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Challenging the Other:
Exploring the Role of Opponent Gender
in Digital Game Competition for Female Players

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Abstract

The present study investigated the effect of opponent gender on the game experience of female players. Concretely, it looked into skill perception and player emotions of women in same gender and cross-gender game competition. We set up a $2 \times 2 \times 2$ (male vs. female opponent $\times$ low vs. high competitive women $\times$ lost vs. won game) experimental design in which women were instructed to play against a proclaimed male and female competitor. Unknowingly, however, participants played against an AI, which was configured to produce a winning and a losing condition for each opponent by manipulating difficulty. Results indicated that opponent gender only had an effect on perceived stress, which was higher with male opponents. Moreover, players evaluated their own gaming skills as lower and the skills of presumed male opponents as higher when they thought they were playing against men. Importantly, our results also showed that the above described pattern for self-perceived skills and perceived opponent skills was modulated by trait competitiveness with a larger effect size for low competitive women. Overall, this study illustrates that gender dynamics affect the play experience of women in cross-gender gaming competition. Implications and suggestions for future research are discussed.

Introduction

IN THE PAST DECADES, digital gaming has become a mainstream pastime, playing an ever more important role in the lives of a growing variety of both men and women.[1] The growth of the female gamer segment has been impeded, however, by the persistent view that games are predominantly "male territory."[2–4] Scholarly research has tried to explain this gender bias by raising questions about popular themes,[5,6] female avatar representation,[7,8] and gaming access for women.[9,10] Related to this, a fourth possible explanation for the limited female presence in the gaming space is reluctance to engage in cross-gender competition due to cultural norms of gender division.[11]

The social cognitive theory (SCT) of gender development and differentiation[12] explains gender-linked conduct in terms of a triadic reciprocal causation in which interactions occur between environmental forces, personal factors, and behavior. Much of what is acquired in this dynamic process takes place through social modeling referring to observational learning of gender-linked behavior.[12,13] Next to parents and peers, media hold a central position in providing symbolic models of gendered roles and conduct.[12,14] It is argued that digital games in particular tend to promote traditional gender ideals, for instance, by underrepresenting women and diffusing sexualized images.[7,8,15] Besides providing role models, gaming itself concerns a gendered leisure activity. Unlike many other media, such as television or radio, playing games is a behavior that is typically associated with males.[16–18] This is not surprising, as history shows how men were continuously favored by the game industry and thus steadily grew as its core audience.[19,20] Furthermore, female players, especially those of games perceived as masculine, are reported to encounter harassments as a result of their mismatch with socially acceptable feminine roles.[21–24] This becomes particularly apparent when women are overtly competing against male players as "cross-gender challenges call into question the whole social order."[11(p476)] This is further corroborated by research into tournament entry, showing that women are more reluctant than men to enter cross-gender competitive environments.[25,26] In other words, it seems that gender dynamics thwart competition between men and women in game contexts. Whereas previous research showed that females experience more aggressive thoughts when playing against males,[27] no empirical study has looked into the effects of cross-gender competition on the broader game experience of female players. The present article aims to fill this gap and thus further our understanding

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of the role of gender differences in game play. Concretely, we propose the following research question:

> **RQ: How does opponent gender affect the game experience of female players?**

Beliefs about one's capabilities play a major role in competition. According to SCT, people's expected outcomes function as a motivating source to execute certain behavior. To reach certain outcomes successfully, behavior should be supported by a sense of self-efficacy, that is, one's perceived capability and skills to produce an attainment.[28] However, self-efficacy is susceptible to gender stereotyping, as it diminishes judgments about personal abilities.[12] The theory of stereotype threat[29] explains the mechanism underlying this process by stating that the psychological threat to confirm a negative stereotype about one's social category undermines performance expectations.[29–32] This identity threat is most likely to occur in competitive environments[33,34] such as in mediated contests.[35] Given that female gamers take a marginalized position in a male dominated environment,[16] this may lead to lower self-confidence when competing against male opponents. Low self-efficacy can function as a barrier to competition, motivating women to play solitarily,[36] adopt more acceptable gaming roles such as caregiver,[37] or even avoid playing games altogether.[11]

