Who Wants to Play? Cueing Sex-Based Stereotypes in Games

Joe A. Wasserman and Christine E. Rittenour

West Virginia University

Author Note

Joe A. Wasserman, Department of Communication Studies, West Virginia University; Christine E. Rittenour, Department of Communication Studies, West Virginia University Correspondence concerning this paper should be addressed to Joe A. Wasserman, Department of Communication Studies, West Virginia University, 108 Armstrong Hall, P.O. Box 6293, Morgantown, WV 26506-6293. E-mail: jowasserman@mix.wvu.edu

Abstract

Male/female-based stereotypes appear to be widespread, providing a potential barrier to women's participation and success in gaming contexts, such as recreational gaming, competitive eSports, and game-based learning. Differences in the strength of stereotypes associated with different kinds of games, which would have implications for reducing these barriers, are currently unknown. In an online between-participants experiment manipulating the platform (analog tabletop, digital tablet computer, digital desktop computer) of the game Splendor, 105 participants responded to questions asking them to separately rate their perceptions of men's and women's affinity for the game. Confirming extant research on gaming stereotypes, they perceived women as having less of an affinity for this game. While this trend emerged similarly between all platforms of the game depicted, the magnitude of this difference was less when participants had a stronger social group identification with gamers. These perceptions did not depend on social group identification with women. Given the potential for stereotypes to discourage women from gaming and threaten their performance and learning in gaming contexts, as well as the prominent and persistent public interest in gaming, we suggest researchers further examine stereotypes and identity in the study of diverse games, and game platforms, and powerful perceptions.

Keywords: video games, analog games, stereotypes, gender, identity, game platforms

Who Wants to Play? Cueing Perceived Sex-Based Stereotypes of Games

Games are increasingly popular as entertainment and for educational applications; nevertheless, negative stereotypes related to games and certain groups of people, particularly women, appear to be widespread (Lien, 2013). These stereotypes have the potential to impair performance (Kaye & Pennington, 2016), impede learning (Rydell et al., 2010), and reduce participation (Cheryan, Ziegler, Montoya, & Jiang, 2017) among those who are negatively stereotyped. Understanding the landscape of these stereotypes and relation to contexts, as well as game and individual characteristics, has utility for ongoing efforts to uncover and ultimately reduce the negative effects of stereotypes. By identifying specific cues that trigger perceptions of stereotypes related to games, this study is a step toward reducing barriers for women's participation, sense of belonging, and success in gaming contexts. We investigated (a) the potential for specific game characteristics—in this case, game *platforms*—to cue perceptions of different stereotypes and (b) the influence of individual identity differences on perceptions of sex-based stereotypes associated with games.

1. Review of Literature

Despite nearly equal rates of gaming among men and women, there is a persistent belief among men and women (both gamers and non-gamers) that the majority of people playing videogames are men (Duggan, 2015). Although it has been argued that gaming preferences and practices are becoming less sex-stereotypical (MacCallum-Stewart, 2009), gendered stereotypes pervade the production and marketing of games, the construction of "gamer" as an identity and "gamers" as a community, and responses to women in gaming. This study complements existing scholarship on gendered stereotypes in games and gaming by applying a fine-grained, empirical approach to beliefs about and perceptions of these stereotypes.

1.1. Sex-Based Stereotypes of Gamers and Gaming

Lien (2013) documented some of the historical, reciprocal influences of playing habits, market research, videogame design, and marketing that may have produced perceptions of gaming as male-dominated. For example, there is a predominance of male, "hardcore" gamers in market research on games, and thus games are produced and marketed predominantly to these male, "hardcore" gamers in ways that exclude and/or objectify women (Kerr, 2006). In turn, these production practices have influenced the marketing and content of games themselves. For example, advertisements for games are riddled with stereotyped and sexualized depictions of women (Peck, Ketchum, & Embrick, 2011). Within games themselves, male characters are over-represented compared to males' frequency in the general population (Williams, Martins, Consalvo, & Ivory, 2009).

The technological, commercial, and cultural forces that have focused on games for men and excluded non-males from gaming (Fron, Fullerton, Morie, & Pearce, 2007) have influenced game consumption patterns and the policing of community boundaries. Women's exclusion often occurs through minimizing and de-prioritizing their participation and their games of choice. So-called "casual" games played by "casual" gamers that are typically played on smartphones or tablets are feminized in opposition to "hardcore," masculine games and "hardcore" gamers that are typically played on other platforms, such as consoles (Vanderhoef, 2013). Women constitute the majority of the casual games market, and casual games are often produced with a female audience in mind (Jenkins & Cassell, 2008). Despite the fact that so-called casual gamers have a good deal of knowledge about games, play for long durations, and prefer challenging games (Juul, 2010), they are stereotyped as having minimal games knowledge, an unwillingness to commit time to games, and a preference for easy games. These presumptions about women's

game choices and preferences may influence perceptions of gendered stereotypes associated with different game platforms.

These gendered stereotypes of casual versus hardcore game players align with the more general stereotype of computers as toys for boys (Cooper, 2006). Additionally, there is a lack of representation of women gamers in media, among game reviewers, on voice chat, at conventions or other fan gatherings (Paaßen, Morgenroth, & Stratemeyer, 2017) and at competitions (Taylor, Jenson, & Castell, 2009). When women attempt to enter masculinized realms of gaming, masculine norms of gaming and gaming communities are rancorously policed, including hostile and misogynist responses to women in gaming (Jenson & De Castell, 2013), the systematic harassment of GamerGate (Jenson & de Castell, 2017; O'Rourke, 2014), and negative reactions to women's voices in gaming voice chats (Kuznekoff & Rose, 2013).

The majority of critical scholarship on gendered stereotypes of games and gaming presume the existence of these stereotypes, but empirical documentation is lacking (e.g., Carr, 2005; Cote, 2017; Jenson & de Castell, 2011; Jenson, de Castell, & Fisher, 2007). Paaßen et al. asked, "First, is it the case that gamers are predominantly men? …Second, what are the mechanics that perpetuate gendered gamer stereotypes? Here, we draw on the extensive research on stereotypes, in particular social role theory. Finally, what are the consequences of these stereotypes?" (Paaßen et al., 2017, p. 422)—but did not question the specific contours of gendered gamer stereotypes. By empirically investigating perceptions of sex-based gaming stereotypes, this study complements existing scholarship by adding detail to the characteristics of these stereotypes.

