

Girls getting played: Video game stereotype effects on gendered career perceptions

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Abstract

The continued desire for more graduates in science, technology, engineering, and mathematical (STEM) fields has resulted in a number of educators proclaiming video games as the next step in motivating students towards these careers. While the popularity of games with children lead many to believe that games may be the key to driving girls toward STEM careers, the negativity surrounding the “girl gamer” stereotype may actually continue to drive females away. The present study investigates the effect of stereotype threat on female video game players and how this effect impacts the perception of gender and overall appeal towards both gaming and STEM fields of study. A 2 (gender of opponent: male or female) x 2 (article type: stereotype threat or non-threatening) experiment found that game-related stereotype threat caused participants to rate STEM careers as more suitable for males but actually did show an increase in the appeal of certain STEM careers such as Computer Science. These results suggest a connection between perceptions of gender in video games and STEM which must be understood and addressed in regards to motivating more females toward STEM careers.

Extended Abstract

The continued desire for more graduates in science, technology, engineering, and mathematical (STEM) fields has resulted in a number of educators proclaiming video games as the next step in motivating students towards these careers (Clark & Ernst, 2009; Mayo, 2009). Alongside the use of games in the classroom, a number of game development competitions for students, such as the National STEM Videogame Challenge, were created to promote game design and development in an attempt to foster more interest in technical fields. A 2011 survey of college students majoring in STEM careers found that the number one factor for early interest in STEM careers reported by males was gaming (61%) while only 29% of females selected the same response (Harris Interactive, 2011). Although a number of organizations stated their belief that games could also be the catalyst needed to raise interest for younger girls in STEM fields (e.g., AAUW, 2000; Collete, 2013), the female presence within STEM and games are very similar.

Throughout the history of STEM fields and video games, both have been predominately categorized as a male-dominated field of interest. Research into the gender divide in STEM fields suggests that females are less interested, feel incapable of success, fear resentment from male counterparts, or believe that interest in these fields show a lack of femininity (Morgan, 1992; Smeding, 2012; Weber, 2012). Similarly, studies focused on gender differences in video game play argue that women show less interest in playing, are more likely to be subjected to insults and hostility, and are generally seen as less skilled (Lucas & Sherry, 2004; Kuznekoff & Rose, 2012). While the popularity of games with children lead many to believe that games may be the key to driving girls toward STEM careers, the negativity surrounding the “girl gamer” stereotype may actually continue to drive females away. This study investigates the effect of stereotype threat on female players and how this effect impacts the appeal of and perception of gender towards both gaming and STEM fields of study.

According to Steele & Aronson (1995), stereotype threat is “being at risk of confirming, as self-characteristic, a negative stereotype about one’s group” (p. 797). This threat can result in anxiety and reduced performance while continued negativity due to threat can result in a loss of motivation to engage in the activity completely (Steele, 1997; Fogliati & Bussey, 2013). Video games are largely associated with males, and the stereotype that women are less skilled, if they play at all, is something female players are likely reminded of frequently by other male players (Norris, 2004; Kuznekoff & Rose 2013). In a recent study, after playing against a male opponent, female players reported feeling more stressed and rated their skills as lower than their opponents (Vermeulen, Castellar, Van Looy, 2014).

The present study investigates the effects of opponent gender and priming stereotype threat on participants’ in-game performance and perceptions of STEM fields, in terms of both appeal and gender. We hypothesized that playing against a male opponent and reading an article to prime the stereotype of males being better suited to succeed in gameplay would both have a negative effect on female players’ performance, with the lowest scores coming from those exposed to both forms of threat. Also, that this threat would negatively impact how female players felt about pursuing studies in STEM fields. Finally, we also hypothesized that, by priming stereotype threat in relation to video games, women would also feel that males were overall better suited for STEM fields.

A 2 (gender of opponent: male or female) x 2 (article type: stereotype threat or non-threatening) experiment was designed to test these hypotheses. 56 female college students participated. Participants were initially given a pretest to record their gaming habits, appeal towards various fields of study, and asked to rate whether they viewed these various fields as more suitable for men or women. Afterwards, they read an article either detailing the perceived differences in skill for male and female gamers or detailing the fact that gendered differences in gaming were actually non-existent. Participants were asked to create a profile to play a 10 minute match of *Unreal Tournament* against either a male or female opponent, actually a computer-controlled AI given either a male or female name similar to the profile

they created for themselves. Lastly, participants were given a post-game questionnaire covering a number of subjects including the material from the pretest.

