Running head: GIRLS PLAYING GAMES

Girls Playing Games: The Effect of Gender Stereotypes on Video Game Playing Motivation and Performance

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Abstract

Research on gender and video game playing has long been interested in the question of why females play fewer video games and play video games less frequently than males do. The present study examines the immediate impacts of a negative gender stereotype on females' motivation for and performance in playing a racing video game. Exposure to a negative gender stereotype about video game playing was expected to decrease competence beliefs and motivation to play the game, as well as worsened performance. Results were in the hypothesized directions, although no statistically significant differences were found. Implications for theories of video game playing and achievement motivation are discussed.

Girls Playing Games: The Effect of Gender Stereotypes on Video Game Playing Motivation and Performance

Published empirical research on sex differences[1] in video game playing over the last two decades consistently has found that males play video games more hours per week compared to females, more frequently than females do, and they are more likely to self-identify as video gamers (Buchman & Funk, 1996; Colley & Comber, 2003; Gentile, Lynch, Linder, & Walsh, 2004; Kubey & Larson, 1990; Ogletree & Drake, 2007; Phillips, Rolls, Rouse, & Griffiths, 1995; Roberts & Foehr, 2004; Roe & Muijs, 1998; Van Schie & Wiegman, 1997). These findings have been consistent across different countries and within different age groups.[2]

Numerous studies have established the fact that playing video games is considered masculine and is more popular among males than among females (Funk & Buchman, 1996a, 1996b; Hartmann & Klimmt, 2005, 2006; Newman, 2004), and the social construction of video game playing as a primarily male activity seems to persist (Williams, 2006). Gender roles, stereotypes, and the social construction of gender are likely to influence females' motivation to play video games. This representation of video game playing often is reinforced by video game content and game marketing aimed at adolescent and young adult males (Beasley & Standley, 2002; Dietz, 1998; Ivory, 2006). The belief that video game playing is a male activity may have implications for sex differences in video-game related competence beliefs and motivation to play. The present study focuses on a previously unexamined potential proximal cause for females' lower interest in video game play—negative stereotypes about female players.

The gender-typed nature of gaming is not a stereotype per se, although it may contribute to a stereotype that females are poorly skilled at playing video games, which can influence the

individual's ability beliefs and the subjective value of video game playing. Although scholars have suggested that gender role and gender role stereotypes about video game playing are likely to affect females' game playing (Brown, Hall, Holtzer, Brown, & Brown, 1997; Cassell & Jenkins, 1998), no known published research to date has examined how such stereotypes can affect motivation at the point of exposure. In comparison, a relatively abundant literature has focused on the effect of stereotype exposure on behavior and performance (Beilock, Jellison, Rydell, McConnell, & Carr, 2006; Inzlicht & Ben-Zeev, 2003; Marx & Stapel, 2006; J. L. Smith, 2004; Steele, 1997; Wheeler & Petty, 2001 and others).

This study examines whether a gender stereotype about video game playing affects the intrinsic motivation to play a commercial video game. Does exposure to a negative stereotype about women's skills at video game playing influence a female's motivation for playing a video game? How does stereotype exposure influence expectancies about video game playing? In terms of effects on behavior, does exposure to a negative stereotype about female video game playing harm actual performance in the game?

Theory

Attempts to explain females' lack of motivation to play games, relative to males, fall into three major categories of argument. The first suggests that something about the games themselves does not appeal to females, for reasons of nature, nurture, or some combination thereof. Video games' non-appeal may stem from the content—namely, that it includes generous amounts of violence and hypersexuality, or an insufficient supply of female main characters (Beasley & Standley, 2002; Dietz, 1998; Downs & Smith, 2005; Hartmann & Klimmt, 2006). Certain games' style—three-dimensional rotation, coloration, and lack of textures—may not

appeal to females and their particular set of cognitive skills (Lucas & Sherry, 2004; Subrahmanyam & Greenfield, 1994). Or perhaps it is games' structure, i.e., their competitive nature does not appeal to females, who are less competitively-oriented (Hartmann & Klimmt, 2006). A second explanation considers the environmental factors that may contribute to females not playing games. For example, video game equipment may not be available for use in girl-only households, video game systems may not be owned by their friends, or females may be less likely to find video game playing an effective way to socialize with their friends (Lucas & Sherry, 2004). A third type of argument points to social factors' contribution to females not playing games: namely, that video game playing is a male-typed domain (Cassell & Jenkins, 1998; Funk & Buchman, 1996a). Such arguments may point to the early history of computer gaming as the reason why games are associated with male computing culture (Kiesler, Sproull, & Eccles, 1985), and includes the claim that the culture of technology is gendered (Williams, 2006), or that the leisure spaces associated with gaming are male-typed overall (Bryce & Rutter, 2003; Gailey, 1993). Whereas the claims made regarding the first two arguments have been tested empirically, the influence of gender socialization, particularly gender roles and stereotypes on females' video game playing motivation, has received little observational attention.