1.2. Sex-Based Stereotype Threat and Games

Stereotypes associated with particular activities (e.g., gaming) or particular educational

domains, such as mathematics, have negative consequences for performance and learning. Stereotype threat, a negative self-evaluation that aligns with an individual's perceptions of negative stereotypes of a group (Steele & Aronson, 1995), is thought to underlie many of these negative consequences. When individuals identify with a negatively stereotyped group, or believe that others categorize them within it, this negative self-evaluation has a detrimental effect on their performance on cognitive, social, and sensorimotor tasks (e.g., Günther, Ekinci, Schwieren, & Strobel, 2010; Steele & Aronson, 1995). Stereotype threat can be activated by priming a particular negative stereotype or merely by priming membership in a group that is associated with a task-relevant negative stereotype (Steele & Aronson, 1995). As such, if individuals associate games—or certain *kinds* of games—with particular identity categories that have task-relevant negative stereotypes, merely playing or even observing games may trigger stereotype threat.

Sex-based stereotypes of games and computers likely underlie stereotype threat responses among female game-players. Stereotype threat plagues women and girls using computers, including digital games, by encouraging internal attribution for failure and heightening anxiety associated with computer use (Cooper, 2006; Koch, Müller, & Sieverding, 2008). Beyond biological sex, self-evaluated non-masculine gender role decreases self-efficacy associated with computing technology (Huffman, Whetten, & Huffman, 2013). Women also experience stereotype threat when playing strategy games such as Chess (Backus, Cubel, Guid, Sanchez-Pages, & Mañas, 2016; Maass, D'Ettole, & Cadinu, 2008; Rothgerber & Wolsiefer, 2014) and while playing video games (Kaye & Pennington, 2016; Vermeulen, Castellar, Janssen, Calvi, & Van Looy, 2016). Some evidence suggests that the consequences of sex-based stereotype threat related to games depend on the specific gaming context. Specifically, when playing a *casual*

videogame, neither an explicit prime (a statement describing female inferiority at games) nor an implicit prime (using a male-bodied avatar) affected women's performance (Kaye, Pennington, & McCann, 2018). Additionally, women appear to outperform expectations when competing against men in international Chess tournaments (Stafford, 2018). Furthermore, while some research has found that stereotype threat more strongly affects women who identify as gamers (Vermeulen, Van Bauwel, & Van Looy, 2017), others have found that priming a *gamer* identity—as opposed to the priming of other social identities—can protect against stereotype threat effects (Kaye & Pennington, 2016). Although precise reasons underlying inconsistencies in sex-based stereotype threat effects are unknown, it is possible that contextual or game characteristics cue different perceptions of stereotypes that in turn strengthen or mitigate stereotype effects. Although this study does not directly address the negative consequences of stereotypes, a more fine-grained understanding of the nature of gaming stereotypes has both (a) theoretical consequences for studying gaming and stereotypes and (b) potential practical implications for mitigating the negative effects of stereotypes.

1.3. Contextual Cues of Sex-Based Stereotypes

In non-gaming contexts, contextual cues have been found to influence perceptions of belonging and stereotypes. For example, an imbalanced male/female ratio at a conference has been found to increase women's—but not men's—cognitive and physiological vigilance, while decreasing their sense of belonging (Murphy, Steele, & Gross, 2007). Stereotypical environmental cues such as Star Trek posters and—notably for the present study—video games in computer science classrooms have also been found to be perceived as more masculine, thereby decreasing women's interest in pursuing computer science (Cheryan, Plaut, Davies, & Steele, 2009). Also not affecting men, stereotypical computer science classrooms that included these

stereotypical objects triggering computer science stereotypes decreased women's sense of belonging in the class, thereby decreasing their interest in pursuing computer science (Cheryan, Meltzoff, & Kim, 2011; Master, Cheryan, & Meltzoff, 2016).

1.4. Present Study

Stereotypes are, by definition, bundles of traits or characteristics thought to be true of a social group. These can coincide with the adjacent construct of *prototypes*, the conceived aggregated personification of a group in the form of an exemplary mental image that could be an actual person (e.g., an exemplar) but need not be any actual human being (Allport, 1954). According to prevalent stereotypes, the prototypical gamer is not only male, but also unpopular, unattractive, lazy, and socially inept (Kowert, Griffiths, & Oldmeadow, 2012). These are characteristics of a *general* gamer prototype, however. Thus, these and other characteristics may be more or less prominent in individuals' prototypes of players of a *particular* game. Therefore, we ask:

RQ1: What characteristics are perceived as prototypical of the player of the game used in this study, Splendor?

Though not always directly assessed or addressed as such, research summarized thus far suggests that the *prototype* of a competent and comfortable (even "natural") gamer is male. Given the aforementioned review of gendered stereotypes of games and gaming, we predict that:

H1: In comparison to men, women will be perceived as having less affinity for a game.

Particular game characteristics may cue perceptions of sex-based stereotypes and prototypes to varying degrees. In particular, *game platform*—e.g., tabletop, desktop computer, tablet computer—may be expected to cue sex-based stereotypes of games to different degrees. For example, although analog tabletop games such as Eurogames (Woods, 2012) have been

growing in popularity as entertainment media (Griepp, 2017) and instructional tools (e.g., Berland & Lee, 2011), they are less well-known than videogames. As a rough comparison, in 2016, the hobby games market in the U.S. and Canada was $1.4 billion (Griepp, 2017), and the videogame market in North America was over 18 times as large, at $26 billion (McDonald, 2017). Because individuals are more likely to have more direct and vicarious experience with videogames than with tabletop games, stereotypes related to videogames may be stronger than stereotypes related to tabletop games. Moreover, because tabletop *Eurogames* are less broadly known than videogames or classic games like Chess, and because of aforementioned negative stereotypes of women and computer use, tabletop games may cue sex-based stereotypes less strongly than games on digital platforms. Therefore, we predict that:

H2: Compared to a tabletop version of a game, a digital version will elicit greater differences between perceptions of men's and women's affinity for the game.

