Examining Gender Bias in Children’s Video Games

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Introduction

Women are underrepresented in the technology industry, despite a large demand for more technology workers (Microsoft Research, 2010; Turner, Bernt, Pecora, 2002). A recent study by Microsoft (2010) predicts that of the 1.4 million jobs opening in the technology industry from 2006-2018, only 29% will be filled by women. In fact, the number of women in technology fields has been declining for some time. The amount of women receiving computer science undergraduate degrees is down by 17% since 1985, and the number of women in IT careers has been falling since it reached a high of 36% in 1991 (Microsoft Research, 2010; Ashcraft & Blithe, 2009). The limited number of women working in technology is a problem for multiple reasons. Firstly, women lose out on a lucrative career path, with average salaries of around $85,000 (Dice, 2013). Second, a gender diversified workforce has proven to be more productive, creative, and profitable than a workforce that consists of only one gender (Turner, Bernt, Pecora, 2002). Additionally, women aren't just 50% of technology companies' consumers; women's choices influence 85% of purchasing decisions in the world (Paul, McElroy, & Leatherberry, 2011). Women's input will help technology companies reach a larger customer base.

Research suggests that playing video games encourages entry into high-tech fields (Cassell & Jenkins, 1998; Margolis & Fisher, 2002 Turner, Bernt, Pecora,
Women play and enjoy video games, but they do not play as much as their male counterparts (Shu-Fung, 2010). The differences between men and women’s play habits begin as early as kindergarten (Hayward, 2012; Lucas & Sherry, 2004). Researchers have attempted to explain the differences in men and women’s play habits by studying cognitive and social factors that might influence these habits. Research identified cognitive factors that affect gaming including spatial skills (Burke, Kandler, Good, 2012; Sherman, 1967; Subrahmanyam, Greenfield, 1994), motor skills (Hall, Kimura, 1995; Lucas & Sherry, 2004), and analytical skills (Consalvo & Treat, 2002; Homer, Hayward, Fyre, Plass, 2012). The research on cognitive factors however is inconclusive. Studies suggest that cognitive differences between men and women are not a factor if both men and women are given the opportunity to play a similar amount of time (e.g., Burke, Kandler, Good, 2012; Subrahmanyam, Greenfield, 1994; DeL isi & Wolford, 2002).

Research focused on social factors such as the tolerance for violence in games (Dietz, 1998, Shu-Fang, 2010, Cooper & Mackie, 1986; Baron & Richardson, 1994; Bartholow & Anderson, 2001), sexualization of female characters (Beasley & Standley, 2002; Downs & Smith, 2010; Taylor, 2003; Royse, Lee, Undrahbuyan, Hopson, Consalvo, 2007), motivations that affect women’s choices (Keisler, Sproull, and Eccles, 2006; Kerr, 2009; Royse, Lee, Undrahbuyan, Hopson, Consalvo, 2007; Burgess, Stermer, and Burgess M., 2012; Ip, Jacobs, Watkins, 2008), social interactions in gaming (Schmid, Schmid, Bombari, Mast, 2011; Yee, 2008; Pena & Hancock, 2006; Jansz, 2005), and the stigma that women do not play games (Etaugh
& Liss, 1992; Moller, Hymel, & Rubin, 1992; Pellett & Harrison, 1992; Smith, 2010; Chris, 2008; Beasley & Standley, 2002; Shu-Fang, 2010). This study investigates how social factors take shape in children’s video games and how that might influence the choices young girls make in regards to gaming. In the next section, we review the literature investigating cognitive and social factors affecting choice of play. The review will conclude with a conceptual framework that explains choice of play.

**Literature Review**

Women do not play as many video games as men (Entertainment Software Association, 2012; Ogletree & Drake, 2007; Lucas & Sherry, 2004; Shu-Fang, 2010). Most people, male and female, believe that video games are a male-pastime (Cruea & Park, 2012; Lucas & Sherry, 2004). The widespread use of video games has prompted many researchers to examine various implications and motivations of game playing. The different disciplines have many different reasons for conducting this research, ranging from a desire to find new educational tools to helping the video game industry develop more appealing games. Researchers in psychology (e.g. Subrahmanyam & Greenfield, 1994; Jing, Spence & Pratt, 2007), computer-human interactions (e.g. Homer, Hayward, Fyre & Press, 2012), gender studies (e.g. Ogletree & Drake, 2007; Behm-Morawitz & Mastro, 2009; Jansz, Martis, 2007), communication (e.g. Hartmann & Klimmt, 2006; Lucas & Sherry, 2004; Schmid, Schmid, Bombari, Mast, 2011; Lotz, Kinder, 2011), education (Gagnon, 1985; Johnson, 1984; Lowery & Knirk, 1983; Ethington & Lee, 1986; Hamlen, 2011), and gaming (Greenberg, Sherry, Lachlan, Lucas, & Holmstrom, 2011; Carr, 2005; Kerr, 2009) have all examined this
phenomena. From this research we have gathered that a number of factors are in play that can largely be divided into cognitive factors and social factors. By examining these two areas of research we believe that we can give a comprehensive overview of the reasons women choose to play less video games than their male counterparts.

Cognitive Factors Affecting Women’s Play

Video games draw on a variety of cognitive skills. Some of the most heavily utilized and researched skills are spatial, motor, and analytical skills (e.g. Subrahmanyam & Greenfield; Lucas & Sherry, 2004; Consalvo & Treat, 2002). Research suggests that men and women are genetically predisposed to have different cognitive abilities (Eals and Silverman 1994; New et al. 2007; Silverman et al. 2000; Silverman and Eals 1992). According to some (Grodal, 2000; Lucas & Sherry, 2004), video games are designed for men’s cognitive strengths, which put women at an early disadvantage for playing games (Lucas & Sherry, 2004). In the following sub-sections of this review of the literature, we will explore how these cognitive skills affect the playing habits of women.

Spatial Skills

Spatial skills are important in video game play because many common game features require spatial skills. According to Linn and Peterson (1985) spatial ability can be broken into three definitions:

- **Mental rotation** involves the ability to rapidly and accurately rotate a two- or three-dimensional figure.
- **Spatial perception** is a person’s ability to determine spatial relationships with respect to the orientation of his or her own body, in spite of distracting information.
• **Spatial visualization** involves complicated, multi-step manipulations of spatially presented information.

In video games these skills are utilized heavily. For example, rotating blocks in Tetris uses mental rotation, and navigating a 3D world would require spatial perception. Researchers have been studying spatial skills and video games for many years, with most research focusing on how spatial skills are improved through game play (Subrahmanyam & Greenfield, 1994; Gagnon, 1985; Lowery & Knirk, 1982-1983; Okagaki & Frensch, 1994; Jing, Spence, & Pratt, 2007; Dorval & Pepin, 1986). Research that studies the differences between men and women’s spatial skills has had some controversy. Many studies have found that men and women have different spatial abilities (Burke, Kandler, Good, 2012). This research suggests that men outperform women in spatial activities consistently in nearly every category (Burke, Kandler, Good, 2012). Yet, some research argues that the men’s apparently superior skills are not the result of genetic factors, but rather of faulty analysis and studies (Burke, Kandler, Good, 2012; Postma, Oers, Back, Plukaard, 2012). These studies argue that men and women have equally good spatial abilities, but confront spatial problems differently. Even some studies that have found women to initially have inferior spatial skills have shown that after a short period of time in gameplay both genders show improvement in their spatial skills (Okagaki & Frensch, 1994; Dorval & Pepin, 1986; Hirvasoja, 2004; Subrahmanyam & Greenfield, 1994; Jing, Spence & Pratt, 2007). Subrahmnayam & Greenfield (1994) suggest that because men are more likely to play video games they have more practiced spatial skills, giving them a
competitive advantage over female players who have played less and thus have less
developed spatial abilities. Based on our review, we might conclude that it is not
women’s abilities that keep women less interested and less skillful at spatial games,
but their experience levels.

**Motor Skills**

Video games are designed to use another cognitive skillset: motor skills. We
define motor skills as hand-eye coordination and physical reaction time (Green &
Bavelier, 2004). Motor skills are utilized when players have to quickly hit button
sequences on their controllers, often in reaction to sudden stimuli on the screen.
Provenzo (1991) found that men were better at games that required fast reflexes and
muscle memory than women were. Other studies show that men are better at dodging
moving objects (Tottenham, 2006; Hall, Kimura, 1995; Lucas & Sherry, 2004). Many
action games require these skills, especially fighter and first-person shooter games
(Lucas & Sherry, 2004). These two popular genres of video games are usually played
by males (Homer et. al., 2012; Shu-Fang, 2010; Hamlen, 2010; Greenberg, et al.,
2010). As in spatial skills, motor skills can be greatly increased with small amounts of
video game practice (Drew & Waters, 1985; Green & Bevelier, 2004; Griffith et. al.,
1983; Orosy-Fildes & Allan, 1989; Yugi, 1996). Once again we may conclude that
women have equal skill levels as men if they had equal levels of motor skill
experiences gained by playing video games.
Analytical Skills

