3.29$, $SD = 1.38$) significantly lower $t(302) = 16.27$, $p < .001$, and the effect size was moderate, $d = .70$. For young men, compared to challenge ($M = 4.82$, $SD = 1.21$), their second highest gratification (social interaction: $M = 4.29$, $SD = 1.73$) was significantly lower $t(227) = 5.27$, $p < .001$, and the effect size was small, $d = .36$. Therefore, challenge was not only the top-ranked gratification for female

Table 3
Reported Liking of Video Game Genres by Sex

	Mean Liking			<i>d</i>
	All (<i>n</i> = 534)	Young Women (<i>n</i> = 305)	Young Men (<i>n</i> = 229)	
Traditional	4.18	4.60**	3.61	1.09
Card/dice	4.22	4.72**	3.57	0.84
Classic board games	4.13	4.62**	3.46	0.83
Quiz/trivia	4.46	4.94**	3.82	0.82
Puzzle	4.59	4.98**	4.07	0.69
Arcade	4.58	4.84**	4.23	0.47
Physical enactment	4.04	3.62**	4.58	0.95
Fighter	3.72	3.11**	4.45	0.88
Shooter	3.80	3.18**	4.54	0.91
Sports	3.84	3.21**	4.60	0.88
Racing/speed	4.75	4.74	4.77	0.02
Imagination	3.81	3.57**	4.11	0.52
Fantasy/role playing	3.76	3.62*	3.92	0.19
Action/adventure	3.87	3.47**	4.33	0.63
Strategy	3.70	3.22**	4.22	0.69
Simulation	3.92	3.86	3.99	0.09

Note. * Mean differences between women and men were significantly different ($p < .05$). ** Mean differences between women and men were significantly different ($p < .001$).

players and male players but had a significantly higher mean than the second-ranked gratification for female players and male players, supporting Hypothesis 3.

Hypothesis 4, that young women will enjoy non-mental rotation games more than mental rotation games, and Hypothesis 5, that young men will prefer mental rotation games, were tested by comparing reported liking of genre factors that either did or did not center on skills such as mental rotation and route navigation. Game genres were factored in patterns of game liking based on strength of correlation using principal axis factoring (see Table 4 for factor loadings). The factor analysis resulted in three game type factors: traditional, which included card/dice, classic board games, quiz/trivia, puzzle, and arcade games; physical enactment, which included fighters, shooters, sports, and racing/speed games; and imagination, which included fantasy/role playing, action/adventure, strategy, and simulation. We compared the average liking of traditional factor games (e.g., puzzle, quiz/trivia, card/dice), which typically do not require mental rotation, against the average liking of games in the physical enactment and imagination factors (e.g., fighter, shooter, fantasy/role playing, action/adventure) that often require mental rotation to play effectively.

Table 4
Factor Analysis for Game Genres

Genre	Factor 1	Factor 2	Factor 3	Variance Explained
Traditional				16.9%
Card/dice	.70	-.03	-.05	
Classic board games	.68	-.07	-.01	
Quiz/trivia	.67	-.07	-.07	
Puzzle	.58	-.18	.14	
Arcade	.53	.10	-.07	
Physical enactment				11.9%
Fighter	-.11	.67	.19	
Shooter	-.15	.66	.27	
Sports	-.05	.48	-.02	
Racing/speed	.28	.44	.07	
Imagination				9.8%
Fantasy/role playing	-.08	-.06	.65	
Action/adventure	-.09	.41	.56	
Strategy	-.05	.04	.53	
Simulation	.20	.10	.33	
Total variance explained				38.6%

Female players reported liking the non-mental rotation games more than they liked mental rotation games. They liked traditional games ($M = 4.60$, $SD = .86$) significantly more than physical enactment games ($M = 3.62$, $SD = 1.10$), $t(300) = 13.46$, $p < .001$, $d = 1.00$, and more than imagination games ($M = 3.57$, $SD = 1.15$), $t(292) = 13.49$, $p < .001$, $d = 1.01$. Likewise, male players reported liking the mental rotation games more than they liked non-mental rotation games. They liked physical enactment games ($M = 4.58$, $SD = .93$) significantly more than traditional games ($M = 3.61$, $SD = .96$), $t(229) = 12.03$, $p < .001$, $d = 1.03$. They liked imagination games ($M = 4.11$, $SD = .93$) more than traditional games as well, $t(228) = 6.04$, $p < .001$, $d = .54$. Therefore, Hypothesis 4 and Hypothesis 5 were supported. Furthermore, Hypothesis 6, that young men will like mental rotation games more than young women will, was supported. Male players liked physical enactment games ($M = 4.58$, $SD = .93$) more than female players did ($M = 3.62$, $SD = 1.10$), $t(530) = 10.66$, $p < .001$, $d = .95$. They liked imagination games ($M = 4.11$, $SD = .93$) more than female players did ($M = 3.57$, $SD = 1.15$), $t(521) = 5.76$, $p < .001$, $d = .52$. See Table 3 for differences in male players' and female players' liking of video game genres.

Hypothesis 7 posited that young men will be more motivated by competition than young women will. Male players reported their gratification of competition ($M = 3.87$, $SD = 1.47$) higher than female players reported theirs ($M = 2.73$, $SD = 1.41$). This difference was significant, $t(531) = 9.12$, $p < .001$, and

the effect size was large, $d = .80$. ANCOVA analysis results confirm a significant $F(2, 531) = 55.46, p < .001$, and large, partial $\eta^2 = .17$, difference even after controlling for playing time per week. As such, Hypothesis 7 was supported.