Perceived stereotypes and prototypes would be expected to vary by digital platforms as well. As aforementioned, "casual" games that are typically played on smartphones or tablets are feminized in opposition to more masculine "hardcore" games that are more typically played on desktop computers and consoles (Vanderhoef, 2013). The feminized stereotype of casual games are part of an ongoing tension surrounding masculinized gamer and geek identities (Salter & Blodgett, 2012; Taylor, 2012). Stereotypes are, by definition, exaggerations in their presumptions that the stereotyped trait applies to the whole group. Still, compared to men, women have reported stronger preferences for videogame genres that could be categorized as "casual:" card, dice, board, quiz, puzzle, and arcade games (Lucas & Sherry, 2004). Men have reported stronger preferences for videogame genres that could be categorized as "hardcore:" fighting, shooting, racing, and sports games (Lucas & Sherry, 2004). These gendered gaming

preferences may be due in part to women having shorter blocks of free time than men, which makes casual games that can be played in shorter sessions more appealing (Winn & Heeter, 2009). The link between game genres and platforms is exemplified by the preferred platforms for playing Candy Crush, an exemplar "casual" game, and Call of Duty, an exemplar "hardcore" game. Whereas Candy Crush is played 63% of the time on a tablet or smartphone, Call of Duty is played 84% of the time on a console (Casual Games Association, 2014) . In line with aforementioned gendered stereotypes, we assert that gender biases will also differ depending on the tablet versus desktop platforms employed in this study. Specifically, we predict that:

H3: Compared to a tablet version of a game, a desktop computer version will elicit greater differences between perceptions of men's and women's affinity for the game.

The interplay between identity, gameplay practices, and perceptions of stereotypes related to games are complex and empirically unresolved. For example, in terms of general negative stereotypes of gamers as unpopular, unattractive, non-dominant, and socially incompetent, self-identified gamers and non-gamers did not vary in their perceptions of how others stereotyped online gamers, but self-identified gamers personally perceived online gamers more favorably than did non-gamers (Kowert et al., 2012). In terms of sex-based stereotypes related to gaming, despite relatively low rates of explicit endorsement of negative sex-based stereotypes, in comparison to women who frequently played games, women who infrequently played videogames (and all men) have been found to more strongly endorse explicit negative stereotypes of women and games (Vermeulen & Van Looy, 2016). Furthermore, women who identify more strongly as gamers have been found to have more concern about stereotype threat, greater concern of being stigmatized as a female gamer in general, and less consciousness of being stigmatized by male gamers (Vermeulen et al., 2017)—although priming a gamer identity

has also been found to protect women from stereotype type threat effects (Kaye & Pennington, 2016). Given the complexity of the relationships between identity and perceptions of stereotypes, the following research question is asked:

RQ2: (How) will differences between perceptions of men's and women's affinity for games differ depending on how strongly individuals identify with (a) women or (b) gamers?

2. Method

2.1. Participants

In total, participants were 136 undergraduate students enrolled in communication courses at a large Mid-Atlantic university. Of the participants who completed the online questionnaire, 11 were excluded from analysis for using a mobile device and an additional 20 were excluded for failing an attention check, yielding a total of 105 valid participants. Of these 105 participants, 85 (81.0%) identified as white, 70 (66.7%) identified as female, and the average age was 20.1 (SD = 2.85). A plurality of participants (n = 35, 33.3%) reported playing games "(almost) never," while between 11 and 18 (10.5%–17.1%) participants reported playing games "1-2 times per semester," "1-2 times per month," "once a week," or "2-3 times a week." or "(almost) daily."

2.2. Procedures

After approval from the university's Institutional Review Board, participants were recruited from a departmental participant pool of undergraduate students enrolled in communication courses. Participants were randomized into one of three conditions in an online experiment: tabletop game (n = 34), digital tablet game (n = 34), or digital desktop computer game (n = 37). Participants viewed a brief text description and image of a game for a minimum of 10 seconds. Subsequently, participants completed an online questionnaire asking them to separately rate their perceptions of men's and women's affinity for the game they viewed and

received extra credit for participating.

2.3. Stimulus Materials

In all conditions, participants were shown the same game, Splendor (André & Quidault, 2014), which was chosen because it has existing tabletop and tablet versions, is relatively simple (so, amenable to brief description), and as a Eurogame (see Woods, 2012) was unlikely to be recognized by most participants. As a card or board game, Splendor would likely be categorized as a "casual" game at first glance. Based on aforementioned stereotypes and gendered game genre preferences, it may be (a) stereotyped as feminine and (b) preferred by women more than by men (Lucas & Sherry, 2004). All scenarios began with an identical simplified description of the game, which read: "*In this game, Splendor, you play as gem merchants competing to earn the most points by producing the most valuable gems. During the game, the players take gem and gold tokens. These tokens are currency for purchasing development cards. Development cards are worth prestige points and/or bonuses. These bonuses allow players to purchase subsequent development cards at a reduced price. Prestige points determine the winner. Whoever has the most prestige points at the end of 20 turns wins.*" The last line and image of the game varied by condition and served as part of the manipulation: "*Splendor is a [tabletop/tablet computer/desktop computer] game for two-to-four players.*" Participants viewed images of the game on the respective platforms, which were designed to appear as similarly as possible, with the exception of the platform (see Appendix). Additionally, the surface area occupied by the image of the game itself was designed to be as equivalent as possible across conditions: 540 x 480 pixels in the tabletop condition, 543 x 407 pixels in the tablet condition, and 543 x 406 pixels in the desktop computer condition. The same stimulus image without the text description was displayed on each subsequent page of the online questionnaire that included items referring

to the game, excluding the page containing manipulation and attention checks.

2.4. Measures

Measures are reported in the order in which they appeared to participants.

Prototype of Splendor player. After reading the description of Splendor and viewing the game for the first time, participants were asked, "Looking at the game, who do you think would play it? Just write what first comes to mind." Participants typed their responses into a large text box without word or character limitations, writing an average of 18.4 words (SD = 15.3).