Video games also require the use of analysis and critical thinking to solve problems. Gameplay in the puzzle, strategy, and sport genres especially rely on the ability of the player to analyze the situation and correctly solve problems and develop strategies. While very early psychological studies found that men had better analytic skill than women (Maccoby, 1966; Tyler, 1965), since the 1970s most studies have concluded that there is no difference between men and women in analytic ability (Sherman, 1967; Beckham, Carbonell & Gustafson, 1988; Ethington & Lee, 1986). Many of the early differences described in analytical thinking of men and women can be attributed to the difference in spatial performance of the genders, but with the elimination of those factors men and women tend to perform equally well (Sherman, 1967; Ladd, 1977). Women do not enjoy male dominated genres of shooter and fighter games, but they do enjoy genres that tend to involve a lot of analytical thinking (Provenzo, 1991). Studies have found that women enjoy puzzle games, platform games, sports and strategy games greater than any other genres (Consalvo & Treat, 2002; Homer, Hayward, Fyre, Plass, 2012). We find it reasonable to conclude that women enjoy these genres more than other genres because they initially are not disadvantaged by lack of experience when playing, unlike with games that require heavy motor and spatial skills that men have more experience playing.
For many years psychologists believed that there is an inherent difference between men and women’s cognitive abilities (Burke, Kandler, Good, 2012). It is true that men and women use their cognitive abilities differently (Schmid, Schmid, Bombari, Mast, 2011; Postma, Oers, Back, Plukaard, 2012; Lotz, Kinder, 2011; Foels, Tomcho, 2009). This does not mean that one gender has innately superior cognitive abilities, though. Studies that have shown men or women having superior abilities often do not successfully factor out experience levels (e.g., Burke, Kandler, Good, 2012; Subrahmanyam, Greenfield, 1994; DeLisi & Wolford, 2002). With the same level of experience, men and women could have equal cognitive abilities. Lucas and Sherry (2004) discuss how the initial difference in skill levels between men and women can have an effect on women’s desire to play video games, creating “…a vicious cycle…that discourages female players from video-game playing.” Homer et. al.’s (2012) study on childhood gaming shows that, excluding children at the age of
12, boys play more hours of video games than girls. Consequently, it is possible that because women play video games less at an early age they are competitively disadvantaged (Vorderer, Hartmann, Klimmt, 2003; Lucas, Sherry, 2004; Royse et. al, 2007; Taylor, 2003). Research suggests that competition is one of the greatest motivating factors for video game playing, so a competitive disadvantage would strongly demotivate women from playing games (Jansz, 2005; Vorderer, Hartmann & Klimmt, 2003; Olson, 2010; Morlock, Yando, & Nigolean, 1985). But, if men and women start off on equal footing cognitively, there must be other factors that stop women from starting to play at the same time men do. These other factors are the social factors that discourage women from playing. In our next section we will examine these factors in detail.

Social Factors Affecting Women’s Play

If cognitive factors are not the underlying reason why girls do not play video games, we turn our attention to the social factors. Kiesler, Sproull and Eccles (2006) admit there is nothing “intrinsic to computing that would discourage girls,” but the social implications of computing appear to be a strong prevention factor. Yee (2008) argues that women perceive not the gameplay but the culture as the “primary deterrent to potential female gamers.” It cannot be ignored that video games and computing are often considered a “man’s toy” and women are discouraged from playing because of their gender (Kiesler, Sproull, Eccles, 2006; Etaugh & Liss, 1992; Reisman, 1990). There is social pressure for genders to conform to certain gender-norms, and the convention that video games are for men has led to a social stigma that women should
not play games (Maisonave, 2012; Yee, 2008; Kunekoff & Rose, 2012; Etaugh & Liss, 1992). Examining the culture of video games as well as the social differences between men and women’s motivations for gameplay may give insight into further reasons why there are not more female players.

After an extensive review of the literature, we have categorized the many factors that influence women’s play into a five broad topics. The first topic is price and time commitment associated with gaming. While not as heavily researched as other factors, studies indicated that women are less likely to put the money and time into gaming as men (Royse, et. al. 2007). The second topic is the tolerance for violence in games. It is understood that men and women have different tolerances for violence and many games feature violence. By examining the literature we hope to understand the origin of women’s distaste for violent games (Shu-Fang, 2010; Dietz, 1998). The third topic is the sexualization of female characters. Both male and female characters are sexualized in games, but coupled with underrepresentation and the portrayal of weak female characters can lead to the impression that women do not belong in games except as an object of lust (Beasley & Standley, 2002; Downs & Smith, 2010; Taylor, 2003; Royse, et. al., 2007). Fourth, we identify relationships or social interaction as a factor that shapes the gaming experiences of men and women. Women theoretically should be attracted to very social/interactive games, but their small presence in highly social games raises questions about the nature of gaming relationships (Yee, 2008; Maisonave, 2012). Finally we examine the effects of the social stigma against women in gaming and how that prevents women from playing
games (Kerr, 2009). The following sub-sections elaborate on the five social factors we identified.

1. Pricing & Time Commitment

   A notable factor in why women are not as motivated to play video games is because they are more concerned about the time and money involved in gaming (Royse, et. al. 2007). A study of women who consider themselves to be gamers, revealed that the women were too concerned about game and console pricing to buy frequently (Kerr, 2009). The women instead played the consoles of boyfriends or brothers, and only bought games on sale or won them in competitions. A study on credit card spending of college aged students found that women spend their money on clothes, while men spend their money on electronics, entertainment, and eating out (Hayhoe, Leach, Turner, Bruin, Lawrence, 2005). Dittmar, Beattie, and Friese (1995) support this conclusion with their findings that women spend more money on appearance items and men spend more on leisure items. This gives insight into why the industry does not target women gamers as heavily. Women gamers exist, but they are not registered customers.

   As previously discussed, women’s cognitive abilities applicable to video games are weakened by their lack of experience. If women spent more time playing, then they would be equally as competitive as men. Research shows that men play more hours of video games than women (e.g. Ogletree & Drake, 2007; Wright et al., 2001; Homer et al., 2012). Interviews with non-gamer women show they are
aggressively opposed to video games because the games take time from the “real world” (Royse, et al. 2007). One woman stated that “women usually have more things to do.” Women like her worry about the negatives of taking time away from other activities, as it has been shown that those who play a lot of video games have lower academic scores than those who do not (Burgess, Stermer, & Burgess M., 2012; Ip, Jacobs, Watkins, 2008). Video games also take time from relationships with loved ones (Ogletree & Drake, 2007; Jones, 2003). Some studies have found that girls spend more time on personal care, social interactions, and chores than boys, and boys spend more of that time playing video games (Griffiths, 1993; Huston, Wright, Marquis, & Green, 1999). But money and time are not concerns limited to females, so there must be more to explain the disparity.

2. Tolerance for Violence

One such explanation for the disparity is the often studied violence in video games. Violent video games are not as appealing to women as they are to men (Shu-Fang, 2010; Dietz, 1998; Funk, Buchman, Jernks, et al, 2006; Jansz, 2006; Hartmann & Klimmt, 2006). Males’ enjoyment of violent video games can be in part explained by their moral disengagement and identification with the characters they play (Hartman & Vorderer, 2009; Bandura, 2002; Sanders, 2004; Shu-Fang, 2010; Jansz, 2006). Studies suggest that women are not as good at moral disengagement, and that they do not identify with violent male characters that exhibit masculine traits (Hartman & Vorderer, 2009; Bandura, 2002; Sanders, 2004; Shu-Fang, 2010; Jansz, 2006). Men are generally more aggressive than women, so the aggression shown in
violent video games can be seen as a masculine trait (Baron & Richardson, 1994; Green, 1990). Women are also not as desensitized to violence as their male counterparts, because women are exposed to less violent media (Wright, et. al. 2001; Shu-Fang, 2010; Funk, Buchman, Jernks, et al, 2006). This can explain why violent video games cause females to feel more guilt than their male counterparts (Shu-Fang, 2010). The majority (80%) of video games include aggression or violence, so it can be concluded that this majority of games deters women due to their violent nature (Dietz, 1998).

3. Sexualization of Female Characters
   As previously emphasized, it is important for players to identify with the characters that they are playing. Women are less likely to identify with characters that exhibit masculine traits, but only 14% of characters in video games are women (Shu-Fang, 2010; Beasley & Standley, 2002; Downs & Smith, 2010). To make matters worse, women are ten times more likely to be shown nude or partially nude compared to men (Downs & Smith). A quarter of women characters also have unrealistic body proportions, including for the most part very large breasts and/or very small waists (Beasley & Standley, 2002; Downs & Smith, 2010). Remarkably, the majority of disproportionate female characters occur in E-rated games (Beasley & Standley, 2002; Downs & Smith, 2010). Based on gender schema theory, young children take this sort of media imagery and experiences and internalize it as appropriate gender roles (Brabandt & Mooney, 1986; V.W. Cooper, 1985; Wroblewski & Huston, 1987; Bern, 1981, 1983, 1993). Since the majority of female characters in games aimed even at young children are usually unimportant and overly sexualized in comparison to male
characters (Beasley & Standley, 2002), it is possible that it is at a very young age that children internalize the gender role that video games are meant for males and not females. The lack of strong female characters and sexualization of the few female characters in games targeted to young children teach children that video games are for boys and not girls.

4. Social Interaction

Many researchers have linked the social nature of games to a motivation for play (Olson, 2010). Women are more social than men (Schmid et. al., 2011). Some researchers have found that women are more interested in social games than non-social games (Yee, 2008; Williams, Consalvo, Caplan, Yee, 2009; Hartmann & Klimmt, 2006). There are two different types of social interactions with games: one is the social interactions that occur in single-player game modes (e.g. conversations with AI that change how the AI interact with the player), and the other is the interaction with other players in multiplayer games (e.g. playing games with friends in the room). There has not been much research conducted involving social interactions in single-player games. Hartmann & Klimmt’s (2006) frequently referenced study showed that women have a strong preference for highly social single-payer games. Media research suggests that women strongly prefer television programming with meaningful dialogue and character interaction, two things that can be present in video games as well (e.g. Mayer, 2003). The research into multiplayer gaming is more extensive. Men are more likely to attend parties for gaming and game with friends, as well as rate social aspects as higher
motivations to play than women do (Olson, 2010; Pena & Hancock, 2006; Jansz, 2005). Some studies have even found that these social games are less likely to attract women gamers (Lucas & Sherry, 2004). Yet, other studies have concluded just the opposite (Yee, 2008; Williams, Consalvo, Caplan, Yee, 2009).