Flow and Self Determination Theory

Two competence-based theories that have been useful for explaining the motivation to play games and pursue media entertainment more generally are Flow Theory (Czikszentmihalyi, 1990) and Self-Determination Theory (SDT) (Ryan & Deci, 2000). Although Czikszentmihalyi's (1990) concept of flow may be applied to traditional media use (Kubey & Czikszentmihalyi, 1990; Sherry, 2004), the theory seems particularly suited to explain the enjoyment of video game play

and has been applied as such (Choi & Kim, 2004; Kubey & Czikszentmihalyi, 1990; Sherry, 2004; Sweetster & Wyeth, 2005). Recently, Self-Determination Theory has also been applied to understand why users of media entertainment are motivated to do so (Vorderer, Steen, & Chan, 2006), and empirically tested regarding the enjoyment of video games (Ryan, Rigby, & Przybylski, 2006). These theories and their application to video game play are outlined below.

Ryan and Deci's (2000) Self-Determination Theory (SDT) posits that intrinsically motivating activities are so because they fulfill needs for competence, autonomy, and social integration. The types of activities that are intrinsically motivating, and thus fall within the scope of the theory, are those which feature novelty, challenge, or aesthetic value. The authors suggest that satisfaction of these needs through participation in intrinsically motivating activities relates not only to an immediate experience that is enjoyable, but healthy development and functioning, i.e., long term well-being (Ryan & Deci, 2000). Mini-theories within SDT focus on antecedents and outcomes of fulfillment of these needs, for example, Cognitive Evaluation Theory (CET), which examines how social environment and context promote or prevent a sense of autonomy or competence, and thus intrinsic motivation.

Ryan et al. (2006) tested the applicability of SDT and CET to video game playing with four studies looking at properties of video game environments and their associations with SDT needs and short term well-being outcomes. The authors assert that the satisfaction of immediate psychological needs (autonomy, competence, and where relevant, relatedness) provide the proximal psychological determinants of game play. The authors also suggest that "perceived competence is among the most important satisfactions provided by games, as they represent arenas in which a person can feel accomplishment and control" (p. 4).

Taken together, this body of research suggests that the development of skill and perceived competence promote positive media use experiences and motivation. Applied to video games, the research implies that a high level of perceived competence should be associated with a high level of enjoyment. This relationship suggests the first hypothesis:

> H1: Greater perceived game playing competence after play will be associated with greater video game playing enjoyment.

In addition, theories of planned behavior and expectancy-value theories in general suggest that expected competence motivates behavior and action (Elliot & Dweck, 2005). The following hypothesis follows from such theories and research:

> H2: Greater expected competence before playing a video game will be associated with greater motivation to play the video game.

Stereotypes and their effects on performance

What are stereotypes? The term, initially used to describe equipment used for print reproduction, was adapted for use in a social sense by the U.S. journalist Walter Lippman, who described stereotypes as "pictures in our heads" that are often resistant to change (Lippman, 1922, cf. Kunda, 1999). Allport (1979) described stereotypes as overgeneralized and oversimplified beliefs used to characterize a group of people. In recent psychological literatures of social cognition, stereotypes are usually viewed as cognitive structures that contain our knowledge, beliefs, and expectations about a social group (Kunda, 1999). These mental representations may be positive or negative, and comprise both abstract knowledge about a group and exemplars of group members. Thus broad attributes (e.g., women are irrational) and exemplars (my female

colleague, or a character in my favorite movie) influence stereotypic conceptions (Hamilton & Sherman, 1994). Note that stereotypes are often socially constructed within a particular time and culture, often through media characterizations of the stereotyped groups. For this reason, specific stereotypes about women that exist in one culture may not be present in another. The stereotype that Asians are good at math, for example, is prevalent in the U.S. but not in Canada (Shih, Pittinsky, & Ambady, 1999). Correspondingly, a culturally-specific stereotype will only directly affect individuals to the extent that he or she has developed awareness of the stereotype by growing up or living in that culture.

Gender stereotypes in video games

Video game content representations of male versus female characters in games may also influence gender stereotypes and females' willingness to play video games. Multiple content analysis studies examining representation of gender in video games have found that females are underrepresented and clothing-disadvantaged (Beasley & Standley, 2002; Dietz, 1998). Content analysis of online video game reviews reveals similar patterns (Ivory, 2006). A study by Downs and Smith (2005) examining gender portrayals in top selling video games found continued under-representation of female, compared to male, characters in the most popular console games. They also found that female video game characters were more likely to have unrealistic body images, be partially nude or wear sexually revealing clothing, and inappropriately attired (for the task at hand).