Sex-based stereotype perceptions. Participants' perceptions of men's and women's affinity for the game were measured using indirect comparisons. I.e., participants' perceptions of men's and women's affinity were separately calculated as mean scores of four items each. Rating men's affinity more highly than women's was interpreted as indicating perceptions of sex-based stereotypes. Participants were asked to rate their perceptions of a typical man's or a typical woman's interest in (from 1 = *very uninterested* to 7 = *very interested*), likelihood of playing (from 1 = *extremely unlikely* to 7 = *extremely likely*), liking of (from 1 = *strongly dislike* to 7 = *strongly like*), and performance in (from 1 = *complete failure* to 7 = *complete success*) Splendor (see Table 1 for full question text). The same questions referring to four other identity categories (three age categories plus "gamer") were included to distract participants from the intended comparison of participants' beliefs about men and women. To reduce the dimensionality of these measures, exploratory factor analysis (EFA) with oblique direct oblimin rotation using principal axis factoring was performed in SPSS 24. Items referring to men and women were analyzed separately. The Kaiser-Meyer-Olkin measure (men: KMO = .78; women: KMO = .77) and Bartlett's test of sphericity [men: χ^2 (6) = 233.14, $p < .001$; women: χ^2 (6) = 240.46, $p < .001$]

indicated that these data were adequate for EFA. Oblique rotation was used to allow factors to correlate, because nothing was known about the factor structure of these items in advance. Similar results were obtained for the equivalent sets of items referring to men and women, respectively: one factor with Eigenvalue > 1 on which all items had standardized loadings > .600 was extracted for each (see Table 1). Both sets of four items were separately averaged to form mean scores for analysis. Items measuring perceptions of men's affinity for Splendor ($M = 4.60$, $SD = 1.23$) and women's affinity for Splendor ($M = 3.52$, $SD = 1.28$) achieved good reliability (for both, $\alpha = .87$). To be clear, the comparison being made was not between male and female participants, but between participants' *perceptions* of men's and women's relative affinity for the game.

Table 1

Exploratory Factor Analysis Results for Items Measuring Perceptions of Men's and Women's Game Affinity

Item Text	Structure Coefficients	
	Items Referring to "Man"	Items Referring to "Woman"
How interested would a typical (man/woman) be in playing the game?	0.933	0.938
How likely would a typical (man/woman) be to play the game?	0.855	0.827
How much would a typical (man/woman) like the game?	0.761	0.806
How well would a typical (man/woman) perform in the game?	0.624	0.630
Percent of variance explained	64.20%	65.30%
Eigenvalue	2.569	2.611

Note. Exploratory factor analyses using oblique direct oblimin rotation and principal axis factoring were separately performed on items referring to men and on items referring to women.

Identification. Participants' identification with women and identification with gamers

were each evaluated with a single prompt, "For each of the following groups, please indicate which picture best represents the way you perceive your relationship with that group," and a five-option pictorial item (from 1 to 5; see Figure 1) measuring identity fusion (Swann Jr., Gómez, Conor, Francisco, & Huici, 2009), which was adapted from earlier pictorial measures of group identification (Schubert & Otten, 2002). While participants' average identification with *women* fell above the midpoint ($M = 3.68$, $SD = 1.5$), participants' average identification with *gamers* fell below the midpoint ($M = 2.22$, $SD = 1.5$).
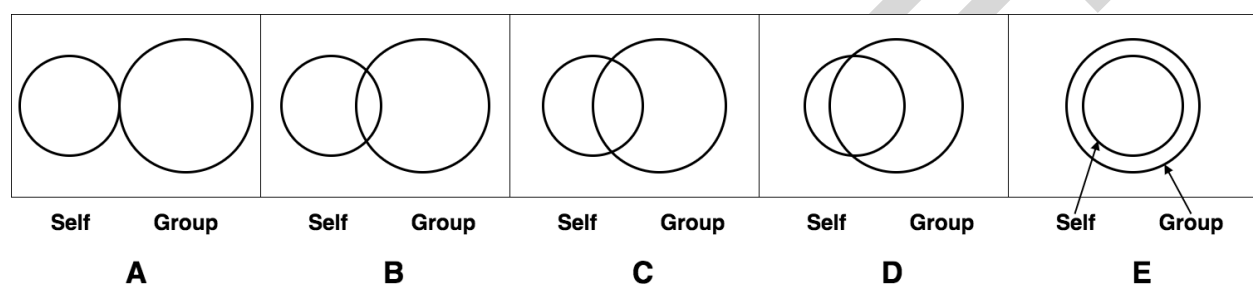

Figure 1. Identity fusion measure (Swann Jr. et al., 2009). Participants were requested to select A, B, C, D, or E.

Exposure, manipulation, and attention checks. As an exposure check, the time spent on the page containing stimulus material was recorded ($M = 42.3$ seconds, $SD = 30.4$ seconds). As a manipulation check, participants responded to a single closed-ended prompt for the platform of the game in the study, "The game you answered questions about on this survey is played on…," which included the following options in random order: *Tabletops*, *Desktop computers*, *Tablet computers*, *Videogame consoles*, and *Smartphones*. As an attention check, at the end of the study participants responded to a single closed-ended prompt for the name of the game in the study, "The name of the game you answered questions about on this survey is…" The name of the game, Splendor, was displayed to participants a total of eight times throughout the online experiment and questionnaire. In addition to Splendor, these options included nine

other popular tabletop, mobile, and computer games displayed in random order, including

Settlers of Catan, Minecraft, and Candy Crush.

Demographic and background variables. Participants self-reported their age in years in

response to an open-ended prompt, selected their race from a drop-down menu of seven options

(*White*, *Black or African American*, *American Indian or Alaska Native*, *Asian*, *Native Hawaiian*

or Pacific Islander, *Other*), selected their sex from non-exclusive multiple-choice options (*Male*,

Female, *Female to Male Transgender*, *Male to Female Transgender*, *Nonbinary*, *Other*, *Prefer*

not to Answer), and selected a multiple-choice response to the question, "How frequently do you

play games of any kind?" (*[Almost] Never*, *1-2 times per Semester*, *1-2 times per Month*, *Once a*

Week, *2-3 times a Week*, *[Almost] Daily*).