The inconclusive research may be explained by the social communities in multiplayer games, not the act of socializing itself. Women are likely to receive three times the number of negative comments from other gamers online than men of equal skill if the woman’s gender is discovered (Kunekoff & Rose, 2012). Online harassment is a well-known problem in video games, but little research has been done to study its effects or origin (Maisonave, 2012). Maisonave (2012) believes that the origin of these hostile communities comes from the social belief that women do not, and should not play video games. Ultimately, these hostile communities likely demotivate women who would like to receive social rewards from gaming. So, women do enjoy and desire to play social games, but the unappealing nature of the social communities stop women from playing more social games.

5. **Stigma**

Men and women both report that games are a “particularly masculine pursuit,” an idea that greatly affects how women who play are viewed (Selwyn, 2007, p. 533). As children, “sex-appropriate” behaviors are rewarded and encouraged by parents and teachers, and children who do not conform to sex roles are not as easily accepted by their peers (Etaugh & Liss, 1992; Moller, Hymel, & Rubin, 1992; Pellett & Harrison,
Since video games are considered a male pastime, engaging in video game playing by females puts them at risk of being ostracized from social groups at a young age. Men, on the other hand, are encouraged to play video games. A study of women gamers found that all began playing video games between the ages of 6 and 10 years, suggesting that childhood gaming experiences influence adult behavior (Kerr, 2009). Examining how early discouragement from gaming affects women later in life might explain why women often do not play games even as they get older.

**Conclusion of Social Factors**

There are a number of social factors that contribute to women playing less video games than men. The violent nature of games and sexualization of female characters makes the context of the games unappealing to women, and the stigma and social culture that is unaccepting of women further pressures females away from games. These factors all lead to a decrease in money spent and time played on video games, which in the end contributes to the less practiced cognitive skills that keep women from being competitive. Research indicates that this cycle starts at a very young age as children are encouraged to play “sex-appropriate” games, stopping video game play in young girls. As girls grow older they tend to be more accepting of male pastimes, which could lead to an increase in game play, but it is possible that because young boys have been playing for a longer period of time they are more competitive players, demotivating young girls from joining in play (Liden & Bigler, 2002). Our research will examine video games designed for young children in order to determine if the games are contextually more appealing to young boys than girls, which would
contribute to the idea that video games are for boys and not girls as well as make girls less interested in playing them.

**Conceptual Framework**

In our review of the literature we identified a number of important cognitive and social factors that influence women’s choice of play. Figure 2 below represents our understanding of the literature as we attempt to explain the factors that influence women’s choice to play video games.

![Conceptual Framework Explaining Factors Affecting Choice to Play Video Games](image)

Figure 2: Conceptual Framework Explaining Factors Affecting Choice to Play Video Games

The model indicates that cognitive skills influence the amount that women play. The literature suggests that if a woman has less proficient cognitive skills relevant to gaming she will enjoy playing video games less, leading her to play a smaller amount, and vice-versa. Different play amounts influence proficiency and cognitive skills, which in turn influence competitiveness. A player’s proficiency at video games influences the end choice to play video games or not, because people
who are more competitive at video games enjoy them and play them more. So, ultimately, greater cognitive skills lead to a higher amount of gameplay.

The other set of factors that influence choice of play are social. The social factors discussed in the previous sections influence how much time and money women desire to commit to video gaming. Research suggests that women are unwilling to commit time and money to games because they are unappealing due to violence, sexualization of women, the difficulty of women being accepted in social gaming circles, and the stigma against women who play games. Less time and money committed to games means less play time. Less play time once again leads to a decrease in proficiency, which helps determine if women will choose to play games. Based on our research, it is clear that there is no inherent difference in cognitive skills between men and women. We will therefore focus our research on social reasons women do not play, and specifically we will examine childhood experiences as they start the cycle of gaming proficiency.

**Research Question**

This research aims to explain why women play fewer video games than men. By identifying causes, the video game industry can tailor games to be more appealing to women by avoiding game characteristics that make women less likely to play. The literature suggests that childhood experiences with video gaming greatly influences the amount of gameplay in adulthood (Kerr, 2009). Since most adult players indicate that they began playing between the ages of 6 and 10, we can assume that playing video games as a child makes an individual more likely to play in adulthood (Kerr,
Studies have shown that young girls do indeed pay fewer games than young boys. This study attempts to uncover the characteristics of Everyone-rated (E-rated) games and determine if these characteristics are a factor in young girls choosing not to play. Specifically, this study asks the following question:

**Are video games targeted toward young children more contextually appealing for boys than girls?**

According to our literature review, the ability to identify with game characters and experience the game in a positive social environment greatly influences whether a person will play a game (Shu-Fang, 2010). By examining certain characteristics of the game, such as the gender of the playable character or violence within the game, we can determine if a game is more likely to be appealing for boys or girls. The design of our research is described in the following section.

**Research Method**

This study examines the characteristics of video games targeted towards young children. To explore the characteristic of this population of games we conducted a qualitative survey of E-rated video games. A qualitative survey is defined as a survey to analyze “the diversity of member characteristic within a population” (Jansen, 2010). The goal of our study is to examine the characteristics of video games in a certain population, so using a survey perfectly satisfies those needs. A sample of the population of games was identified based on the theoretical criteria explained in the following section.
Sampling

In order to answer our research question we studied Everyone-Rated (E) games as according to the Entertainment Software Rating Board (ESRB). The ESRB is a “non-profit, self-regulatory body that assigns ratings to video games,” and virtually all video games sold in the USA and Canada include an ESRB rating (ESRB, 2014). The rating system was devised “in 1994 after consulting a wide range of child development and academic experts, analyzing other rating systems and conducting nationwide research with parents” (ESRB, 2014). It should be noted that the ESRB was initially created by a number of software manufacturers, including Nintendo and Sega, because the game manufacturers were threatened that if a system of rating was not developed the US government would mandate one (Funk, Flores, Buchman, Germann, 1999). Today the ESRB is still supported by the video game industry, although its ratings are supposed to be impartial (Funk, Flores, Buchman, Germann, 1999).

We chose E-rated games because the games are suitable, and often intended, for young children. According to eBay’s ESRB ratings guide, E-rated games are intended for children between the ages of 6-10, although they are suitable for all ages (eBay.com, 2014). In Kerr’s 2009 study, all of the women gamers interviewed starting playing games between the ages of 6 and 10. According to the U.S. Federal Trade Commission, 73% of parents often check the ESRB ratings of games purchased for their children (2007). Early Childhood Rated was not included in our study because we believe the games would have so little violence, sexualization, and story components that they would be equally appealing to both boys and girls.
There are over 20,000 E-rated games (ESRB, 2014). In order to make our study feasible, we narrowed our sample down to the E-rated games available at Ohio University’s Game Research and Immersive Design (GRID) Lab. The GRID Lab is a place for residents of the Appalachia Ohio area to study and develop interactive media and technology (GRID Lab, 2014). The games that are chosen act as a tool to help aid GRID lab attendees to develop both serious and educational games. According to the Amazon rank of the games at the time of purchase by the GRID lab (purchasing for the most part took place in 2009), 44 of the 83 games fall within Cynthia Stine’s top 5% of purchased video games (Stine, 2013). Only 4 fall below the top 15% of video games, so we know that the GRID lab games were for the most part very popular in 2009 (Stine, 2013).

When removing duplicate game titles across platforms, the GRID Lab has 83 E-rated games and four different consoles available: GameCube, Xbox 360, Playstation 3, and the Wii. For each platform a different number of games are available to play, the smallest amount being 12 games. To ensure each platform was studied with equal weight, 12 games from each console were selected as a simple random sample to be played, totaling in 48 games. Originally, we had hoped to find what percentage of all E-Rated games were made up by each console, and study that same percentage of games for each console. This was not possible to do because the GRID Lab does not have enough games for the percentages to be accurately represented. For example, the Lab has 14 Playstation games, yet Playstation makes up 54% of all E-rated games. 54% of 83 games is about 45 games, and since we only had
14 to choose from this system of selection was unworkable. Instead, the largest number of games that could be played across all consoles was chosen. The games were selected randomly by listing the titles in an excel worksheet next to a column of randomly generated numbers. The titles were then sorted by the randomized numbers they were adjacent to, and the first 12 games of each list were chosen (a list of all games played can be found in Appendix A). Occasionally a game would fail to work as expected, and had to be eliminated from the list. If it were eliminated, the next unselected item on the randomized list was chosen to be included in the sample. This also explains why even though there are 13 GameCube games available, only 12 were found to be playable, giving us our sample size for each console.

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<th>GRID Lab Games</th>
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<tr>
<td><strong>Console</strong></td>
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**Data Collection**

To collect relevant data on the characteristics of E-rated games we created a survey instrument based on our theoretical framework to examine video game characteristics. The instrument included items that examined the social factors
identified in the framework. Specifically, we examined violence, sexualization, and social interaction of video games (see Appendix C for details of the instrument). Sampled games will be content analyzed using this instrument.