Hypothesis 8, that young women will be more motivated by challenge than by competition was tested with a t test. Among female players, challenge ($M = 4.23, SD = 1.32$) was rated higher than competition ($M = 2.73, SD = 1.41$) as a motivator to play video games. The difference was significant, $t(301) = 21.67, p < .001$, and the effect size was large, $d = 1.10$. Furthermore, challenge gratification had the highest mean for young women with competition ranking fourth among young women. Therefore, Hypothesis 8 was supported.

Discussion

Funk and Buchman (1996b) noted that although studies have consistently found gender differences in video game play, “The origin of gender differences in game-playing habits has not yet been established” (p. 27). The current study attempted to offer one such theoretical account—and empirical support for that account. Specifically, we focused on the communicative nature of video game play in an attempt to seek an explanation for the consistent and pervasive differences that have been witnessed in the adolescent culture.

To gain a better understanding of gender differences in game use, we examined video game play as an interpersonal communication phenomenon. Within the interpersonal context in which game play occurs, needs for inclusion, affection, and control—as well as individual differences in sex and socially constructed gendered perceptions of video games—shaped people’s motivations for and patterns of game play. Based on established social norms, video games are perceived to belong in the male domain, and female players and male players alike experience greater social acceptance by staying within sex-role expectations. Consequently, based on their motivations for inclusion and affection, female players were less likely to be video game players, played for fewer hours, and did not seek out game-play situations for social interaction as much as male players did. Furthermore, female players also were less likely to enjoy game-play situations that involved three-dimensional rotation or games played for competition because they gained a lesser sense of control than they did in other interpersonal or play activities. Thus, we found that the gender differences in video game use were consistent with the uses-and-gratifications paradigm and FIRO theory.

As with any study, however, there are limitations. We are troubled by the statistically significant lower means for all the video game use motivations by the young women in the current study. Young women’s lower reported motivations may, in itself, explain why they are less likely than young men to

play video games. Originally, we expected that some motivations would be associated with male players and others with female players. One explanation was that young men play games more often and may be more generally enthusiastic about game play than young women are. This idea did not hold up to our ANCOVA analysis controlling for amount of game play. Next, we thought the differences may be due to methodological bias. However, the focus group sample we used to identify the set of uses and gratifications was about 65% female players. In addition, the research team that helped develop the scales comprised mostly women who reflected on personal experience in the process. If anything, we would suspect this process would have resulted in female-biased factors. At this point, we think that the differences may be a result of more enthusiastic reporting for young men, possibly driven by low reporting by woman because of gender-role stereotypes. Further research on the instrument is necessary to determine if the general pattern of under-reporting on this instrument is the case.

Designing Games for Young Women

If gender differences in video game play can indeed be attributed to a cycle of video games not meeting female players' needs of inclusion, affection, and control, then it is necessary for us to identify a place where the cycle can be broken, if we are ever to bridge the gender gap. This task is made easier by the fact that although video games are enjoyed more and played more by male players, female players still are interested in the video game experience. It appears that the logical choice—the route over which academy and industry have the most control—is in redesigning games in a way which gives female players a greater sense of control over their gaming experience.

When the medium is designed so that female players are able to meet their primary gratification of control, they will be more inclined to play. In other words, when girls and women view video games as a viable option for meeting their interpersonal orientation for control and, based on the uses and gratifications paradigm, they will play more often. As such, further experience and practice will improve their skills and reduce any preexisting, sex-based cognitive differences. When more female players find satisfaction (i.e., control) in the video game experience, the stereotyping of the video games as part of the male domain will begin to break down. Consequently, if video games are no longer viewed as a cross-sex stereotyped activity for girls and women, the likelihood of female players being able to meet their needs for inclusion and affection will be increased by engaging in video game play.

However, the task of creating so-called “girl games” is not so simple. Several game manufacturers have made efforts to tap into the female gamers’ market by designing games for girls and women. Unfortunately, early attempts in this arena have focused on adding female protagonists, such as the ones which were strongly scorned by Dietz (1998) for being too sexualized, reducing violent content, and slowing the speed of the game (Kinder, 1996; Laurel, 1998). These changes have been criticized as being completely off track and perfunctory, in essence, building the “computer game equivalent of pink Legos” (Laurel, 1998, p. 122) or “slapping the pink bow on ‘Pacman’” (Cassell & Jenkins, 1998, p. 24).

Furthermore, it is unclear as to whether the long-term benefits derived from video game play (e.g., career success in high-tech fields) have more to do with the technological or the competitive nature of the game. Game redesign that has focused on transporting traditional girls’ games to a video game format may only be perpetuating some of the problems associated with noncompetitive girls play, such as restricting personal potential (Kane, 1990) or placing girls at a future disadvantage by isolating them from a rules-based competitive environment, which boys learn to navigate at an early age through play. As such, removing the complex and competitive elements from video games—although those changes initially may lure female players to video game playing—can have serious long-term implications.

Rather than making cosmetic changes or reducing the complexity of games, redesign efforts should focus on playing into female players’ natural cognitive abilities. Grodal (2000) explained that video games have long been designed to capitalize on masculine hunting abilities (e.g., mental rotation, route navigation, projectile guiding or interception). He commented, “It is deplorable that the video game industry has not yet invented games that cater to those gatherer skills and motivations that are attractive to girls” (p. 209). Specifically, games can be designed in a way that makes female players’ natural cognitive abilities a central focus of the games. Games could focus on landmark memory, object displacement, and perceptual speed. A game designed in this way may look more like a mystery to be solved, rather than a land to be conquered. As female players return to landmarks for clues, identify items that have mysteriously disappeared, or decipher rapidly flashing messages, they will gain a sense of control and mastery of the video game environment. At the same time, they also will be reaping the benefits of increasing their mental rotation skills, their navigational ability, and their confidence in managing a complex and competitive virtual world—one not so entirely different from the one they will be entering to embark on their careers.

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