3. Results

3.1. Manipulation Check

To evaluate the success of the game platform manipulation, we investigated participants'

correct identification of the platform of the game they viewed. A total of 76 (72.4%) participants

correctly identified the game platform, suggesting a successful manipulation. The rate of passing

this manipulation check was compared across conditions with an exact chi-square test, which

indicated that the proportion of participants who correctly identified the game platform in the

tabletop condition ($n = 22$, 64.7%), tablet condition ($n = 22$, 64.7%), and desktop computer

condition ($n = 32$, 86.5%) did not significantly differ, $\chi^2 (2) = 5.69$, $p = .06$, Cramer's V $= .23$.

Therefore, the success of the manipulations appears not to have substantially differed across

conditions. Although participants who failed this manipulation check were not excluded from

main analyses, results excluding them are reported in footnotes.

3.2. Preliminary Analyses

Before testing hypotheses, we investigated between-condition differences of demographic and other variables of interest. The omnibus test results of a series of one-way analyses of variance (ANOVAs) did not identify significant differences between conditions in terms of time spent viewing the stimulus [$F(2, 102) = 2.05$, $p = .13$], age [$F(2, 101) = 0.11$, $p = .90$], frequency of playing games [$F(2, 102) = 0.38$, $p = .69$], identification with women [$F(2, 101) = 1.66$, $p = .20$], or identification with gamers [Welch's adjusted $F(2, 66.00) = 2.58$, $p = .08$]. The results of an exact chi-square test indicated that the proportion of males to females did not significantly differ between conditions [$\chi^2 (1) = 0.16$, $p = .81$, Cramer's V $= .81$], suggesting participant characteristics did not differ among conditions.

3.3. Research Question and Hypothesis Tests

To answer RQ1 regarding the prototype of a Splendor game player, the first and second authors implemented the following procedures. As prototypes are streamlined stereotype clusters, our procedures are similar to those used by researches soliciting and summarizing specific stereotypes of target groups (Hummert, 1994; Odenweller & Rittenour, 2017). First, we independently read all of the responses. Based on the fact that many participants mentioned more than one unique characteristic, it was determined that each characteristic should be considered as its own unique piece of codeable information. It should be noted that the resultant list of codes totaled 228 pieces of codeable information, the mean frequency was 1.68 unique characteristics per participant, and the mode was one characteristic (range: 0–4). Second, together the researchers grouped identical and synonymous responses. Third, using a pile sorting technique, they further grouped categories they collaboratively deemed to be similar in content. This generated 38 initial categories, which were then reduced further to 16 supra-categories of characteristics, some of which had several subcategories. In accordance with previous stereotype

research, those supra-categories with fewer frequencies than 10% of the sample were omitted

from the master list in Table 2. Because this research is exploratory, we mention these low-

frequency categories and the four remaining responses given by just one participant (i.e., not

warranting their own code) at the end of the following category descriptions. Prototype

characteristics are listed in Table 2, followed immediately by descriptions of each category, with

names of each derived primarily from content, using the language that was most frequently used

by participants whenever possible.

Table 2

Supra- and Sub-Categories of Prototypes of Splendor Game Players

Supra-Category	Sub-category	Frequency
Age		n = 51, 37.5 %
	Young people	n = 30
	Adults	n = 17
	Old people	n = 4
Interest in other games		n = 40, 29.4%
Interest in game theme		n = 21, 15,4%
	Interest in history	n = 10
	Interest in fantasy	n = 8
	Interest in gems	n = 3
Gender		n = 18, 13.2%
	Males	n = 16
	Females	n = 2
Like games		n = 17, 12.5%

The most frequent category was *age*, which involved any reference to a player's general

or specific age. As is customary with what is actually an interval level of measurement,

participants talked about ages as phases or "chunks" of time (Harwood, 2007). The *young people*

subcategory included this precise language (i.e., "young people") or "children," "teenagers," or

"kids." If participants referenced "adults" or "not children," they were placed in the *adults*

subcategory. Some included an additional rationale, e.g., "too complex for children." *Older*

adults included a specific reference to being very old or fitting into this subcategory, which is

designated by aging scholars as 65 or older, but is likely to be anyone deemed "old adult" instead of simply an "adult," the latter of which would place them in the second subcategory rather than this third and final subcategory.

The next category was *interest in other games.* Mention of Splendor players that presumed specific liking of a different game or of a general platform (e.g., computer, video, card), genre (skill, role playing games, puzzle), or task (memorizing, strategy) were placed into this category. Differentiating subcategories systematically was not possible given that some participants were vague, others very specific (e.g., "the same demographic as…Dungeons and Dragons," "people that like Pokemon"). We presume that this is largely about similarities that participants perceived between Splendor and other games they knew or have heard by name.

Interest in game theme included interest in *history, fantasy*, and *gems* specifically. These characteristics are highly game-specific, thus adding a type of uniqueness to the prototypical Splendor player that is not present in aforementioned stereotypes of gamers. Here again we presume that participants perceived Splendor to represent these themes.

In direct accordance with the overarching goals of the study and our hypotheses, among those who had a response placed in the *gender* category, participants were more likely to mention *males* (most often using this exact language) than *females.* Importantly, both of the participants in the latter subcategory mentioned females alongside males (i.e., "males and females would both like this"), revealing that no participant viewed the prototypical Splendor player as more likely to be female than male. As others have suggested (Pennycook, 1994), it is likely that many who did not mention sex or gender may have thought primarily of males, as the absence of a pronoun or label has unmarked masculine connotations (in other words, one says "female" because it is the presumed "other" whereas "male" is presumed to be the norm or non-

other).

Although it adds little meaning to our understanding of this research question, we note that 17 participants pointed out that someone would like Splendor who also liked playing games and/or videogames (*like games*) in general.

Several (supra)categories did not reach the 10% sample threshold for inclusion in Table 2. Ten individuals wrote that neither they themselves ($n = 8$) nor anyone else ($n = 2$) would play this game. Ten individuals also saw Splendor as something that one would play in order to pass time ($n = 8$) or serve as a distraction ($n = 2$). A small subset of participants ($n = 9$) referenced the prototypical personality of a gamer, including introvert, competitive person, challenge-seekers, and someone with thinking ability. Only five participants made the positive proclamation that they themselves ($n = 4$) or "anyone" ($n = 1$) would be interested in playing this game. The word "nerd" was used by three participants, and—because of its multiple meanings, some of which could overlap with other categories—were kept as their own unique code. Two participants mentioned interest in animation. Not counted as enough to even create a category, each of the following were mentioned by only one participant each: comic books, science fiction, and people with ADHD.