To determine how we go about collecting characteristics data we looked to the literature for guidance. Beasley & Standley (2002) and Downs & Smith (2009) both conducted content analysis of video games and used 20 minutes of gameplay, starting from the beginning of the game, to conduct their study. Following their lead, the games were played on average 15 minutes and 45 seconds over a period of three months. Many simple games, especially sports games that have no women and little story or violence, could be played for much shorter than 20 minutes while still being studied fully. Other, more complicated games, required extra research in order to reach saturation. To deal with this, some games were researched online in addition to being played for 20 minutes or more. All of the games were played by the co-author, Lisa Roach, an experienced game player. Notes were taken during various pauses in gameplay, such as during loading screens, and final thoughts were written at the end of the gameplay.

The games were studied based on the constructs described earlier in our framework: violence, sexualization, and social interaction. In the following portion of this paper we will describe the operationalization of these concepts, and a chart outlining how they were recorded can be found in Appendix C.
Violence

To study violence we used the American National Television Study’s definition of violence, which is as follows: “any overt depiction of a credible threat of physical force or the actual use of such force intended to harm an animate being or group of beings” (as cited in Jansz, 2005). This definition was chosen because it is from a respectable and often cited study that had many contributors, and we believe that it encompasses the type of aggression that would influence the enjoyment of men or women. It should be noted that the definition excludes violence from legal sports activities, such as a football player tackling an opponent, because the players do not intend to harm one another. We measured violence based on the frequency of violence in a game, as well as the intensity.

Smith, Lachlan, and Tamborini measured violence in their study in terms of prevalence (2003). They determined by the number of game segments that have violence take place in them, and a rate/minute of violent actions will also be accounted for (2003). We measured violence in the same way, but we were unable to record the gameplay as Smith, Lachlan, and Tamborini did, making it extremely difficult to count segments and rates/minute while playing accurately. Instead, a simple scale of violence prevalence with none, low, medium, and high options were used. The original chart for measuring concepts is located at Appendix B.

Intensity was measured based on two factors. First, the result of the violent actions were recorded, such as if it caused death, a knock-out, or if the opponent simply disappears. Then the harm/pain the action causes, coded the same as Smith, Lachlan, and Tamborini coded their harm/pain measurement. The scale goes none (no
harm/pain), mild (grunting or staggering backward), moderate (blood shedding, bruising), and extreme (severed limbs, large amounts of blood).

Sexualization

Sexualization is defined as “an instrumental approach to a person by perceiving that person as an object for sexual use disregarding the person’s dignity and personality traits, with the person’s worth being measured in terms of the level of sexual attractiveness” by the European Parliament (Skrzydlewska, 2012). A number of studies suggested that women are more sexualized than men in video games (e.g. Dill & Thill, 2007; Beasley & Standley, 2002; Dietz, 1998; Downs & Smith, 2010). Sexualization of women is usually studied in terms of the amount of clothing that female characters wear, as well as their body proportions (Dill & Thill, 2007; Beasely & Standley, 2002; Behn-Morawitz & Mastro, 2009). We studied sexualization by ranking the clothing worn as conservative, average, sexual, or overtly-sexual. These rankings were determined based on exposed skin, especially around the breasts, midriff, and legs, much as Dill and Thill did in their study (2007). Clothing was also ranked as appropriate or inappropriate for the character’s situation. In addition, women were coded by overall body proportion (legs-waist-hip-breasts) as compared to an average person. Body proportion was coded as Downs and Smith had it coded, as realistic, unrealistic, not applicable, or cannot tell (2010).

In addition to studying the clothing and body portrayal of females in games, we will also look at the role of the female character. A character that has a role of little importance and is dressed provocatively would safely fit under the definition of
sexualized, because their worth is based only on their attractiveness. Using Dietz’s (1998) rating system, the roles will be categorized as follows: no female character, female characters portrayed as sex objects (based on the previously discussed clothing and body proportions, or if the women leaves with a male winner), females as victims (based on women who had been kidnapped or assaulted as part of the plot), females as the hero (based upon whether or not there were female characters who were or could be the action character and winner of the game), and females in feminine roles (based upon appearance, such as wearing pink, long dresses and the like, and characterization, such as playing supportive roles to men). After observation we added to Dietz’s rating system the options of instructional character and supporting character.

Social Interaction

Social interaction in video games includes both meaningful social interactions in single-player games as well as social interactions with other players in multiplayer games. Research suggests that girls are more attracted to single-player games with meaningful social interactions, and there is conflicting evidence about their motivations to play multiplayer games (Hartmann & Klimmt, 2006; Lucas & Sherry, 2004; Yee, 2008). We studied single-player social interactions in a few ways. First, we examined the amount of time the user is spoken to (instructionally, or story-telling). Then, we examined the amount of time spent in dialogue (for example, cut-scenes where talking occurs). Finally, we recorded the amount of controllable dialogue options the player has, which was determined by the average number of dialogue
choices as well as the average number of times the player has controllable dialogue (meaning more than one dialogue option). The more dialogue opportunities and choices, the more socially rich the game will be considered. In addition, we recorded if the player has or has the option to have companions. A character will be deemed a companion if they physically travel with the player and aid in the player’s challenges.

For multiplayer games we recorded the minimum and maximum number of players, and if the players play together cooperatively, go up against one another competitively, or if there is an option for both. Additionally, we will noted if the game is playable on a wide-area network (WAN), which would indicate that the game is playable with strangers rather than just individuals in the same room. Also, if the game was playable on WAN, we examined players’ communication opportunities by noting if there is no ability to communicate, text-only communication, speak-only communication (through a microphone), or both text and speak. Since speaking provides the most realistic social interaction, speaking will be considered the most highly social interaction, with the option to text or speak the highest social ranking.

Data Storage

In order to record our data, a couple of techniques were utilized. As the video games were played, notes were written on a printed piece of paper in order to evaluate the game. An example of this paper tool can be found in Appendix C. After the game was played and evaluated on paper, the notes were transferred to an EXCEL worksheet that included notes on all of the other games. By using EXCEL we were later able to sort and organize our data based on different constructs, such as gender or game producer.
Data Analysis

Our data analysis was conducted both inductively and deductively. In the development of our cognitive framework, we began by researching previous literature in order to create the original framework. After conducting initial surveys of games, the conceptual framework was updated to be more accurate based on our observations (Appendix B and Appendix C show the development of the framework). Once the data was collected, we analyzed the data across multiple dimensions in order to create a more complete picture of our findings. Genres, game producer, and consoles were specifically analyzed so that comparisons between different groups could be done. When we found that the majority of our games fell under the sports genre, we began removing sports games from data sets in order to avoid skewing the data. By examining the data from different groupings, we were able to see a more accurate picture of the influences that shape the games.

Research Findings

Our analysis revealed various game dimensions and how they take shape in E-rated games. The discussion of our findings first presents revisions and enhancements made to our content analysis scheme followed by a detailed description of the findings for each of the factors identified in the framework.

Revisions to the Framework

A number of changes were made to our framework after our initial observations of several of the games. Changes to the framework are indicated by a
star in the final framework presented in Appendix C. There were 11 revisions made in total. One of the major changes made was to eliminate constructs that required exact measurements of time, such as the rate of violent actions per minute. While this construct would give us a more accurate picture of the amount of violence that takes place, with no ability to record the games as they were played it hindered gameplay too severely to keep a count and a time while playing. Thus the construct was changed to a simpler violence frequency with high, medium, low and none as options. Additionally, time in dialogue was changed to two different constructs - time in conversation and time characters speak to the player. These were also measured as high, medium, low, and none, for the same reasons why violence could not be measured in exact time. A construct for breast size was eliminated because breast size is already considered in the breast/hip/waist ratio construct. The role of female characters was eliminated because the females often did not fall into well-defined roles. Also, since the games were not played to completion, not all female characters were observed in our surveys, so their roles could not be determined. After these major revisions, we arrived at our final framework that was used to survey our games.

Genres

We chose to take specific note of genres in order to determine if there is correlations in patterns of data with the genres of the games. Additionally, we also took note of the game producers and consoles for the same reason. The majority of the game genres studied fell into the sports category, with the second highest amount being action adventure. There was one fighting game, and no first-person shooters.
The large number of sports games played heavily influences some of the data, so frequently throughout this discussion sports games will be removed to show more subtle patterns in the data. Please see Appendix D for a list of genre definitions. Most of the games studied were produced by Nintendo and EA.

Gender Representations
We examined the gender representation within games in a few ways: the gender of the player’s character, the gender of the narrators, and the genders of other characters. 45% of the games required the user to play as a male, and no games
required the user to play as a female. When eliminating the often male-heavy sports games, 37.5% of the games require the user to play as a male, while the majority (45.8%) of the games allow the user to choose a gender. Of the games that require the user to play as a male, 57% are sports games and 28% are action adventure. When it comes to narrators, 59% of the games have male narrators, and 2.3% (1 game in total) have a female narrator. Counting all characters present in the games, 70% of games had more male characters than female, and no game had more females than male (the other 30% had equal male and female characters, or neutral characters).
**Violence**

The majority of the E-rated games we studied included no violence, and those that did include violence rarely featured any severity. Even when eliminating sports games (which rarely contain violence because it would be illegal in most sports), 51% of the remaining games contain no violence. Of the games that did contain violence, 4 show mild amounts of pain and only 1 moderate, the rest of the games had no indication that pain was felt. The less severe the violence is, the more likely it is to appear in a game.

<table>
<thead>
<tr>
<th>Violence Frequency</th>
<th>Violence Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Death</td>
</tr>
<tr>
<td>Medium</td>
<td>Disappear</td>
</tr>
<tr>
<td>Low</td>
<td>Sit...</td>
</tr>
<tr>
<td>None</td>
<td>N/A</td>
</tr>
</tbody>
</table>

When examining the games that have high or medium amounts of violence, the console that contains the most violent games is by far Nintendo’s GameCube with 50% of the games, followed by Nintendo’s Wii with 25% of the games.
* adding up the numbers of violent games by console will result in more games than studied because games that appear on both Xbox and Playstation were counted for both consoles

Most of the particularly violent genres were not observed in our study, such as fighting games and first-person shooters, leaving the action adventure genre as the most violent genre studied.