Applying social cognitive theory, the authors suggested one implication of the findings was that video games may reinforce unrealistic body proportions as ideal and adversely impact females' body images. However, relevant to our discussion here is the possibility that lack of

female representation in most video games would indirectly suggest that playing games is more of a male-appropriate domain. Highly sexualized and inappropriately clothed female characters can also lead to females' disinterest in playing video games or certain games by reinforcing the impression that the video game, and perhaps game playing in general, is an activity for males. Indeed, in a study by Hartmann and Klimmt (2006), the presence of a sexualized female gender role portrayal on a video game cover decreased female respondents' preference for the game, relative to the non-sexualized portrayal.

Effect of gender stereotypes on perceived competence

Gender-typing of domains may influence an individual's beliefs about abilities in competence-related (traditionally, achievement) contexts. Specifically, experimental studies manipulating various situational factors surrounding such contexts have found the most important factors to be (1) the specific domain of evaluation (2) whether or not clear performance feedback is given, and (3) the extent to which performance-related social comparison is anticipated (Lenney, 1977). The research cited with regard to domain specificity provides evidence that gender-typing of a specific activity influences females' estimates of their abilities prior to their engaging in the task. As might be expected, when experimenters manipulated an activity to be perceived as male-typed or female-typed, females' performance expectancies were lower or higher, respectively. Corbin and Nix (1979) also demonstrated that the self-confidence of females is equal to males for a task that is perceived as appropriate for females but not for tasks perceived to be a male activity. Insofar as sex differences in self-confidence and efficacy beliefs exist overall and with regard to video game playing, differences in attributions and self-confidence are likely to affect motivation via expectancies for success. Therefore Hypothesis 3 states:

H3: Female players exposed to a negative stereotype about females' video game playing abilities will have lower expected competence and lower intrinsic motivation for playing the video game.

Effects of stereotype activation

From a psychological perspective, there are a number of reasons why individuals in a stereotyped group may conform to existing stereotypes. Research on stereotype activation examines how stereotype salience can influence attitudes and behavior of perceivers and actors (i.e., of those considering a person of the stereotyped group or of the stereotyped individuals themselves). Activation of either positive and negative stereotypes can result in positive or negative behavioral and performance effects for the individual, regardless of whether or not he or she is a member of the stereotyped group (for a review, see Wheeler & Petty, 2001). Stereotype threat describes a specific phenomenon where a negative self-stereotype activation leads to performance detriments.

Stereotype threat

Stereotype threat is "the social-psychological threat that arises when one is in a situation or doing something for which a negative stereotype about one's group applies. This predicament threatens one with being negatively stereotyped, with being judged or treated stereotypically, or with the prospect of conforming to the stereotype" (Steele, 1997, p. 614). The theory of stereotype threat attempts to explain how the very existence of negative stereotypes in a society can contribute to their validation. The experience of stereotype threat does not require that individuals even believe the stereotype or think it applies to them. The level of threat experienced

depends on the person's identification with the stereotype relevant domain. Different groups experience different forms and degrees of stereotype threat because the stereotypes about them differ in content, in scope, and in the situations to which they apply regardless of personal belief in those stereotypes (Steele, 1997).

In perhaps the most well-known demonstration of stereotype threat, Steele & Aronson (1995) investigated the phenomenon experimentally. Black and White students at Stanford University taking a difficult verbal test were either told that the test was an assessment of intellectual ability (ability-diagnostic) or a laboratory problem-solving task unrelated to ability and thus to the stereotype about ability (ability-nondiagnostic). Controlling for students' initial verbal abilities, Black participants performed significantly worse than White participants in the diagnostic condition, but in the the nondiagnostic condition, the performance gap disappeared. Their second experiment demonstrated the effects of stereotype threat with a much more subtle manipulation—whether or not participants recorded their race on a demographic questionnaire just before taking the test, which was described as nondiagnostic. Identifying their ethnic background prior to taking the test, Black students for whom race was made salient suffered decreased performance.

Thus stereotype threat can hinder performance in stereotyped domains, e.g. women and math performance, elderly individuals and cognitive functioning, merely by making the negative stereotype salient. The above literature leads to the following hypothesis:

> H4: Female players exposed to a negative stereotype about females' video game playing abilities will perform worse compared to female players not exposed.