H1 predicted that in comparison to men, women would be perceived as having less affinity for a game (regardless of game platform). In comparison to men ($M = 4.60$, $SD = 1.23$), women ($M = 3.52$, $SD = 1.28$) were perceived to have less affinity for the game, Splendor, as indicated by the results of a paired sample *t*-test, $t(104) = 8.47$, $p < .001$, $d = 0.82$ (adjusted for within-subjects dependence, see Morris & DeShon, 2002)[1]. H1 was supported.

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[1] Excluding participants who failed the manipulation check did not qualitatively alter these results. Among the subsample who passed the manipulation check, men ($M = 4.49$, $SD =$

H2 predicted that compared to a *tabletop* version of a game, a *digital* version would elicit greater differences between perceptions of men's and women's affinity for the game. H3 predicted that compared to a digital *tablet* version of a game, a digital *desktop computer* version would elicit greater differences between perceptions of men's and women's affinity for the game. These hypotheses were tested with a 3 between- (platform: tabletop, tablet, or desktop) x 2 within-participants (target gender: men or women) mixed factorial ANOVA. See Table 3 for mean perceived affinity by gender and condition. The results of this mixed factorial ANOVA indicated a significant within-participant main effect of target gender [$F(1, 102) = 72.25$, $p < .001$, $\eta_p^2 = .42$], a non-significant between-participant main effect of condition [$F(2, 102) = 0.48$, $p = .62$, $\eta_p^2 = .009$], and a non-significant interaction between target gender and condition [$F(2, 102) = 1.01$, $p = .37$, $\eta_p^2 = .02$][2]. As such, men and women were perceived as having different amounts of affinity toward a game (as in H1). However, the magnitude of this difference did not depend on game platform. H2 and H3 were not supported.

Table 3

Mean perceived affinity by target gender and game platform

Game Platform	*n*	Perceived Men's Game Affinity		Perceived Women's Game Affinity	
		M	*SD*	*M*	*SD*
Tabletop	34	4.68	1.29	3.68	1.35
Tablet	34	4.74	1.19	3.40	1.27
Desktop	37	4.40	1.23	3.47	1.23

To address the role of individuals' identities in their perceptions of sex-based gaming

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1.21) were perceived to have less affinity for games than women ($M = 3.38$, $SD = 1.14$), $t(75) = 7.93$, $p < .001$.

[2] Excluding participants who failed the manipulation check did not qualitatively alter these results. Among the subsample who passed the manipulation check, there was a significant within-participant main effect of target gender [$F(1, 73) = 68.09$, $p < .001$, $\eta_p^2 = .48$], a non-significant between-participant main effect of condition [$F(2, 73) = 0.41$, $p = .66$, $\eta_p^2 = .011$], and a non-significant interaction effect [$F(2, 73) = 2.764$, $p = .07$, $\eta_p^2 = .07$].

stereotypes, RQ2 was asked about the potential for differences between perceptions of men's and women's game affinities to depend on individuals' identification with (a) women or (b) gamers. Because of H2 and H3's non-significant main effect of platform condition and non-significant interaction effect of condition and target gender, all three platform conditions were collapsed for this analysis. RQ2 was addressed with two moderation analyses using the MEMORE v2.beta2 macro in SPSS, which probes conditional effects in two-instance repeated-measure designs (Montoya, 2018; Montoya & Hayes, 2017). The first test investigated if differences in perceptions of men's and women's affinity for games depended on degree of identification with women, $F(1, 102) = 1.16$, $p = .29$, $R^2 = .01$. This test did not identify a significant moderating effect of identification with women, $b = 0.09$, $SE = .09$, $t(102) = 1.07$, $p = .29$. The second test investigated if differences in perceptions of men's and women's affinity for games depended on degree of identification with gamers, $F(1, 102) = 4.55$, $p = .04$, $R^2 = .04$. This test identified a significant moderating effect of identification with gamers, $b = -0.18$, $SE = .08$, $t(102) = -2.13$, $p = .04$[3]. For every one-point increase in identification with gamers on the five-point measure, the difference in perceived affinities of men and women for games decreased by .18, from 1.32 [$t(102) = 8.05$, $p < .0001$, 95%CI: 0.99, 1.64] for those with no identification with gamers to 0.59 [$t(102) = 2.23$, $p = .03$, 95%CI: 0.07, 1.12] for those with the maximum identification with gamers (see Figure 2). The difference in perceptions of men's and women's affinity for games was significant for all degrees of identification with gamers. Therefore, in response to RQ2,

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[3] Excluding participants who failed the manipulation check did not qualitatively alter these results. Among the subsample who passed the manipulation check, perceptions of men's and women's affinity for games did not depend on degree of identification with women, $b = 0.14$, $SE = .10$, $t(73) = 1.51$, $p = .14$. For moderation by identification with gamers, excluding participants reduced the power of the analysis to identify a statistically significant effect, but parameter estimates were very similar, $b = -0.19$, $SE = .10$, $t(73) = -1.90$, $p = .06$.