**Sexualization**

As with violence, not many video games featured overt sexualization of female characters. For the most part, females wore average clothing and had realistic body proportions. But, 13% of games showed unrealistic body proportions, and 15% had
sexual clothing. Of the 13% of games featuring unrealistic body proportions, 66% were produced by Nintendo, with the rest produced by EA. For the sexual clothing, 57% were produced by Nintendo, and 28% were produced by EA. The majority of sexual clothing appeared in sports games, but unrealistic ratios more often appeared in action adventure and the party genres.

<table>
<thead>
<tr>
<th>Sexual Clothing</th>
<th>Body Ratio Realism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual</td>
<td>Overly</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

### Sexual Clothing By Genre
- Action: 1
- Fighting: 0
- Party: 0
- Racing: 1
- Rhythm: 1
- Simulation: 0
- Sports: 0
- Unknown: 4

### Unrealistic Ratio By Genre
- Action: 2
- Fighting: 0
- Party: 2
- Racing: 1
- Rhythm: 0
- Simulation: 0
- Sports: 1
- Unknown: 0

**Social Interaction**

Eighty-nine percent of games had no conversational dialogue or options for the player to choose a response. Fifty percent of games had characters that were never spoken to whatsoever, but those that did have characters speaking to the protagonist were more likely to have medium amounts of speaking than low or high amounts. Out of the 81 games in the GRID lab, 54 were marked as having no storyline, and 27 had
Eighty-six of games allow for multiplayer gameplay and 46% allow for online play. Seven games had in-game companions.

### Discussion

The findings discussed above indicate some interesting themes and suggest some initial interpretations of how the social characteristics of E-rated games might be influencing the choice girls make to play video games. This section elaborates on these implications.
Genre of E-rated games favor boys

Genres work well to help generalize the popularity of games among boys and girls because the different genders tend to gravitate towards different genres. Our study observed a higher number of games with genres that are popular amongst boys than girls. According to Homer, et al., boys most prefer sports and fighting games (2012). The other two most popular genres among boys, first-person shooters and MMORPGs, were not observed in this study. This is likely because first-person shoots and MMORPGS frequently feature violence and sexualization, giving them a higher rating than E. Simulation (what Homer, et. al. refers to as “Virtual Life”) is the most popular genre for girls, before fighting and party games. We only observed one fighting game in our sample despite the genre’s popularity with both genders. Of the genres most popular with females, 9 games were observed, while 19 games with genres popular with males were observed. This suggests that E-rated games tend to fall into genres that are more preferred by boys than by girls. The difference in genre representations is mostly a result of the high number of sports games in our study. A larger sample of E-rated games could help determine if our study has an accurate representation of the distribution of genres in the total game population. If it does, then it is clear that games aimed at children represent genres that are more popular for boys than girls.

Representation of Females Lacking

Women are not likely to identify with masculine characters (Shu-Fang, 2010). The genre most preferred by boys, sports, is also the genre with the lowest amount of
female representation. The majority of sports games require the user to play as a male character, and 11 out of the 18 sports games have all or the vast majority of supporting characters as male. Thirteen out of the 18 games had male announcers, while the rest had no announcer at all rather than a female announcer. These male dominated trends in sports games are a reflection of the reality of popular sports, which usually have gender segregated teams and tournaments. This makes it difficult to find female players in games like football, basketball, and soccer. As previously discussed, game players are more likely to play game with characters they identify with, and the nearly exclusive male cast in sports games is likely one of the reasons the games are more popular with boys than girls (Shu-Fang, 2010). If the large number of sports games is an accurate representation of the E-rated games available to children than E-rated games are difficult for girls to be interested in because the majority of games have characters with whom they do not identify with

For the rest of the games, when not including sports, the majority allow a user to choose their character’s gender. Still, 29% require the user to play a male character, and not a single game requires a user to play as a female. Additionally, as with sports games, no games had more female supporting characters than male characters, and many games had many more male characters than females. In sports games there were no female narrators, but even when including all of the games there is only one female announcer to be found. As previously discussed, girls are less likely to play games if they cannot identify with the character that they are playing. The games with optional gender allow for girls to choose characters with gender’s they identify with, but there
is clearly a bias towards forcing players to choose male characters rather than females when no option is given (Shu-Fang, 2010; Beasley & Standley, 2002; Downs & Smith, 2010). Requiring a girl to play a game as a male makes her less likely to enjoy playing the game, thus making the male-dominated games more appealing to boys than to girls. Even when a player is allowed to choose their gender, the majority of games have mostly male supporting characters and narrators, so if a user were to choose their gender as female they would obviously be a minority within the game. Having such male-dominated game character lists encourages the idea that games are a masculine pastime, further perpetuating the notion that girls should not play games.

**Violence is limited in E-rated games**

Women are less likely to play games with violent content (Shu-Fang, 2010; Dietz, 1998; Funk, Buchman, Jernks, et al, 2006; Jansz, 2006; Hartmann & Klimmt, 2006). The majority of E-rated games observed featured no violence, and if violence was observed it tended to manifest itself very mildly. An interesting finding is that Nintendo produces 50% of the most violent games, and the Nintendo produced Wii and GameCube consoles have 75% of the games that feature high or medium amounts of violence. Nintendo’s Wii is the third most popular home game console in the world, ranked just below Sony’s Playstation and Playstation 2 (Sony Computer Entertainment, 2009; Sony Computer Entertainment, 2013; Nintendo, 2014). It is likely that the ESRB gave the Nintendo games an E-rating rather than a Mature rating because Nintendo games have cartoon violence, rather than realistic. The ESRB categorizes cartoon violence as more acceptable than realistic violence, but a study by
Funk, et. al. found that many consumers disagree with the categorization of cartoon violence and believe it should be ranked as more highly violent (1999). A number of studies suggest that realistic violence causes more aggression in children than cartoon violence, but cartoon violence still produces some aggression in children (Hapkiewicz & Stone, 1974; Freshbach, 1972; Atkin, 1983; Liss, Reinhardt, and Fredrikson, 1983; Bandura, Ross, Ross, 1963). Funk, et. al.’s study suggests that even cartoon violence is still perceived as violent, especially by children (1999). Therefore, even though the ESRB rates Nintendo’s cartoon-violence heavy games as E, the amount of violence could still dissuade young girls from playing Nintendo games.

Women are not highly Sexualized in E-rated games

Women do not like highly sexualized women in their video games (Taylor, 2003; Royse, et. al., 2007). Similar to violence, there was not excessive sexualization of female characters in games. Where sexualization did take place, Nintendo once again had the most games. Japan is known to have more sexualized games than the United States in general (Parish, 2012). Japan even has a genre of games known as eroge, which encompasses erotic video games. The majority of the sexualization of Nintendo characters came from the Mario games that include the characters Princess Peach and Daisy, who are often represented as having very small waists and large hips and frequently wear inappropriate attire. For example, in Super Mario Strikers Peach and Daisy wear short-shorts and shirts that expose their stomach, while all male characters are modestly dressed. In another popular scenario, Peach is the damsel in distress who must be rescued by Mario in the game Super Mario Galaxy. Peach and
Daisy are the only female characters represented in the Mario games (Birdo, the pink non-human character who wears a bow and jewelry, is officially a boy who likes to dress as a girl, although Nintendo does not keep this consistent and sometimes refers to Birdo as “it” or a girl), so young girls only have the option of choosing a sexualized female character, male characters, or non-human characters (North American Instruction Manual of *Super Mario Bros 2*). Of the 10 best-selling video games of all time, 3 games are Mario games, so it is not unrealistic to assume a large number of children are exposed to the Mario video game franchise (Wikipedia, 2014).

**E-rated games are limited in Social Interaction**

According to Hartmann & Klimmt the amount of social interactions in a game greatly influence a woman’s choice to play the game. A girl is significantly less likely to play a game if she does not feel it has satisfactory social interactions. For single-player gameplay the games we studied had very little social interaction. The majority of games we studied had no conversational dialogue options, and of those that allowed responses all but one had only two responses to select from. For games that had conversation, it was observed that the player’s responses in general did not affect the outcome of the game or the relationships of the player with the other characters. Additionally, only about 15% of games had a companion AI working with and supporting the player’s character. Since dialogue options are displayed as written text, the low appearances of dialogue could be attributed to the lesser reading abilities of the games’ target demographics. Yet, certain games such as EA’s The Sims (rated Teen), have a large number of social options while still being text minimal (2000).
This is achieved by filling talk bubbles with pictures instead of words, and having short dialogue response options, such as “Tell a Joke.”

Kerr’s study of women gamers found that all started playing as children due to their brothers, fathers, or male friends playing the games with them (2009). Eighty-seven percent of games we studied have multiplayer gameplay, with the remaining 13% being single-player only. Over half of the games with multiplayer gameplay had online multiplayer options. While women are more likely to play multiplayer with family members at home, online gameplay is different. Research has shown that the culture of online multiplayer games can be unaccepting of girls, and so young women might choose to not take advantage of the games that allow for wide-area network access. Certain games have minimal single-player storylines because it is expected that most players will play the multiplayer options, making the online games very unappealing to girls. Online multiplayer games can foster communities with populations as large as some countries, creating conversation topics that leave out those not involved in gaming (Routledge, 2011; Olson, 2010). When girls are left out of the gaming communities and discussions it further ostracizes women from gaming in general because it reinforces the idea that women are not gamers.