In testing our results, in-game performance was not found to be significantly different across the four conditions. Based on an analysis of covariates (ANCOVA), there were several significant results in the relationships between our manipulations and perception of STEM fields. The ANCOVA model of this study includes two manipulations, estimated hours of video game play per month and the kill-to-death ratio of participants within the game. First, when examining the effects of the manipulations on STEM (Science, Math, Engineering, and Computer Science: $\alpha = 0.84$) subjects overall, there was an interaction effect on players' perception of the relationship between gender and STEM fields ($F(1, 50) = 4.83$, $p = .033$, $\eta^2 = .088$): If participants were in the threat condition, playing against a male opponent made them feel that STEM subjects were much more male-dominant. If they were in the no threat condition, those who played against a male opponent rated STEM subjects as less male-dominant than they previously thought during the pretest survey.

In digging into individual subjects within the STEM field, the two articles read before gameplay did have different effects in terms of thoughts toward gender and engineering: when players read the article priming stereotype threat, they tended to score engineering as more male-dominant in the posttest survey ($F(1, 50) = 7.51$, $p = .009$, $\eta^2 = .131$). If they read the article stressing gender equality in terms of gaming ability, they perceived engineering as less male-dominant in the posttest survey. Besides the main effect, there was also an interaction effect of the two manipulations on participant's thoughts towards gender and engineering ($F(1, 50) = 4.46$, $p = .040$, $\eta^2 = .082$). When they were told to play against male players, the effects of the articles were enlarged. If they were in a threat condition, playing against male opponents made participants feel that engineering is an even more male-dominant field. While those in the no-threat condition playing against a male opponent, perceived engineering as less male-dominant and more equal between the two genders.

Also, players expressed different thoughts on gender roles in regards to both technology ($F(1, 50) = 4.41, p = .041, \eta^2 = .081$) and math ($F(1, 50) = 3.35, p = .073, \eta^2 = .063$) dependent upon which gender they believed they played against. Believing they played against a male enhanced the idea that technology and math were both more male-dominant fields of study. If they believed they played against a female opponent, they perceived males and females as more equally suited in these two fields during the posttest. However, the effects of the articles were not significant in these two subjects. Yet, the two manipulations did have an interaction effect in terms of player's thoughts on gender and math ($F(1, 50) = 4.65, p = .036, \eta^2 = .085$). Participants in the threat condition, who also played against a male opponent, rated men as much better suited for mathematical fields of study when compared to their pretest scores while those playing against a female opponent rated the two genders more equally. However, if participants were in a no-threat condition, playing against a male made them believe that math is not as male-dominant as they originally thought.

When looking towards the appeal of STEM subjects, participants actually increased their scores for appeal of most STEM subjects, including Engineering, Computer Science, Math, and Science. Among these subjects, the manipulation of stereotype threat had a significant effect on participant's scores on the appeal of computer science ($F(1, 50) = 6.77, p = .012, \eta^2 = .119$). When participants were in the threat condition, they perceived computer science as more appealing in the posttest. If they were in a no threat condition, their thought on computer science was largely the same as their pretest survey. One possible explanation is that while the article's ability to prime stereotype threat, as seen in regards to gender and STEM rating shown earlier worked in terms of larger perceptions of gender, it also resulted in a desire to overcome the stereotype.

These results do suggest a connection between perceptions of gender in video games and STEM. One possible explanation for the lack of performance differences could be the difficulty selection for the computer's AI, which was lowered after pilot testing showed the higher setting was too unforgiving. As a result, most participants performed fairly well, which may also help explain the growth in appeal by

participants who felt they performed better than they expected. Despite this, the fact that perceptions of gender actually worsened due to our manipulations indicates that the stereotype threat was still strong enough to have negative influences.

The results from this study indicate that the gender bias evident in video games may be linked to females developing negative views toward pursuing STEM careers. This supports the idea that promoting gender equality in video games could be a way to promote gender equality of STEM fields. By drawing a link between these two, this study will hopefully bring new knowledge of the link between games and STEM and inform future initiatives to overcome gender bias in both contexts.

Resources

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