although the magnitude of differences in participants' perceptions of men's and women's affinities for a game did not significantly depend on their identification with women, it did significantly depend on their identification with gamers. Specifically, the more an individual identified with gamers, the more similar were their perceptions of men's and women's affinities for Splendor.
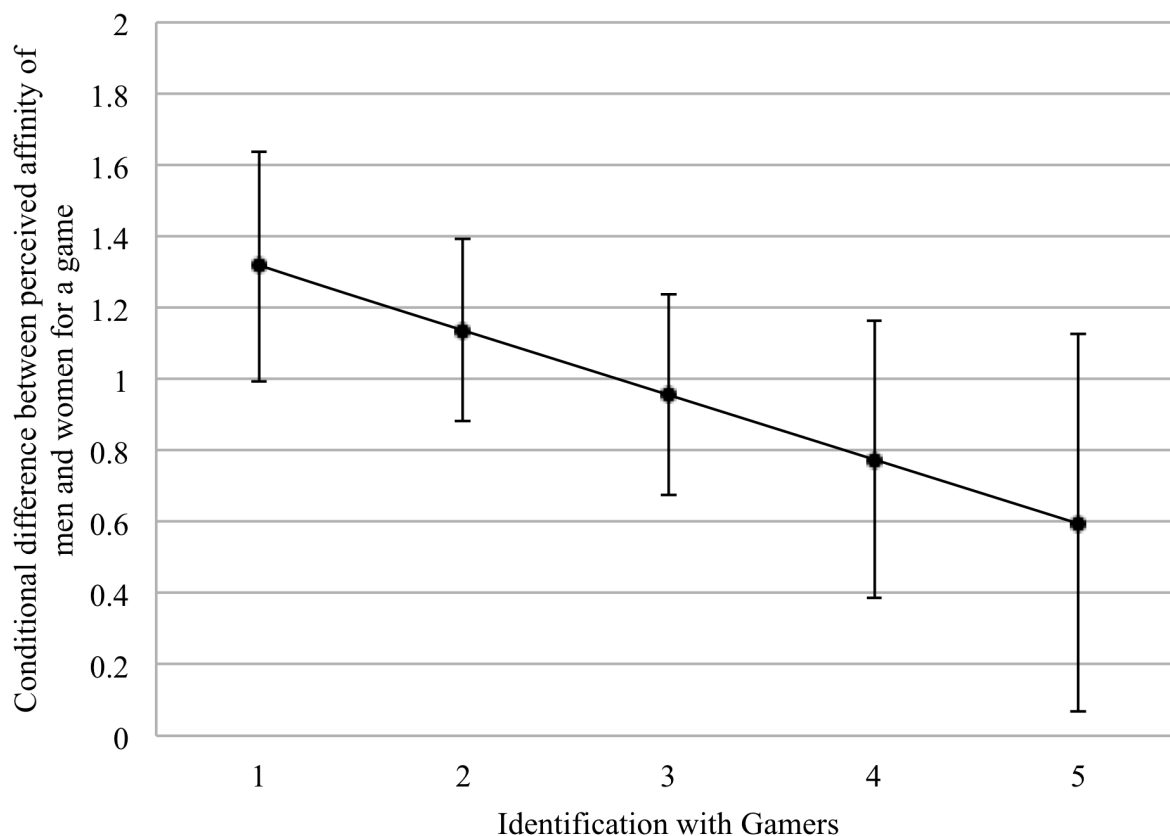
Figure 2. Differences in perceptions of men's and women's affinity for a game (y-axis), conditional upon identification with gamers (x-axis). Positive values on the y-axis indicate the magnitude of perceptions that men have greater affinity for a game than women. Positive values on the x-axis indicate greater self-identification with gamers. Error bars indicate 95% confidence intervals, none of which include zero.

3.4 Post Hoc Equivalence Tests

Because the interaction between target gender and condition was non-significant, we examined the equivalence of the differences between perceptions of men's and women's affinity for Splendor among the three conditions. We did so by first calculating difference scores ([men's affinity] – [women's affinity]; $M = 1.09$, $SD = 1.31$) for each condition: (tabletop: $M = 1.00$, $SD = 1.65$; tablet: M = 1.35, $SD = 1.52$; desktop: $M = 0.93$, $SD = 1.24$) and then employing two one-sided tests (TOST; Lakens, 2017). To use TOST for equivalence testing, researchers first determine the smallest effect size of interest, which is then used to set bounds of effect sizes around zero. Next, two one-sided t-tests are performed to test if the effect size is both significantly greater than the lower bound and significantly lesser than the upper bound. Two significant one-sided tests provide support for claims that an effect is equivalent to a mean difference smaller than the smallest effect size of interest. In the absence of an *a priori* smallest effect size of interest, we used the TOSTER package for R (Lakens, 2017) to identify the equivalence bounds that we had 80% power to test at an alpha level of .05: Cohen's $d \pm .710$ (i.e., raw differences of ± 0.932). Using TOST with equivalence bounds of -0.932 and 0.932 (on a raw scale), an alpha of 0.05, and not assuming equal variances, the equivalence test of difference scores between tabletop and tablet conditions was significant, $t(61.9) = 1.791$, $p = .039$; as was that between tabletop and desktop conditions, $t(68.97) = -3.005$, $p = .002$; but that between tablet and desktop conditions was non-significant, $t(63.96) = -1.551$, $p = .063$. These results indicate that between the two digital conditions, difference scores were not statistically equivalent, i.e., smaller than the smallest effect size of interest.

4. Discussion

This study examined the influence of game platform and identification on individuals' perceptions of men's and women's affinity for a game, Splendor. Prototypes of Splendor players

included characteristics related to age, interest in other games, interest in the game theme, gender, and general gaming proclivity. As predicted, men were perceived to have greater affinity for the game than women. Significant differences in these perceptions of affinity were not found among digital (including tablet versus desktop computer) and tabletop versions of the game. Post hoc equivalence tests provided supplemental evidence that differences in these perceptions were equivalent between tabletop and tablet, as well as tabletop and desktop conditions, but were not equivalent between tablet and desktop conditions. Furthermore, although the magnitude of these differences in perceptions of men's and women's affinity for the game did not depend on how much participants identified with women, perceptions of sex differences in affinity for the game were smaller the more participants identified with gamers.

Despite roughly equal participation in gaming among men and women (Duggan, 2015) and equal skill in advancing through games (Shen, Ratan, Cai, & Leavitt, 2016), this study's findings suggest that, regardless of game platform, men are perceived to have greater affinity—including interest, enjoyment, and performance—for games than women. These stereotypical perceptions may be related to more general stereotypical perceptions of sex differences, such as that women are more emotional as opposed to competitive (Barrett & Bliss-Moreau, 2009). Regardless of the particular origins of these stereotypes, the potential consequences of negative sex-based stereotypes of women and games, even if individuals do not themselves endorse them, are impaired performance (Kaye & Pennington, 2016), impeded learning (Rydell et al., 2010), and reduced participation (Cheryan et al., 2017) among women, potentially due to stereotype threat (Steele & Aronson, 1995). These negative consequences are expected for women in both recreational and more 'serious' uses of games. For example, the increasingly common use of games as instructional tools (Boyle et al., 2016) may be inequitable if men benefit from them

more than women. Furthermore, competitive gaming, or e-sports, is approaching $500 million in international revenue, and is expected to surpass $1 billion ("Global esports market report," 2016). Differential participation in these high-stake competitions would have economic consequences for women. Although previous research has found that identification with women matters in some gaming contexts (Vermeulen et al., 2016), in this study, differences in stereotyped perceptions did not depend upon participants' identification with women.