Study Limitations and Opportunities for Future Research

Our study was limited mainly in its sample diversity. The lack of access to a larger number of E-rated games makes it difficult to draw conclusions from our sample about the larger population, and the study should be completed again with
more games to confirm our findings. Additionally, having only one coder may have
led to bias in the interpretation of the games. Completing the study again with multiple
coders, or with more time so games could be played, recorded, and then analyzed
afterwards would allow for a more trustworthy scale. It is also important to confirm
the validity of our findings by surveying children’s responses to the games we studied,
or perhaps the popularity of each of the games by gender. The difference between
cartoon violence and realistic violence was shown to have significant impacts on the
rating of games, so future studies should take note on whether cartoon violence is as
unappealing to girls as is realistic violence. It would also be interesting to interview
young girls who do not play video games and ask why they do not, because most of
the current research on focuses on adults and teens. A longitudinal study would be the
most revealing, yet most difficult, study that could be conducted in the future. The
study could start with newborns and keep track of when (and if) they start playing
games, what games they play, and then follow up some years later to determine if they
are still playing or if they have started playing.

Conclusion

The purpose of this project was to determine if E-rated games were more
appealing for young boys than girls. We developed a framework to describe the
constructs that influence the appeal of games for boys and girls. This framework takes
into account the cognitive capabilities of the user, as well as a number of important
social factors. Based on our review of previous literature, we believe that social factors
have a more significant impact on a child’s choice to play video games. These factors
include violence, sexualization, and the social interaction within the video games. In order to study these factors we conducted a survey of E-rated video games.

Our research suggests that E-rated video games are lacking in many ways that would make them contextually appealing to girls. The majority of E-rated games we found were of the sports category, a genre more popular among boys than girls. The representation of female characters in games is very poor, making it difficult for girls to identify with the characters in the games. There was minimal violence and sexualization. The games have nearly no rewarding single-player social interactions, but a large number did allow for multiplayer gaming, which can be appealing in offline contexts but not in online scenarios. Based on this research it is arguable that E-rated games are more appealing to boys than girls, and could be a cause of why girls do not start playing games as much as boys when they are young. Thus, it is at a young age that the idea that games are a male pastime is created and reinforced, making it less likely for women to start playing even as they get older and less sensitive to gender defined play types.
Appendix
Appendix A
List of All Games Played

<table>
<thead>
<tr>
<th>Game Name</th>
<th>Game Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ikaruga</td>
<td>Fifa 06</td>
</tr>
<tr>
<td>Lego Star Wars</td>
<td>Game Party</td>
</tr>
<tr>
<td>Lego Star Wars 2</td>
<td>Madden Live 08</td>
</tr>
<tr>
<td>Pikmin 2</td>
<td>Madden NFL 06</td>
</tr>
<tr>
<td>Spongebob Squarepants</td>
<td>Madden NFL 07</td>
</tr>
<tr>
<td>Creature from the Krusty Krab</td>
<td></td>
</tr>
<tr>
<td>Spongebob's Atlantis Squarepants</td>
<td>Mario Gold Toadstool Tour</td>
</tr>
<tr>
<td>Super Mario Galaxy</td>
<td>Mario Power Tennis</td>
</tr>
<tr>
<td>Katamari Damacy</td>
<td>MLB 08 Show</td>
</tr>
<tr>
<td>Little Big Planet</td>
<td>NBA Live 08</td>
</tr>
<tr>
<td>Super Smash Bro's Melee</td>
<td>NCAA 07</td>
</tr>
<tr>
<td>Mario Party 7</td>
<td>Super Mario Baseball</td>
</tr>
<tr>
<td>Mario party 8</td>
<td>Table Tennis</td>
</tr>
<tr>
<td>Viva Pinata Party Animals</td>
<td>Tiger Woods PGA 06</td>
</tr>
<tr>
<td>Carnival Games</td>
<td>Tiger Woods PGA 08</td>
</tr>
<tr>
<td>Smarty Pants</td>
<td>World Soccer Winning</td>
</tr>
<tr>
<td></td>
<td>Eleven 9</td>
</tr>
<tr>
<td>Wii Play</td>
<td>Namco Museum Remix</td>
</tr>
<tr>
<td>Mario Kart Double Dash</td>
<td>Super Mario Strikers</td>
</tr>
<tr>
<td>Donkey King Barrel Blast</td>
<td>Dance Dance Revolution</td>
</tr>
<tr>
<td></td>
<td>Universe 3</td>
</tr>
<tr>
<td>Forza Motorsport 2</td>
<td>Donkey Konga</td>
</tr>
<tr>
<td>Gran Turismo 4</td>
<td>Viva Pinata</td>
</tr>
<tr>
<td>Nascar 08</td>
<td>Animal Crossing</td>
</tr>
<tr>
<td>Need for Speed Underground 2</td>
<td>Fifa 08</td>
</tr>
<tr>
<td>Project Gotham Racing (PGR)</td>
<td>NCAA 08</td>
</tr>
</tbody>
</table>
Appendix B
Original Conceptual Framework

<table>
<thead>
<tr>
<th>Game Name</th>
<th>Game Producer</th>
<th>Console</th>
<th>Genre</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Violence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intensity</td>
<td>1 2 3 4 5</td>
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<td></td>
</tr>
<tr>
<td><strong>Sexualization</strong></td>
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</tr>
<tr>
<td>Clothing-Sexualization</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clothing-Appropriateness</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast Size</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast/Hip/Waist Ratio</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Realism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#Female Characters</td>
<td></td>
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<td></td>
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<tr>
<td>Role of Female Characters</td>
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<tr>
<td><strong>Social Aspects</strong></td>
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</tr>
<tr>
<td>Time in Dialogue</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Number of Players</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAN Capabilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication Median</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Playing Style (competitive vs co-op)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Companion AI (yes/no)</td>
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## Appendix C
### Final Conceptual Framework

<table>
<thead>
<tr>
<th>Notes</th>
<th>Date:</th>
<th>Time Played:</th>
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<tbody>
<tr>
<td><strong>Game Name</strong></td>
<td><strong>Game Producer</strong></td>
<td><strong>Console</strong></td>
</tr>
<tr>
<td><strong>Violence</strong></td>
<td><strong>Rating/Value</strong>*</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
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<td>Low</td>
</tr>
<tr>
<td>Result of Action*</td>
<td>Death</td>
<td>Disappear</td>
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<tr>
<td><strong>Sexualization</strong></td>
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<tr>
<td>Clothing-Sexualization</td>
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<td>Average</td>
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<tr>
<td>Clothing-Appropriateness</td>
<td>Appropriate</td>
<td>Not-Appropriate</td>
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<tr>
<td>Breast/Hip/Waist Ratio Realism</td>
<td>Realistic</td>
<td>Unrealistic</td>
</tr>
<tr>
<td>#Female Characters</td>
<td></td>
<td></td>
</tr>
<tr>
<td># Male Characters*</td>
<td></td>
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</tr>
<tr>
<td># Gender Neutral Characters*</td>
<td></td>
<td></td>
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<tr>
<td>Gender of Player’s Character</td>
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<td></td>
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<tr>
<td>Gender of Narrator*</td>
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<tr>
<td><strong>Social Aspects</strong></td>
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<tr>
<td>Time in Instructional Dialogue*</td>
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<tr>
<td>Amount of Conversational Dialogue*</td>
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<tr>
<td>Frequency of Dialogue Choices*</td>
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<tr>
<td>Average # of Dialogue Options*</td>
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<tr>
<td># Of Players</td>
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<td>WAN Capabilities</td>
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<td>Communication Median</td>
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<td>Companion AI (yes/no)</td>
<td></td>
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<td>General Notes</td>
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*The stars indicate differences between the original and final version of the framework. Changes that are not marked include the elimination of breast size and role of female characters.
Appendix D
Genre Definitions

Simulation
“The simulation genre includes video games that simulate sports, flying and driving, and games that simulate the dynamics of towns, cities, and small communities” (Apperley, 2006). For example, Nintendo’s Animal Party simulates a small community, in which the player is a piñata farmer. In our study, we included sports simulations as a separate genre called sports.

Action Adventure
In an action game, a player must often “engage in extreme nontrivial actions in order to make the ergodic traversal” (Apperley, 2006). Essentially this means that the player must select certain correct inputs in order to complete an action, rather than selecting the desired action and having the computer complete it for the player. Another definition describes this as “A broad category of games oriented towards action and exploration, mostly in third-person perspective” (Ream, Elliot, & Dunlap, 2013).

Sports
Realistic simulations of sports.

Rhythm
“Music and dance themed games often involving a unique controller.” For example, Dance Dance Revolution Universe 3 involves the player stepping on a special pad controller in rhythm to a musical beat.
Party

Party games are developed for multiplayer game and simulate board or party games (MobyGames, 2014). These types of games often contain many smaller games of various genres for the players to compete in, such as the “mini-games” present in the board-game like Mario Party.

Racing

These games are a simulation of driving a race car around a track.

Fighting

These games simulate combat between one or more players, usually without weapons. For example, in Super Smash Brothers up to four opponents can fight each other using a series of buttons to activate different moves.
References


Foels, R., & Tomcho, T. J. (2009). Gender differences in interdependent self-construals: It's not the type of group, it's the way you see it. Self and Identity, 8(4), 396-417. doi:10.1080/15298860802391470


Vorderer (Eds.), Media entertainment: The psychology of its appeal (pp. 197-213). Mahwah, NJ: Lawrence Erlbaum.