Method

The experiment consisted of a 2x2 between-subjects design with one measured factor (goal orientation) and one manipulated factor (stereotype condition). Only the results related to the stereotype exposure factor are discussed here. Matched random assignment was used to ensure that treatment (exposure to negative stereotype) and control conditions (no exposure to stereotype) had approximately equal composition of mastery and performance oriented individuals. Grouping along the goal orientation factor (mastery vs. performance) was based on a self-report pre-experimental questionnaire.

Participants

One hundred and thirty six participants were recruited from undergraduate-level classes at a private, American university to complete an online questionnaire about their video game playing background. Of the 134 participants who completed an introductory screening survey, 26 were male and 103 were female (5 declined to state). The majority of respondents were communication majors (76.9%), with only a handful majoring in other humanities or social science (7.5%), science (6%), or undeclared (6%). Survey respondents were asked whether or not they would be interested in participating in an experimental portion of the study, and volunteers provided an email address if they were interested in participating in the experiment.

All female respondents who indicated interest in participating in the experiment were sent an email invitation to schedule an appointment to visit the lab for the experimental portion of the study within the next two weeks. The email invitation directed participants to an online appointment scheduling page (at http://www.flashappointments.com), where they could sign up for an appointment that best fit their schedule.

Of the 69 female respondents invited to participate in the experiment, 60 came to the lab and were included in the experimental portion of the study. Race background of participants was: Asian (32.2%), Black or African American (6.8%), Native Hawaiian and Other Pacific Islander (1.7%), Some other Race (5.1%), White Alone (40.7%), Two or More Races (13.6%). Also, 6.8% were of Hispanic origin. Year in school was as follows: first year students (21.7%), second year students (33.3%), third year students (23.3%), and fourth year or above (21.7%).[3] Respondents who signed up to participate in the experiment were matched for achievement goal orientation, and randomly assigned to either the stereotype condition or the non-stereotype condition. Based on the background questionnaire, however, one participant in the performance orientation-stereotype group was overly familiar with the target game and removed from analyses. Experimental participants' video game playing background and demographic data are presented in Appendix B.

Target Game

Participants played Electronic Arts' *Burnout: Dominator* (2007) for the Playstation2 console. The game was a recently released, commercial, off-the-shelf racing video game, available to the general public. A racing video game was selected because racing games have broad appeal, and male and female college students rate the genre similarly in terms of enjoyment (Lucas & Sherry, 2004). Due to the simple and recognizable controls no pre-play training is necessary, although players were presented with both a poster and survey screen specifying game instructions and controls.

Measures

All questionnaires were administered by an online hypertext survey. Items within measures were presented in randomized order. Several questions in a background questionnaire assessed previous video game experience and estimated time use in an average week. The questionnaire asked about familiarity with various game genres and games, including the study's target game. Several demographic questions (year in school, major, sex, race) followed at the end.

A measure of Pre-Video Game Playing Motivation consisted of revised subscales from SDT's Intrinsic Motivation Inventory (IMI) ("Self-Determination Theory," 2007). The items were worded for use preceding the video game play to measure expected competence, expected enjoyment, effort, and value. The IMI is a multidimensional scale that measures participants' subjective experience at a target activity in laboratory experiments. The interest/enjoyment and perceived competence effort/importance, and value/usefulness subscales were modified to increase relevance to video game playing. Items have often been modified slightly to fit specific activities without affecting its reliability or validity. According to the scale's authors, the interest/enjoyment subscale is considered to be the self-report measure of intrinsic motivation. Participants also rate the items on a Likert-scale from 1 to 7 (1 = not at all true, 4 = somewhat true, 7 = very true). The IMI has strong support for its validity (McAuley, Duncan, & Tammen, 1987) and has been tested in a number of experiments on intrinsic motivation (e.g., Deci, Eghari, Patrick, & Leone, 1994; Plant & Ryan, 1985; Ryan, Koestner, & Deci, 1991). Examples of modified items include: "This will be a game I cannot play very well" and "I expect that this game will be fun to play."

Cronbach's alpha based on standardized items for the subscales was as follows: 7-item enjoyment subscale, $\alpha = .87$; 6-item competence subscale, $\alpha = .75$; 5-item effort subscale, $\alpha = .82$;

5-item value subscale, $\alpha = .86$). One item was dropped from the competence subscale to improve scale reliability, "I will be satisfied with my performance in this game." The new Cronbach's alpha for the 5-item competence subscale was $\alpha = .80$. Analysis of the subscales determined the measure to be of good reliablility.

The measure of game play performance consisted of four separate measures provided by the game at the end of the race: Finish Position, Time, Takedowns, and Crashes. Performance was self-reported. The experimenters compared an arbitrary 10% of subjects' self-report performance with data saved by the game and found no instances of misreporting. Given that participants would have reason to believe that their self reported data could be verified by the experimenter, it is likely that self-reported performance is a reasonable measure of actual video game playing performance.