According to stereotype threat theory, performing in a domain in which one is stereotyped evokes negative emotional or arousal-based reactions.[38–41] Positive emotions are crucial in the determination of future behavior,[42] however, for example for playing games. Poels et al.,[43] for instance, found that positive emotions such as pleasure and arousal are predictive for future play. Moreover, competition has been found to influence emotional responses to digital games.[27,44] Given that social competition involves social evaluative elements,[44] it is plausible that "every evaluation…leads to an *emotional state* (enjoyment, stress, frustration) that differs in accordance to how the 'status quo' is perceived."[45(p4)] Thus, if female players experience stereotype threat, cross-gender gaming competition may evoke lower positive emotional responses than same gender competition. Hence, we propose the following hypotheses:

> **H1: In cross-gender competition, female players will experience more challenge and estimate their skill as lower than in same gender competition.**

> **H2: In cross-gender competition, female players will experience higher arousal and negative affect than in same gender competition.**

Trait competitiveness can serve as a buffer against the negative effects of threatening situations.[46] It could be, for example, that high competitive people reappraise the situation as a challenge, while low competitive people are more concerned with the threat.[29,46] This is in line with research findings regarding sports performance, which demonstrate that athletes with high competitive anxiety have a disposition to worry more about situational threats.[47–49] Thus, it is possible that competition-oriented women are less prone to gender dynamics in cross-gender tournaments. The current study looks into this claim and explores whether competitiveness has a moderating effect on emotions and perceived skill in cross-gender game play.

Method

Participants

Participants were recruited via e-mail and flyers distributed on the University campus (Ghent University, Ghent, Belgium). Forty-nine female college students participated in the experiment. Given that the subjects had to win and lose against a proclaimed male and female opponent, three participants were excluded due to a failed winning condition, and seven were removed because of suspicions regarding the experimental setup. Thirty-nine participants were retained ($M_{age} = 24.33$, $SD = 4.92$, min $= 20$, max $= 49$), of whom 13% indicated that they never played games, 33% played at least once a year, 28% played monthly, 13% played weekly, and 13% played daily.

Design

A $2 \times 2 \times 2$ (competitiveness: high vs. low $\times$ opponent: male vs. female $\times$ outcome: win vs. lose) mixed analysis of variance (ANOVA) design was used to examine the effect of cross-gender competition in game play. The between-subjects factor was trait competitiveness and the within-subjects factors were opponent gender and game outcome.

Measures

Competitiveness. We measured trait competitiveness to investigate its moderating effect on emotions and perceived skill using the Revised Competiveness Index, a structured personality instrument consisting of 14 five-point Likert items.[50]

Subjective measures. To test whether emotional responses were modulated by the cross-gender manipulation, participants filled out the 9-point Self-Assessment Manikin (SAM) of Lang[51] after each play session. This visual self-report scale directly measures people's affective reaction to a certain stimulus in terms of pleasure, arousal, and dominance.[52] Additionally, similar to Mastro et al.,[53] subjective levels of stress and frustration were measured by two items ranging from 0 = "not at all" to 10 = "extremely." To assess skill and perceived challenge, 4-item Likert scales from Novak et al.[54] were used, which ranged from 1 = "strongly disagree" to 9 = "strongly agree." Moreover, participants rated their opponents' skills on a 10-point scale from 0 = "very bad" to 10 = "very good" after each session.

Objective measures. Objective performance, which was recorded using an automatic logging system built into the game, was measured with a total of three parameters of in-game behavior: playing time, player's score in losing condition, and the AI's score in the winning condition.

Procedure

We adapted a three-dimensional (seemingly) multiplayer version of the game *Pong*[55] (see Fig. 1) in collaboration with GriN Multimedia. In contrast to previous studies on cross-gender competition,[27] we opted for a gender neutral and nonviolent game to exclude potential influence from stereotypical male-oriented themes.[56]

Participants were welcomed and introduced to a male and a female opponent before being escorted to a separate room. There they were asked to compete in four rounds of *Pong*,
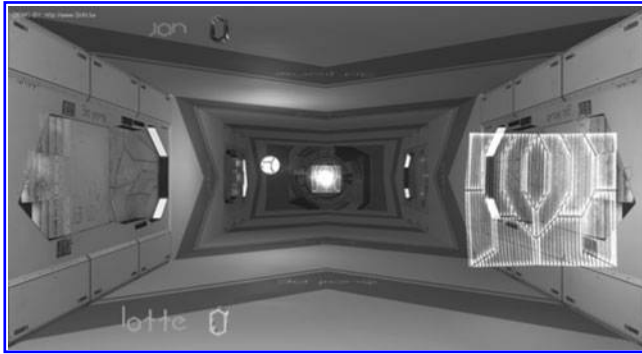
FIG. 1. Screenshot of the *Pong* game developed by GriN Multimedia.