Extended Annotated Bibliography


The authors of this study surveyed pre-adolescents. The survey asked about video game habits, and it confirmed that there is a big difference between boys and girls, even at a young age. The survey also reveals the favorite types of video games, broken down by age and gender.


Hamlen examines the role of feelings of success and time spent playing games. More specifically, the author investigated the endogenous relationship between success in game play and time spent playing video games, hypothesizing that success would increase playing time and vice-versa. One-hundred and eighteen fourth and fifth-grade students completed a self-reported survey that asked about the time they spend playing games, how good they believe they are at the game they play most often, and completing a creativity assessment. The results indicated that girls and boys feel equally as competent at video games when the endogenous relationship between time spent playing and how good they think they are is accounted for. Girls reported the same initial ability and confidence as boys, but they choose not to spend as much time playing video games as boys. In addition, boys reported greater feelings of reward related to success in games. There is also a discussion of what games the children most enjoyed playing. Boys like action, simulation, adventure, and educational games. Girls like simulation, action, educational, and adventure games.


The authors studied the types of video games preferred across gender and age groups. They used 14 game types: Imaginative (Strategy, Fantasy, and Adventure), Traditional (Arcade, Card/Dice, Quiz/Trivia, Board games, Puzzles), and Physical (Sports, Fighters, Shooters, and Racing/Speed). Among males, Physical games were favored, followed by Imaginative and then Traditional games; in contrast, females
favored Traditional games over Imaginative and Physical games, which followed in that order. Also showed men played more games than women, and the amount of play increases up until 8th grade.


This paper consists of four studies that apply a self-determination theory to motivations to play video games and their effect on the players’ well-beings. Results are discussed in terms of human motivation within virtual worlds.


Discussed the genre selection of video games, examining gender amongst other factors. The authors found gender differences were not statistically important when accounting for genre choices and motives for choosing them, although boys tend to use the internet for gaming more.


Game designers have argued that men and women prefer different kinds of video games because of evolution. This paper offers data from massively-multiplayer online (mmo) game playing females that suggest that it is not the gameplay, but the culture of that mmo’s that deters women from playing more heavily.


This article argues computer games are developed with boys in mind and that is why women do not use them, not because women cannot. The games do not align with women's goals, and the authors suggest that if they were designed differently women would be more interested in playing.

Examines what causes players to be loyal to certain games or types of games in terms of non-technical aspects. People tend to be less loyal to social online games, but more loyal to online games that have better gameplay.

More women are playing massively-multiplayer online role-playing games nowadays. The author explores why these women join a typical male environment. The study is thorough and focuses on understanding these women as a means to more a complex understanding of gender and computer games.


Discusses the positives of "predation play", where the player has to hunt and kill to survive, and how women do not play these sorts of games. The author describes the benefits of playing these games and comments that if women would play it could address other gender disparities in play. Encourage women to strive for positions of power and enjoy stressful challenges.


Developed a scale of 6 principle reasons why people play video games: Competition, Challenge, Social Interaction, Diversion, Fantasy, and Arousal. Lucas and Sherry wrote further articles studying how much men and women are motivated by each principle identified in this book.


Carr studies the gaming preferences of girls. She finds that there is a difference between what men and women like, but the author says that it is shortsighted to separate based on gender and it is mostly because of different, alterable tastes based certain attributes of the games that there are differences. The better access and the more familiar with certain attributes players are, the more likely they are to prefer the game, making it easy to see how certain games can fall into gendered lines.

Shu-Fang examines the moral justification of game characters and violence. Males and females demonstrate different patterns of enjoyment to different contextual features of the games. Shu-Fang makes a comparison of violent justified, violent unjustified, and nonviolent games. He found that men do not have significant difference of enjoyment between the three, but women do. Women still get as much enjoyment as men, but women do not identify with the male protagonist as well, and the feeling of guilt makes it further difficult to identify with characters. The author suggests men may be desensitized to violence in media which is why there is not a variation between violence.


The authors survey college students about their gaming habits. They found that more time spent playing games equate to a lower grade point average, depending on gender. There is also a negative association between violent games and school performance.


Ogletree and Drake examine college students and their gaming habits, looking specifically at gender differences and the effects of gaming on the player's well-being. Men play more video games than girls, and it interferes with both sleep habits and class. Women complain about their boyfriends spending too much time playing games. Everyone perceives female characters to be more helpless and sexual.


Jones studies video game usage in college students. All reported having played video games, 70% sometimes play, and 65% are regular gamers. Jones gathered good stats on relationships, and how gaming takes time away from family and studying.
Hayhoe, C., Leach, L. J., Turner, P. R., Bruin, M. J., & Lawrence, F. C. (2000). Differences in Spending Habits and Credit Use of College Students. *Journal Of Consumer Affairs, 34*(1), 113. The authors examine the different spending habits of men and women in college. Women spend more money on clothes; men spend more money on entertainment, electronics, and eating out.

Padilla-Walker, L. M., Nelson, L. J., Carroll, J. S., & Jensen, A. C. (2010). More Than a Just a Game: Video Game and Internet Use During Emerging Adulthood. *Journal Of Youth & Adolescence, 39*(2), 103-113. doi:10.1007/s10964-008-9390-8. Studied men and women in college and examined how video game usage affected risk behaviors, thoughts of self and relationships. A link between negative outcomes and video game playing was found, and there were mixed relationships between risk behaviors, thoughts of self, internet use, and effects on relationships. Significant differences in these categories were found for men and women.


Harris, M., Williams, R. (1985). Video Games and School Performance. *Education, Vol 105*(3), 306-309. Harris and Williams examine the relationship between video games and the school performance of the players. When examining motivations for play, they found that reasons for playing included excitement, being good at it, and having friends who play and these reasons for playing were related to age, sex, and amount of time and money spent on games. Time and money spent on game were positively correlated with each other, and negatively correlated with English grades.


The authors study the relationships between playing video games and the school performances behaviors of children. They found that a large amount of game play and
the playing of violent games lead to troublesome behavior and poor school performance. Gender was not a significant factor.


Kerr studies first female gamers perceptions of certain advertising of video games, then how the video games are used in the women’s daily adult lives. These gamers are largely invisible and play despite the strong masculinity of the gaming world.


The authors conducted interviews of adult female gamers of different gaming levels. The levels studied were high (power games), moderate, and those who never play. There are big differences between the women in terms of motivations to play games and perceptions of gamers.


The authors found that women actually play the highest amount of online games, but tend to underreport the amount that they actually play. The authors also found that women were not affected by advertising for games.


Kuznekoff and Rose prove that women online get harassed when using voice chat. Female voices receive three times more negative comments than male voices, and derogatory words directed at women’s gender are frequent.


Theories about gender differences have led to many misconceptions about women and gaming that are problematic. The article attempts to debunk myths about women gamers and encourages more realistic discussions of women gamers.

Jansz and Martis studied a selection of 12 video games and found equal dominant male and female characters. In addition to noting the characters’ genders, they also observed their races, noting that the characters were always exclusively white.


Lu studied the representation of women in the video game industry. He found that women are just as interested in game design as men, despite their smaller amount of exposure to video games. He suggests that reasons for women not joining the field could be because computer science is not taught in high school and credits don’t transfer into college, unlike other subjects.


Reisman found that computer use is encouraged for males more than females. Computers have been conformed to the status of human society, and women need to receive further training and encouragement to use computers.


Cruea and Park discuss perceptions men and women have about video games. Everyone believes that women play less and that they are not influenced by unrealistic images in video games. Women’s perceptions of video games were correct, while men’s perceptions were incorrect.


Shaw argues that those invested in increasing the diversity in video games must focus on constructing a medium, because targeting people as gamers does not make games non-games wish to play. The author argues for a shift in academic attention to not mark significant groups via identifiers.

Dill and Thill examine the perceptions of young people and the similarities between their perceptions and how the media depicts men and women. The media depicts female video game characters as ultra-sexualized, but not the male characters. The idea that women are sexual and non-aggressive while men are aggressive is a perception held by young gamers.


Hall studies gender and racial inequality in video games, claiming there are significant inequalities. Hall cites a faulty study that skews data to make it look like women cannot handle or do not like more intensive games, while Hall argues that in fact data shows the opposite. Additionally, he notes that there is a significant amount of racism in Japanese video games.


Lucas and Sherry focus on the interpersonal needs for inclusion, affection and control in terms of video gaming. Men and women have an equal desire for all of these factors. Yet, women play video games less frequently and are less motivated to play in social situations. Video games are considered in the "boy domain", and the authors reference gender-typical play and its consequences. Includes a list of video game types and their descriptions, what types of video games are liked by what gender are studies, and implications for game design are discussed.


Boys play more video games than girls, and boys play more sports games. The authors also note that the genders watch different types of television programs.


The authors conducted a study of 7,000 players of the massively multiplayer online game EverQuest 2. The survey asked about the players’ offline characteristics, their motivations and their physical and mental health.
Hartmann, T., and Klimmt, C. (2006). Gender and computer games: Exploring females' dislikes. *Journal of Computer-Mediated Communication, 11*(4), article 2. Hartmann and Klimmt surveyed women to determine reasons why they were not interested in playing video games. They found that games that demonstrated that lack of meaningful social interaction, followed by violent content and sexual gender role stereotyping of game characters were the most important reasons why females disliked the games. In a second study, an online survey revealed that female respondents were less attracted to competitive elements in video games, suggesting an explanation for gender-specific game preferences.

Thirunarayanan, M. O., Vilchez, M., Abreu, L., Ledesma, C., & Lopez, S. (2010). A survey of video game players in a public, urban research university. *Educational Media International, 47*(4), 311-327. The authors of this study surveyed an urban, mostly Hispanic college to determine in part gender differences amongst video game players. The differences between men and women were large and included differences in communication, decisions, leadership, collaboration, teamwork, and giving directions. All of these constructs were more favorably displayed by males.