Two items served as a manipulation check, with two additional items as distracters, which were not actually necessary because the manipulation check was placed at the end of the questionnaire. The treatment check items were: "I think most females will do pretty well at this game" and "I think playing this game will more difficult for females than for males."

Procedure

Prior to the lab experiment, participants were asked to fill out an online questionnaire about themselves—their video game playing background, their familiarity with various genres and games, their achievement goals with regards to video games, and some demographic information. The pre-study survey took approximately 5 to 8 minutes to complete.

The lab had four separate rooms, each equipped with a computer with a 17 inch LCD monitor and external speakers that was used for both completing the hypertext survey and playing the video game on the Playstation 2. Upon arriving at the lab, the participant was greeted by one of two male experimenters and led to a room. The experimenter gave a brief, scripted overview of procedures and showed the participant the LCD monitor controls. After the participants indicated that they did not have any questions, the experimenter told the participants where they would be sitting outside, and closed the door to the individual's lab station. The survey included an overview of procedures, an introduction to the study (including the stereotype manipulation for the treatment group), and a brief introduction to the game, which provided participants with instructions and controls for the game. The survey included instructions which directed participants on what to do throughout the experiment until its conclusion, in order to minimize experimenter effects following the brief introduction.

Matched for achievement goal orientation, half of the experiment participants were randomly assigned for exposure to the negative stereotype about video game playing (treatment condition) when they come into the lab. Similar to previous stereotype threat research (Aronson et al., 1999), participants in the stereotype condition were presented with a brief article that supported the existence of a given stereotype.

In accordance with the stereotype threat literature, which suggests that exposure to the stereotype at all (even a negative stereotype) could potentially prime the stereotype in subjects' minds, control participants received no message. The manipulation was implemented via the two hypertext surveys that were identical, aside from inclusion of the stereotype message (or not). The author of the study set up the survey in each experimental room and told the experimenter

each subject's room assignment only, so that the experimenters were blind to each subject's experimental stereotype condition.

Participants completed a questionnaire about their expectations regarding the video game they were about to play. This questionnaire was the *Pre-Video Game Playing Motivation* measure. After completing the first part of the questionnaire, the pre-play measures, the questionnaire instructed players to begin playing the video game and afterwards, to record their score on the sheet labeled "My Results". The intent was to emphasize the importance of achievement for this game. Players then competed in a race against computer opponents. The average time of game playing was approximately 6 minutes.

After the race, participants completed the second half of the survey, which included space for them to report their performance "My results", and post-play measures *Post-Video Game Playing Motivation* and the *Manipulation Check.* Self-reported results were used as performance measures in this survey. Although manipulation checks are typically presented immediately after the manipulation stimuli and prior to the recording of any dependent measures, for the purposes of this study, the manipulation check was presented at the end of the questionnaire to avoid inadvertently priming control group participants with gender stereotypes. Finally, before the participants left the lab, they were offered snacks and drinks.

Results

Group Equivalence

T-tests to examine whether the groups differed on any of the following variables found no statistically significant differences between groups ($p > .05$): years of game playing experience,

average number of hours playing video games per week, familiarity with racing video games, and familiarity with any of the previous games in the Burnout series. Therefore I considered the groups to be equivalent prior to the experimental manipulation.

Manipulation Check

To assess the success of the stereotype manipulation, I conducted two t-tests with stereotype condition (stereotype versus no-stereotype) as the between subjects variable with the two manipulation check items as dependent variables. The stereotype and no-stereotype conditions did not significantly differ for "I think playing this game will be more difficult for females than for males" $t(59) = .671$, $p = .25$. Similarly, there were no significant differences between conditions for the second manipulation check item, "I think most females will do pretty well at this game" $t(59) = -.159$, $p = .44$. Although the lack of difference for these items between the two conditions appears to indicate that the stereotype manipulation was not effective, the placement of the manipulation check after video game playing rather than immediately following the manipulation may have contributed to the lack of differences between groups on these measures. Specifically, the video game playing experience itself, rather than the stereotype presentation, may have had greater salience for subjects' responses. I revisit this issue in follow up analyses and the Discussion.

Data Analysis

Regression was used to assess the relationships between competence and motivation, as well as between competence and enjoyment (H1, H2). For H3 and H4, a 2 x 2 between-subjects analysis of variance was performed on three dependent variables: competence, expected

enjoyment, and performance. Independent variables were goal orientation (performance versus mastery) and stereotype condition (stereotype exposure vs. no stereotype). To address the issue of the unsuccessful treatment check, I report the results of additional ANOVA tests using a quasi-experimental "perceived stereotype" variable. This quasi-experimental variable was obtained through a median split of the two-item composite manipulation check.