two against each opponent. In reality, the opponents were confederates, and the test person played against an AI configured to produce a winning and a losing condition for each opponent by manipulating difficulty. Before each play session, a screen was shown with the name of the opponent for 15–30 seconds. Opponent order was randomized. As a manipulation check, we asked participants to recall the name of their opponent correctly after each play session. These answers were compared afterwards with the game's log files, which indicated that no participant had reported an incorrect name. After each session, participants had to fill out a questionnaire about their emotions while playing, their perceived skill, and game aesthetics (i.e., cover questions).

Results

Scale validity

The trait competitiveness scale had high reliability ($\alpha = 0.87$). The mean score for the total sample was 44.69 ($SD = 7.82$). Categorization of participants into low ($n = 19$) and high ($n = 20$) competitive women was based on a median split ($Mdn = 47$, range = 32). No significant differences were found between groups for gaming frequency, $t(37) = -1.29$, $p = 0.204$, and expected chance of winning, $t(37) = 1.30$, $p = 0.200$.

Descriptive statistics

Table 1 reports the main descriptive statistics for the opponent gender conditions and the subjective dependent variables used in this study. Overall, Table 1 illustrates that game outcome was an important determinant for all dependent measures.

Analysis

SAM scale. Using the SAM scale,[51] we looked into the self-reported player emotions of pleasure, arousal, and dominance. As shown in Table 2, there was no effect of opponent gender or trait competitiveness on these emotional responses. Game outcome, however, had an effect on pleasure, $F(1, 37) = 71.33$, $p < 0.001$, $r = 0.81$, and dominance, $F(1, 37) = 54.08$, $p < 0.001$, $r = 0.77$. Concretely, winning invoked more feelings of pleasure ($M = 7.36$ vs. $M = 4.78$) and dominance ($M = 6.19$ vs. $M = 3.67$) than losing. Significant differences in arousal were absent for all conditions.

TABLE 1. DESCRIPTIVE STATISTICS FOR DEPENDENT VARIABLES ON ALL EXPERIMENTAL CONDITIONS

	Gender opponent			
	Cross-gender competition		Same gender competition	
	Lost trial	Won trial	Lost trial	Won trial
Pleasure				
Mean (*SD*)	4.72 (1.99)	7.51 (0.91)	4.82 (1.90)	7.21 (1.08)
Min/max	1/8	5/9	1/8	5/9
Arousal				
Mean (*SD*)	5.85 (1.65)	5.56 (2.01)	6.05 (1.50)	5.36 (1.97)
Min/max	2/9	1/9	3/9	1/9
Dominance				
Mean (*SD*)	3.74 (1.73)	6.23 (1.50)	3.59 (1.70)	6.15 (1.69)
Min/max	1/8	2/9	1/8	2/9
Frustration				
Mean (*SD*)	4.85 (2.54)	1.87 (1.84)	4.43 (2.62)	1.90 (1.74)
Min/max	0/10	0/6	0/9	0/5
Stress				
Mean (*SD*)	5.15 (2.63)	3.51 (2.73)	4.13 (2.71)	3.31 (2.83)
Min/max	0/9	0/9	0/9	0/9
Challenge				
Mean (*SD*)	5.60 (1.63)	4.65 (1.57)	5.35 (1.44)	4.58 (1.60)
Min/max	2.50/9	1.75/9	3/8.75	1.75/9
Perceived player skill				
Mean (*SD*)	2.97 (1.17)	5.99 (1.23)	3.05 (1.09)	6.13 (1.05)
Min/max	1/7	2.25/9	1.50/6	3.50/9
Perceived opponent skill				
Mean (*SD*)	8.23 (1.04)	5.85 (1.57)	7.90 (1.19)	5.56 (1.54)
Min/max	6/10	3/9	6/10	1/9