Nevertheless, not everyone perceived equally great differences between men's and women's affinity for a game: the more individuals identified as gamers, the smaller their perceived differences. This finding regarding the influence of gamer identities suggests that it functions as a superordinate identity that can at times subsume gender identity. Drawing from the Common Ingroup Identity Model (Gaertner, Dovidio, & Bachman, 1996), it is possible for more encompassing identities to reduce intergroup tensions by recategorizing members of an outgroup as part of a larger group containing both. In this case, gamer identity may be able to subsume gender identity. Along these lines, priming a gamer identity has been found to protect women against negative stereotype threat effects (Kaye & Pennington, 2016), women who play games more frequently are less likely to endorse negative stereotypes of women and games (Vermeulen & Van Looy, 2016), and women who identify more strongly as gamers have less consciousness of being stigmatized by male gamers (Vermeulen et al., 2017). Relatedly, more avid gamers are more likely to have encountered a broader range of people while gaming (as an instance of positive intergroup contact; see Allport, 1954), including highly competent female players. Thus, given this greater likelihood of positive contact with women gamers, self-identified gamers may less stringently endorse game-related stereotypes (cf. Kowert et al., 2012). Importantly, reducing stereotype via the induction of common ingroup identity is not strictly tied to knowledge of

others; rather, it is about reducing negative emotional reactions (Cuddy, Fiske, & Glick, 2007) through direct or vicarious positive intergroup contact, such as via gaming (Harwood, 2010). More research is needed to confirm these potential explanations for this study's findings.

This study's findings suggest that presenting a game on a different platform may not be sufficient to mitigate perceptions of negative gaming stereotypes. Thus, there remains a need to mitigate negative sex-based stereotypes of games, regardless of game platform. For example, using games as a learning tool should be approached with caution, as stereotype threat's presence in an academic setting may impede women's and girls' learning, or simply lessen their learning gains in comparison to learning through other mechanisms and/or the learning by males in gaming contexts (i.e., create a knowledge gap; see Rydell et al., 2010). Although not directly addressed by this study, one potential strategy for mitigating potential cues that trigger stereotype threat is to ensure that games are designed with diverse representations of characters. Diversifying representations within games may reduce stereotypes by diversifying representations of who can be a gamer, paralleling results found by diversifying representations of women in computer science and engineering (Cheryan, Master, & Meltzoff, 2015). Similarly, positive media representations of women gamers, such as when Sasha "Scarlett" Hostyn won an international, Olympics-sponsored StarCraft 2 competition (Frank, 2018), may also diversify perceptions of gamers and games, thereby alleviating negative stereotypes. Further research is needed to investigate these possibilities.

5. Limitations and Future Research

Contrary to expectations, this study did not identify significant differences in perceptions of men's and women's game affinity between game platforms. The lack of significant differences may be due to the particular game used in this study, the nature of the manipulations,

or sample-specific characteristics. For example, it is possible that sex-based stereotypes associated with the game's historical Renaissance theme, which was mentioned by some participants in open-ended data, overrode differences between platforms. Future research should investigate perceptions of sex-based stereotypes across a variety of game genres, which have been found to be differentially preferred by men and women (Vermeulen & Van Looy, 2016).

Furthermore, all conditions in this study had the appearance of a card game, even in digital conditions. As such, it is possible that even in digital conditions, the game was still perceived and interpreted as a card game because of its on-screen appearance. Indeed, some participants' open-ended responses specifically mentioned interest in card games as a characteristic of a prototypical Splendor player. Even so, this appearance was maintained so as to avoid confounding platform differences with other differences in game appearance. Furthermore, the appearances of the digital game conditions were ecologically valid, as they were screenshots of an actual digital implementation of the game. Finally, as a card game, Splendor could have been perceived as a casual game that would stereotypically be preferred by women (Lucas & Sherry, 2004), but this did not appear to be the case.

Participants viewed but did not play games. Actually playing may produce different perceptions of others' likely affinity for the game. Still, understanding perceived stereotypes *prior* to play remains important, because these stereotypes influence individuals' participation in activities in the first place (Cheryan et al., 2017). Furthermore, initial perceptions can be sufficient to trigger stereotype threat responses, as when subtly making identity categories salient triggers stereotype threat (Steele & Aronson, 1995).

Post-hoc equivalent tests provided some evidence for equivalence among some, but not all, conditions. However, the equivalence bounds that this study had 80% power to detect were

rather large, falling within the upper 75th percentile of effect sizes in communication studies research on media (Weber & Popova, 2012). Future research in this area should attempt to achieve greater power to perform equivalence tests for smaller effect sizes of interest.

Finally, particularities of this study's sample could have influenced findings. The distribution of participants' identities in this study's sample skewed toward extremes: participants tended to be highly identified with women and lowly identified with gamers, which limited the ability to investigate how identification with women and gamers interacted (cf. Vermeulen et al., 2017). This study's participants were primarily ages 18 through 25, which precluded the identification of potential cohort or age differences in stereotypical perceptions. Future research should include participants with more diverse identities and ages to investigate with greater nuance the influence of identity and cohort on perceptions of sex-based stereotypes in games.

6. Conclusion

This study's findings suggest that perceptions of sex-based stereotypes of games and gaming may be relatively consistent regardless of game platform, but that perceptions of these stereotypes are influenced by individuals' identities. Specifically, differences in perceptions of men's and women's affinity for a game were smaller the more participants identified with gamers. Additionally, perceptions of a prototypical player of a *particular* game may be more specific than general stereotypes of games and gamers, including characteristics such as age and interests. Although these findings underscore the pervasiveness of stereotypes across different types of games, they also indicate that there is hope for reducing these stereotypes. As such, further research is merited into the role of identification and identity processes on stereotypes, their origins, and their consequences in games and gaming.

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Appendix: Stimulus Materials

Tabletop condition

Digital tablet condition

Digital desktop computer condition

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