As stated in Hypothesis 1, I expected that perceived game playing competence after play would be associated with greater video game playing enjoyment. A standard linear regression was performed between reported enjoyment as the dependent variable and perceived competence as the independent variable. One case was left out of the analysis due to missing data in the post-playing questionnaire.

Table 1 displays the correlations between the variables. Table 2 displays the unstandardized regression coefficients (B), the standardized regression coefficients (β), R2, and adjusted R2. R for regression was significantly different from zero, $F(1,57) = 34.62$, $p < .001$, with R2 at .38.[4] Thus interest/enjoyment was found to have a statistically significant positive association with perceived competence at playing the video game.

As stated in Hypothesis 2, expected competence prior to video game playing would be associated with greater motivation to play the video game. Table 1 displays the correlations between the variables. Table 2 displays the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β), R2, and adjusted R2. R for regression was significantly different from zero, $F(1,58) = 4.52$ $p = .04$). Thus anticipated interest/enjoyment was statistically significantly associated with expected competence.

Hypothesis 3 suggested a main effect of stereotype condition on competence and motivation, i.e., female players exposed to a negative stereotype about females' video game playing abilities would experience reduced expected competence and reduced intrinsic motivation compared to those who were not exposed to the stereotype. Females in the stereotype condition reported lower expected competence (M = 3.10, SD = .96) compared to females in the no-stereotype condition (M = 3.47, SD = .84), but the results of the ANOVA were not statistically significant $F(1, 58) = 2.18$, $p = .07$, $\eta^2_p = .04$ (a halved p-value is reported here and elsewhere when applicable because the hypothesis was directional). Similar to a one-tailed t-test, a directional F-test with an alpha level of .145 would be the equivalent of a non-directional F-test with an alpha level of .073 (Keppel, 1982, pp. 115-116)[5]. Similarly, females in the stereotype condition expected less interest/enjoyment (M = 4.34, SD = 1.22) from playing the video game compared to females in the no-stereotype condition (M = 4.81, SD = 1.27), though no statistically significant difference was found between the groups $F(1, 58) = 1.66$, $p = .10.$, $\eta^2_p = .03$. These results also do not support H3.

As mentioned previously, scores on the treatment check measure did not differ according to the experimentally manipulated stereotype and non-stereotype groups. Due to lack of statistically significant difference between the stereotype and non-stereotype groups on the treatment check, I conducted two additional ANOVA tests using a quasi-experimental perceived stereotype factor instead of the experimentally manipulated one. This factor was created through a median split of subjects' scores on the combined treatment check items (at 3.5), and it replaced the stereotype exposure factor. This second set of ANOVAs, which included the quasi-experimental stereotype factor (perceived stereotype), found no main effects of stereotype on either competence $F(1, 58) = .467$, $p = .25$, $\eta^2_p = .01$ or enjoyment $F(1, 58) = . 002$, $p = .48$, $\eta^2_p =$

.00. Also, no statistically significant interaction effects for goal orientation x perceived stereotype were found for either competence $F(1, 58) = .003$, $p = .48$, $\eta^2_p = .00$ or enjoyment $F(1, 58) = .054$, $p = .41$, $\eta^2_p = .00$. The initial experimental model accounted for greater variance in competence and enjoyment than the quasi-experimental one. Effect sizes are smaller using the quasi-experimental variable as well. Adjusted R2 for competence was .02 using the experimental stereotype variable, compared to -.03 using the quasi-experimental stereotype variable. The negative adjusted R2 that the quasi-experimental variable obtains indicates that the new model is worse than the mean at predicting competence scores. For enjoyment, adjusted R2 of the experimental model was .07, compared to .04 for the quasi-experimental one, indicating that the experimental model was a better predictor of both competence and enjoyment than the quasi-experimental one.

Two related but separate measures of video game performance in the game were tested—race completion time and best lap time (both were measured in seconds). Stereotype exposure was expected to lower game playing performance, i.e, increase the number of seconds taken to complete a lap or the race. Those in the stereotype condition performed slightly worse (i.e., took more time to finish) ($M = 361.45$, $SD = 94.10$) than those in the no-stereotype condition ($M = 348.57$, $SD = 99.78$), but the ANOVA results indicated no statistically significant main effect for stereotype condition $F(1, 58) = .355$, $p = .28$, $\eta^2_p = .01$. An analysis of best lap times produced similar results $F(1, 58) = .159$, $p = .35$, $\eta^2_p = .00$.