TABLE 2. MIXED ANOVA RESULTS (*F* VALUES) FOR GENDER OPPONENT, GROUP COMPETITIVENESS
(LOW VS. HIGH), AND GAME OUTCOME (LOSING VS. WINNING)

| | *Dependent variables* | | | | | | | |
	Pleasure	*Arousal*	*Dominance*	*Frustration*	*Stress*	*Challenge*	*Perceived skill*	*Perceived opponent skill*
Gender opponent	0.32	0.001	0.47	0.73	6.76*	1.39	0.78	5.02*
Game outcome	71.33**	3.14	54.08**	108.12**	22.62**	13.67**	398.47**	109.32**
Gender opponent × competitiveness	0.09	1.14	0.06	0.73	1.55	0.05	4.52*	4.26*
Game outcome × competitiveness	3.56	0.05	0.20	2.34	0.05	0.48	0.04	0.09
Gender opponent × outcome	1.55	1.80	0.06	1.69	3.76	0.56	0.07	0.03
Three-way interaction	1.55	0.22	0.01	1.01	0.01	1.33	0.52	2.64

*$p < 0.05$; **$p < 0.001$.
ANOVA, analysis of variance.

Perceived frustration and stress. Table 2 demonstrates a significant main effect of opponent gender on stress, $F(1, 37) = 6.76$, $p = 0.01$, $r = 0.15$, showing that participants perceived more stress when competing against male ($M = 4.32$) than female opponents ($M = 3.69$). There was also a main effect of game outcome, $F(1, 37) = 22.62$, $p < 0.001$, $r = 0.62$, indicating that players felt more stress when losing ($M = 4.62$) than when winning a contest ($M = 3.39$).

Moreover, ANOVA revealed a significant main effect of game outcome on frustration, $F(1, 37) = 108.12$, $p < 0.001$, $r = 0.86$. Players felt more frustrated when losing ($M = 4.62$) than when winning a game round ($M = 1.88$). No other significant differences were found in frustration levels.

Challenge. Our results revealed a significant main effect of outcome on perceived challenge, $F(1, 37) = 13.67$, $p < 0.001$, $r = 0.52$, showing that players experienced more challenge in losing ($M = 5.48$) than in winning conditions ($M = 4.61$).

Skill. For perceived skill, a significant main effect of game outcome was found, $F(1, 37) = 398.47$, $p < 0.001$, $r = 0.96$, suggesting that participants perceived their own skill as lower when losing ($M = 3.01$) compared to when winning ($M = 6.06$). However, there was a significant interaction between opponent gender and trait competitiveness, $F(1, 37) = 4.52$, $p = 0.04$, $r = 0.33$ (see Fig. 2). Pairwise comparisons, using Fisher's least significant difference (LSD) test, revealed that low competitive women evaluated their skills significantly lower in cross-gender conditions than in same gender conditions ($p = 0.04$). However, when controlling for alpha inflation, a Tukey honestly significant different (HSD) follow-up test showed no significant differences between pairs. For perceived opponent skill, a significant main effect of outcome, $F(1, 37) = 109.32$, $p < 0.001$, $r = 0.86$, demonstrated that participants perceived the skills of opponents higher in losing conditions ($M = 8.06$) compared to winning conditions ($M = 5.70$). There was also a main effect of opponent gender, $F(1, 37) = 5.02$, $p = 0.03$, $r = 0.35$, showing that gaming skill of male competitors ($M = 7.04$) are perceived higher than those of female competitors ($M = 6.72$). However, results revealed a significant interaction between opponent gender and competitiveness trait, $F(1, 37) = 4.26$, $p = 0.04$, $r = 0.32$ (see Fig. 3). Post hoc comparisons indicated that low competitive women gave significantly higher ratings

to male ($M = 7$ vs. $M = 6.39$) than to female competitors (LSD test: $p < 0.01$ vs. HSD test: $p = 0.02$).

Objective measures. The ANOVA yielded a main effect of outcome on playing time, $F(1, 36) = 157.17$, $p < 0.001$, $r = 0.90$, showing a smaller duration for losing ($M = 81.61$ seconds) than for winning conditions ($M = 128.87$ seconds). No other significant effects were found.