Dickerman, C., Christensen, J., & Kerl-McClain, S. (2008). Big Breasts and Bad Guys: Depictions of Gender and Race in Video Games. *Journal Of Creativity In Mental Health, 3*(1), 20-29. doi:10.1080/15401380801995076 The authors reveal how obvious racial and gender stereotyping exists in video games. The authors discuss bringing awareness to this problem.

Beasley, B., & Collins Standley, T. (2002). Shirts vs. Skins: Clothing as an Indicator of Gender Role Stereotyping in Video Games. *Mass Communication & Society, 5*(3), 279-293. In this study of gender roles in video games, the authors found that male video game characters are more common than female characters. Also, female video game characters are more scantily clad.


In Pena and Hancock’s study, they compare texts sent in fighting video games and found that there is a more significant production of socioemotional content than task content. More experienced players produced more positive and fewer negative socioemotional messages than the less experienced.

In Yee’s 2006 study, he creates an empirical model of player motivations

The authors of this study examined video game players and their motivations for playing. They found that people who play frequently want to master the games and compete with others, and women who do not play frequently like competing with others but are not interested in mastering the game.

Jansz and Martens study who participates in local area network gaming events. Local area network (LAN) gaming events include almost exclusively men around 19.5 years. They play 2.5 hours a day. The players are motivated by social contact and the need to know more about games, as well as by competition ranked third.

Young girls have a higher cognitive load and competitive anxiety, but have the same acceptance of tech constructs and both boys and girls enjoyed the games the same with increase cognitive and competitive stress.

Olson examines motivations for gaming for middle school students, making comparison between boys and girls. The author found that girls are not as motivated to play with friends, yet other studies have shown that girls are more likely to have deeper personal relationships with friends they form in online video games.

Most video games include mostly male characters, as well as violence. Dietz examines how this impacts the identity of children. Specifically, the author observes women’s portrayal in games and violence against women and how it impacts children. Dietz discusses the formation of children’s identities and gendered play.


Children play violent games, and this study found that playing of violent games leads to more aggression as they get older. Japanese and Americans both had more aggressive games than other cultures, despite Japan being a low violence culture.


Smith’s study examines the presentation of violent content. The author found that mature games are likely to feature child perpetrators and also justify acts of repeated graphic gun violence. The findings are discussed in terms of risks interactive violence may be posing to youth.


The authors of this study interviewed the players of violent video games to determine how they disengage in order to perpetrate the violence. The realities of the games as well as competition were cited as reasons for the disengagement of players.


Hartmann and Vorderer conducted multiple experiments to examine moral disengagement and how it affects enjoyment of video game players. They found that familiarity with violence as well as a justified reason for the violence helped players to disengage and not feel guilty when committing violent acts. The research was confused as to whether moral disengagement increased or decreased enjoyment of the games.


This study examined how aligned the ESRB’s rating system is with people’s perceptions of video games. The study found that People rate violence much the same
as it tends to be rated by ratings boards with the exception of cartoon violence. Cartoon violence tends to be rated as less worrisome by the ESRB, but children and adults alike rate cartoon violence the same as realistic violence.

Sander’s study found that everyone has trouble identifying with villains in media, but men enjoy villains more. Women had more trouble identifying with male characters (female characters were not studied).

The authors study exposure to violent video game content for both long-term and short-term. They suggest that long-term exposure to violence desensitizes the user because the longer the user was exposed the more their empathy decreased. The authors also found that men have longer exposure to violent content, perhaps explaining their desensitization to violent content.

Jansz’s study proposes that young men enjoy violent video games because it allows them to experience different emotions in a safe way while they go through a confusing period of change in their lives. It is important and desirable for them that they can select dominant masculine traits (aggression), as well as experience nondominant masculine traits (fear).

Bartholow and Anderson examined the effects of short-term violent video game playing and aggression. They found that playing violent games for 10 minutes lead to an increase in aggression. Men had a greater increase in aggression than did women.

Anderson and Murphy studied to effects of playing violent video games on aggression. They found that playing violent video games produces a temporary increase in
aggression, and it is possible that playing a character of your own sex increases this aggression.

A large discussion of the literature available on video games. Video game culture and its relation to gender is the focus of the paper. Clothing, masculine culture, harassment, and other items are discussed. Has an excellent list of references.

Looks at how children respond to advertisements that are masculine of feminine. Found that as little girls get older they become more flexible with their gender roles.

Little girls and boys separate themselves based on gender. This study looks at if this is because of game preferences. Boys are more competitive than girls in their games, girls more cooperative

This study focuses on gender roles as they are being developed by children. It examines what children like based on what their parents give them and tell them to like. Both boys and girls like increasingly masculine toys as they grow older, but boys never like feminine toys.

A study on the cognitive differences between men and women’s processing of nonverbal cues and tasks. It found that women are better at reading nonverbal cues. This study concludes that women focus on local information processing styles (meaning they are more detail oriented). Men are better at global information processing styles, but local is overall a better method.

A study on the ability of men and women to learn grammar. It found that men and women learn artificial grammar differently, and this is probably because of cognitive factors.

This study surveyed the perceptions people have of cognitive stereotypes. It specifically looked at how accurate stereotypes of cognitive differences between men and women were. Found that they were accurate but that they underestimate the size of the cognitive differences.

This study examined the effects of video game play on spatial skills of boys and girls. Boys were originally better at spatial skills, but after girls played video game their spatial skills significantly improved. Girls had played video games less though, and those that played video games a lot (men) did not experience a big change in spatial skills. Spatial skills are gained through practice. Gender differences in spatial skills are identifiable by age of 10. Women have better hand-eye coordination. Some studies believe spatial skills are genetic, while others do not.

This study examines stereotypes and how different perceptions effect performance. When women are told that men are better than them at certain tests they perform worse on those tests. Men, on the other hand, do not show a difference in performance if they are told they are worse than women.

This study examines how men and women use spatial memory by having them attempt to find cars they parked in a parking lot. Men and women could all find their cars pretty well, men were better at estimating distance. Women focused on landmarks more than men did. Of the group 14% was really bad at finding their car, most of these were women.

This study examined scores on videogames and their correlations with spatial skills. The scores on the two videogames were found to be correlated with different spatial test scores. Significant sex and age differences were also found on several of the measures. The males scored higher than the females on spatial orientation, visualization, and the baseline measures on one of the videogames, while the females scored higher than the males on the test of eye-hand coordination. The age of the subjects was found to be negatively correlated with scores on the videogames and spatial test scores.


This study examined the effects of playing an action videogame on spatial skills. The study found that action game-play eliminated spatial differences between men and women. Women gained more spatial skills than men, and all gained more than control group who played a non-action game.


This study examined the effects of playing a video game on spatial skills. It found no difference between men and women in pre and post-test, and men and women both improved spatial abilities after playing video games (none in the study had played before).


This study examined the effects of playing Tetris on spatial skills and the differences between men and women. Playing Tetris improved spatial abilities of men and women. There was no difference between men and women’s skills except in complex mental rotation tasks.


This study examined the differences I spatial skills of those who play Tetris and those who o not. The study found that Tetris players are better than non-Tetris players at
mental rotation with Tetris blocks, but the same as non-Tetris at other mental rotation, indicating that spatial skills improvement is domain specific.

This study examined the effects of stress on the ability of women to use spatial navigational skills. Stress effects verbal memory and decision-making performance of males and females differently (other studies). His study shows that women's cognitive-map but not landmark map are effected by stress, neither of men's are effected.

This study examined navigational skills of men and women, which fall under the category of spatial skills. It found that men and women perform equally well in complex navigational tasks in real-world settings. They claim other studies that show a difference based on genetics are influence by experience, gendered patterns of activity, and inaccurate self-assessment.

Drew and Waters examined older men and women to see if playing video games could improve their motor skills. The authors had the participants play an arcade game for 2 months and found that their motor skills had significantly improved with training through games by the end of the study.

The authors of this study sought to determine if there were differences between men and women and sex roles in problem solving. The concluded that there is no difference between all categories of men, women and sex roles.

Johnson sought to determine if there was a difference, and how large of a difference if there I one, between men and women’s abilities to problem solve. Similar results as studies in the 50s showing men having superior problem solving abilities

Sherman argues that sex differences in intellectual abilities are attributable to the differences in spatial abilities, and research that shows intellectual differences are biased spatially.

Ethington and Wolfle examined sex differences in GRE scores. They found that men better at quantitative problems, but there was no difference between analytical skills of men and women.

The authors of this study sought to determine if intelligent women tend to stay single. They found that women believe that intelligent women are negatively affected by their intelligence. Men believed this of women as well but not as strongly as women themselves did.

The authors studied how children interpret gender roles. They found women based their roles on morality while boys used social conventions to define their roles.

Studies sexism to see if men or women or more sexist, but the authors found there is no difference in the genders. Instead, individual social attitudes and general motivated cognition determine how sexist a person is. So it is the individual, not the group.

The authors deem to understand why girls do not play physical games. Found that girls want to be "girly girls" and not mess up their hair, clothes, or nails. The study created games that would appeal to littler girly girls: including tag, volleyball tag and others.
Studies awareness of social acceptance of children. Boys were less accurately aware of same-sex acceptance, and girls negatively less accurate towards opposite-sex acceptance.

In this study, men and women were shown painful or erotic videos. Men's cognitive functions were impaired after watching the videos, while women's were not.

This study examined how men and women categorize groups of people. Men and women categorize groups differently, women are more accurate but men and women think of each other differently.