Discussion

The experimental findings demonstrated that competence predicts the motivation to play video games as well as the enjoyment derived from playing video games, and examined two factors that may influence that motivation—individual differences in achievement goals (mastery

versus performance), as well as the specific social situation (exposure to a negative stereotype about one's gender).

As hypothesized in H1 and H2, regression analysis found a positive and statistically significant relationship between perceived video game playing competence (how well a person thought they played) and enjoyment and interest in video game playing (remembered after the fact). This relationship between perceived competence and enjoyment has been established in other experimental research (Ryan et al., 2006), and indeed, approximately a third of experienced enjoyment can be attributed to perceived competence. The motivational aspects of anticipated competence, however, have not received as much attention in empirical research on video games. Regression analysis also found a statistically significant, positive association between expected competence (how well a person thinks they will do) and their intrinsic motivation to play the game (specifically, how much they think they will enjoy or be interested in playing). Nevertheless, expected competence only accounted for less than one tenth of the variance in anticipated enjoyment, which is much less impressive than the competence–enjoyment relationship post-play.

Nevertheless, after establishing the relationship between (expected or experienced) competence and (expected or experienced) motivation, 2 x 2 factorial ANOVA was used to test the effects of achievement orientation and exposure to a negative stereotype on competence, motivation, and performance.

The t-test that examined differences between the stereotype and no-stereotype groups did not find a statistically significant difference between the groups on the manipulation check measure. In order to avoid inadvertently priming the non-stereotype group with the negative stereotype about females' lack of video game playing abilities, the manipulation check was placed

at the end of the study, in a post-video game playing questionnaire. This was in contrast to a common approach, which is to place a treatment check as temporally close to the experimental manipulation as possible, when measured effects when may be strongest. However, doing so may increase the likelihood of a Type I error. In certain cases, exposure to the manipulation check, rather than the manipulation itself, may induce statistically significant experimental effects (Pedhazur & Schmelkin, 1991, pp. 262-264). Additionally, due to the fact that researchers have found that even the most subtle of experimental manipulations (e.g., whether or not one is asked to indicate one's race in a background questionnaire prior to taking a standardized test) can induce stereotype threat conditions, I decided not to risk potentially priming both stereotype and non-stereotype groups by placing a manipulation check prior to the dependent measures. Thus, following the lead of other experimental research in the area of stereotype threat, the manipulation check in the present study followed all of the dependent measures (Koenig & Eagly, 2005; J.L. Smith & White, 2002).

Although the treatment check questions were nearly identical to those successfully used by Koenig and Eagly (2005), the manipulation check did not obtain statistically significant difference between the treatment and control conditions in this study. It is possible that the manipulation check was not an appropriate measure for measuring the effectiveness of the manipulation. Also, the video game playing experience may have been too vivid, unavoidably influencing individual players' attitudes. An additional interpretation for the manipulation check's outcome is possible reactivity by the participants. Placing the manipulation check after measurement of the dependent variable carries the risk that participants may rationalize their perceptions of the manipulation for perhaps unintentional but self-serving psychological reasons (Pedhazur & Schmelkin, 1991, p. 263). In the case of the present study, it is possible that females

exposed to the negative stereotype felt a strong need to respond in a stereotype-defying manner by indicating beliefs contradictory to those that the stereotype presented.

Nevertheless two sets of ANOVAs were conducted and reported—one with the experimental groups as the Stereotype Exposure factor, and another with quasi-experimental groups (established using the treatment check measure) as the Stereotype Perceived factor. Based on the fact that the initial experimental model was able to account for more variance in the dependent measures than the quasi-experimental model, the remaining analyses were conducted using the experimental groups.

The effects of exposure to a negative stereotype were in the hypothesized direction, although the difference was not statistically significant. Females in the stereotype condition, exposed to a negative stereotype about female's video game playing abilities, were less motivated towards video game playing than those who were not exposed. Compared to those who were not exposed to a negative stereotype, females who were exposed expected that they would be less competent at playing the video game, and expected video game playing to be less enjoyable. This is in accordance with the existing theory on gender role stereotypes and their influence on perceived competence and motivation, although the relatively small sample size of the present study may not have been able to detect the effect.

The present study found no statistically significant differences in performance as a result of stereotype exposure. It is possible that for the females who participated in the present study, video game playing was not a domain that held sufficient importance for them. The effects of exposure to a negative self-stereotype appear to be especially detrimental to individuals who strongly identify with the stereotyped domain (for example, math ability for students majoring in the subject) (Aronson & Steele, 2005).