Furthermore, we subtracted AI's scores from player's scores, resulting in a total performance score of the cross-gender and same gender condition. Given that we manipulated winning and losing, the variable outcome was excluded from the analysis. We therefore conducted a 2 × 2 (opponent gender: female vs. male × low vs. high competitive women) ANOVA, which revealed no significant effects. However, there was a marginally significant interaction between
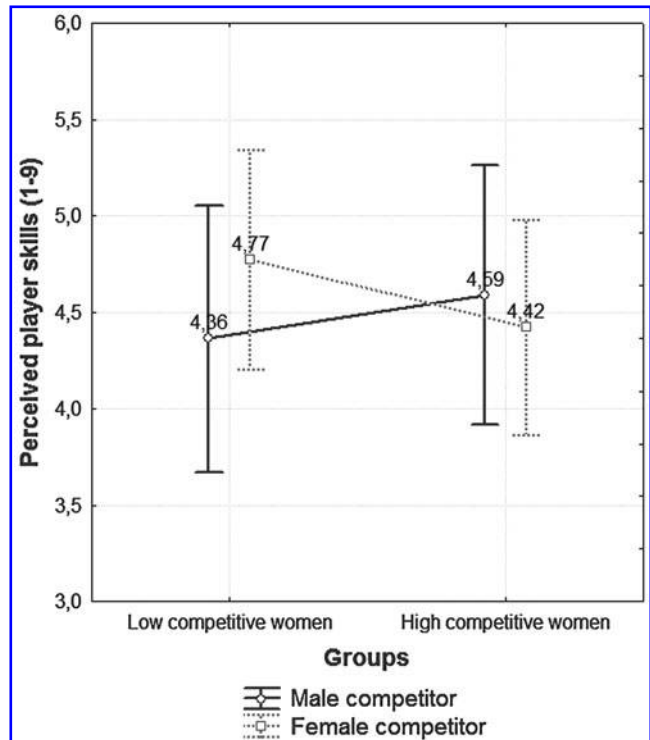

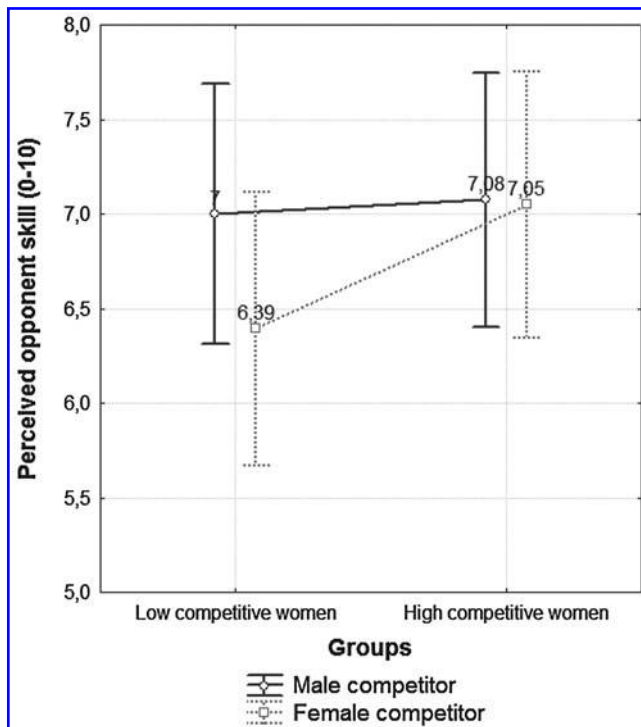**FIG. 2.** Interaction between opponent gender and trait competitiveness on perceived player skill.

FIG. 3. Interaction between opponent gender and trait competitiveness on perceived opponent skill.

competitiveness and opponent gender, $F(1, 36) = 3.07$, $p = 0.089$, $r = 0.28$. Figure 4 depicts a reversed pattern in which low competitive women performed better in same gender conditions compared to high competitive women who scored better in cross-gender conditions.
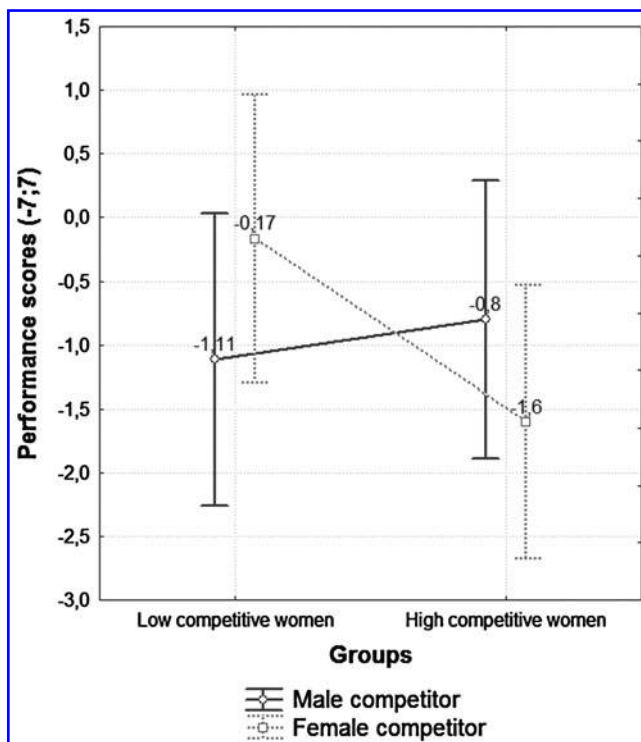

FIG. 4. Marginally significant interaction between opponent gender and trait competitiveness on performance scores.