Conclusions

I began by asking how social factors impact females' video game playing motivation. Although various scholars have theorized socialization and gender stereotypes to be influential in drawing males towards and females away from participation in gender-typed activities (Brown et al., 1997; Cassell & Jenkins, 1998; Lucas & Sherry, 2004), studies that have examined game playing motivation from this perspective have examined the phenomenon only indirectly (Hartmann & Klimmt, 2006), such as with a cross-sectional survey approach (Funk & Buchman, 1996a).

The present study found experimental evidence that exposure to a negative gender stereotype that females are not as skilled at video game playing compared to males can decrease perceived competence and motivation to play the game. Although participants in this study were confronted with the negative stereotype only at one particular instance, the exposure was sufficient to decrease their motivation towards video game playing. Exposure to such stereotypes on a regular basis could lead females to internalize them over time, diminishing their interest and motivation in the stereotyped domain more permanently. If females are exposed to these stereotypes on a regular basis, they may be less interested in playing video games as a result.

Future research examining video game playing motivation from a competence perspective should examine the effect of genres that are differently gender-typed, and test additional experimental manipulations and conditions under which stereotype activation may occur. Even among a single genre, such as racing games, females may perceive one game as suitable for females to play (e.g., *Mario Kart Wii*) but perceive another game as more male-typed (e.g., *187 Ride or Die*) due to the game's style or marketing. Empirical evidence on the perception of how gender-typed particular genres or games does not yet exist; the closest-related information that

researchers have examined is gender preferences for certain genres and platforms, but that is a distant proxy. In addition, individual and situational factors, such as identification with video game playing, or whether or not the player is observable by others (male or female), may moderate the effects. Research indicates that mere presence of males in a domain in which women may face stereotype threat, without any direct references to the stereotype itself, is enough to lead to performance decrements for women (Sekaqueaptwa & Thompson, 2003). This implies that a teenage girl playing a console video game with her brother may experience situational threat, even if they are not in direct competition.

Overall, the study provided further evidence of the positive relationship between perceived competence and enjoyment, which is in line with recent findings that the experience of competence, together with those of relatedness and autonomy, plays a key role in explaining video game playing enjoyment (Ryan et al., 2006). Nevertheless, the data also indicated that competence expectations and intrinsic motivation are intertwined, much like perceptions of competence and enjoyment. Thus it seems suitable to approach video game playing motivation from a competence perspective and attempt to apply theory and knowledge from the competence motivation domain.

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Footnotes

[1] Following the use of terminology set by Deaux (1985), throughout this paper sex is used to refer to the biological categories of male and female. Use of the term gender refers to socially constructed features frequently associated with these biological states.

[2] The Entertainment Software Association's most recent *Essential Facts About the Video and Computer Gaming Industry* claims that a relatively high percentage (40%) of game players are female compared to the rest (60%), who are male (ESA, 2008). Compared to the 2005 report, the 2006 report indicated a slight decline in the percentage of female players, relative to male players (43% of players were female in 2005; 38% of players were female in 2006) (ESA, 2005, 2006). However, that these reports may inflate the actual percentage of female game players, since the report does not disclose its methodology, and the organization has a vested interest in representing the appeal of video games as widespread, i.e., for men, women, girls, and boys, young and old (Newman, 2004).

[3] Unfortunately, age was left off of the survey instrument, so the exact ages of participants is not known.

[4] Confidence intervals for R2 were calculated using R2 software Version 1.1 (Steiger & Fouladi, 1993).

[5] The F-test is a one-tailed test because it is derived from sums of squares, which are inherently non-directional. When employing directional hypotheses, any effect in the direction opposite that of the predicted one must be interpreted as a chance result (Rutherford, 2001, p. 16-17). The author found precedent for and discussion regarding theory-based use of a directional (sometimes referred to as a half-tailed test) in Keppel (1982), Hersen, Michelson, & Bellack (1984), Bittner,

Winn, Bittner, & Lundy et al.(2004), Yeung & Wyer (2004), Papamarcos, Latshaw, & Watson (2007) and Weinberg & Abramowitz (2008).

Tables

Table 1. Correlation Coefficients for Competence and Motivation Variables

Variable	Perceived Competence	Experienced Enjoyment	Expected Competence	Anticipated Enjoyment
Perceived Competence				
Experienced Enjoyment	.62**			
Expected Competence	.51**	.21		
Anticipated Enjoyment	.29*	.72**	.27*	

* $p < .05$ (1-tailed)
** $p < .01$ (1-tailed)

Table 2. Standard Linear Regression of Competence and Motivation Variables

	Experienced Enjoyment	B	β	R^2	R^2 (Adj.)
Perceived Competence	.62**	.78	.61	.38**	.37
	Anticipated Enjoyment	B	β	R^2	R^2 (Adj.)
Expected Competence	.22*	.37	.27	.07*	.06

* $p < .05$
** $p < .01$