Discussion and Conclusion

This study is one of the first to use an experimental approach to investigate how opponent gender affects the game experience of female players. In doing so, we looked at the effect of cross-gender competition versus same gender competition on player emotions and skill perceptions, when controlling for the game outcome (winning vs. losing). Although all variable scores (except for arousal) were dependent on game outcome, we were able to distinguish some distinctive opponent gender effects. Specifically, the present study provides novel evidence showing that perceived skill and stress level of (low competitive) female players are influenced by opponent gender in a gaming competition.

Hypothesis 1 stated that women would feel more challenged and perceive their gaming skills as lower in cross-gender competition. Whereas no effect was found for challenge, perceived player's skill was influenced by opponent gender and trait competitiveness. Specifically, we found that low competitive women rated their own skills lower in case of playing against men instead of women. Given that AI difficulty was equal in the cross-gender and same gender conditions, this finding suggests that low competitive women tend to assess their gaming skills incorrectly when playing against men. This result should be interpreted with caution, however, given that the effect was not significant when using a more conservative post hoc test, possibly due to the small sample size. Nonetheless, we found a similar pattern for perceived opponent skill. Besides a main effect of opponent gender, our analysis indicated an interaction between trait competitiveness and opponent gender. Low competitive women were found to perceive the skills of male competitors as higher than that of female competitors, which is in line with our previous finding. In other words, even when controlling for outcome, low competitive women seem to take gender as a criterion for gaming ability. These findings are in line with Bussey and Bandura's[12] claim that gender dynamics diminish judgments about personal abilities within a gaming context. However, opponent's gender did not affect the judgments of high competitive women. This is not surprising, as more competitive people are less reluctant to enter tournaments[45] and thus may be less prone to restrictive gender dynamics. While high competitive women may interpret gaming competition as a motivating challenge, low competitive women might perceive it as a threat affecting their sense of confidence.[29]

Hypothesis 2 stated that cross-gender competition would elicit more negative feelings in women. This was only partially supported, as opponent gender did not affect pleasure, dominance, or frustration. However, we did find that stress levels were influenced by opponent gender, indicating that participants felt more stress when playing against male than when playing against female competitors. This finding is not unexpected, as the literature has shown that stereotype threat can be a source of stress.[57,58] When female players in cross-gender competition experience social identity threat, emotional strain can occur.

Additionally, we investigated the effect of opponent gender on objective game performance. Whereas there was a slight indication that low competitive women played better against female opponents than high competitive women, no notable differences were found in the players' performance. An explanation could be that the used objective measures were not sensitive enough for detecting differences in

performance across the different conditions. Future research should therefore administer a more fine-grained method.

Another concern relates to ecological validity. Using a laboratory-based research method, the present study set up an artificial context in which participants were instructed to play a game against someone they did not know beforehand. Future studies should investigate cross-gender situations in more natural and/or different social gaming contexts. For instance, some online games offer the opportunity of hiding one's offline gender behind an avatar whose gender may or may not correspond with the player's gender. Further research could investigate whether women playing anonymously with male characters feel less threatened by their opponent. Moreover, there exists a whole spectrum of game genres affording different game playing strategies.[59] Future studies could further examine female players' experiences in collaborative rather than competitive situations.

Despite these limitations, however, the present study provides novel insights into female game play and how this is affected by cross-gender competition. Not only do games as gender-linked tools hinder women to adopt gaming technology,[7,19] women also seem to "perform gender"[60,61] during game play itself. Regardless of game outcome, they are likely to take their own and others' gender as a sign of gaming ability. Stereotype threat theory offers an explanation for this behavior, framing it as an artifact caused by the threat of confirming a negative stereotype as a self-characterization.[29] In a broader sense, this threat can eventually lead women to disidentify with the playing field.[62] Since games are a gateway to computer literacy,[63] women are therefore placed in a disadvantaged position in today's information society. Providing insight into how gaming culture hinders female participation may therefore serve to understand gendered patterns of skill perception better in other fields such as the Internet and computer studies.

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