Stand by Your Man: An Examination of Gender Disparity in *League of Legends*

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Abstract
Although video gaming is becoming a more widespread activity beyond its historically core demographic of young males, participation in competitive gaming remains largely male dominated. Addressing this issue, this research examines the experience of female players in one of the world's most popular games, *League of Legends*. Two studies—one qualitative (with 15 participants) and the other quantitative (with 16,821 participants)—confirm that although female players accrue skill at the same rate as males, there remains a dearth of female players in this community. Moreover, those females who play with a male partner are less confident in their skills and often focus on supporting their partner's advancement, not their own. This work suggests that one way to address the gender gap in gaming is to better understand and improve the social dynamics within popular games.

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Early and sustained access to digital games and their cultures has been linked to interest in Science, Technology, Engineering, and Math-based fields (DiSalvo, 2012; Steinkuehler & Duncan, 2008). Similarly, video games have been found to influence a variety of educational outcomes, such as knowledge acquisition and motivational improvements (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012), as well as general cognitive abilities, such as spatial navigation and orientation skills (Feng, Spence, & Pratt, 2007). Despite recent advances in extending digital gaming to populations beyond its long-standing ''core'' demographic, research points to an ongoing gender disparity in the play of competitive video games (N. Taylor, 2012; N. Taylor, Jenson, & de Castell, 2009; Witkowski, 2013), particularly in action-heavy genres such as real-time strategy (e.g., *Starcraft*), first-person shooters (e.g., *Call of Duty*), fighting games (e.g., *Mortal Kombat*), and more recently, multiplayer online battle arenas (MOBAs; e.g., *Defense of the Ancients* and *League of Legends*).

Given the educational and vocational benefits associated with gaming, particularly in strategy-driven and/or action-intensive competitive gaming genres, the marginalization of females from competitive gaming communities is problematic. An important goal for research in this area, therefore, is to understand the social, psychological, and cultural barriers facing female players, so as to make competitive gameplay a more inclusive space.

This article reports on a mixed-methods approach to documenting and accounting for the gender gap in *League of Legends* (hereafter *League*), one of the most widely played online PC games on the market (Gaudiosi, 2012). We ask why don't more females play *League*? In order to address this question, we broadly examine the gender-based interactions between players in *League*. By looking at the playing field more closely, we seek to understand how gender disparities inside (and outside) *League* shape female experiences of the game and what the implications of these often tumultuous experiences are to female *League* players.

This article describes two separate studies that examine male/female gender dynamics in the game's community.[1] Design and data collection of these studies were conducted independently of each other; however, we discovered, through discussion of our work, that there was significant overlap in research regarding conditions of female involvement in *League*, despite differences in the larger study objectives and methodologies. This enabled us to collaboratively pursue and develop analyses of female players' experiences, as recorded in two separate data sets, and then to integrate these analyses into a cohesive and novel examination of gender disparity in this competitive gaming community.

This integration of two studies from different methodological backgrounds provides an account that is both generalizable and rich in detail. Study 1 is an exploratory qualitative study involving 15 participants; it employs ethnographic techniques to study the co-situated play of participants (most came in pairs, though one group of three participated) in an effort to explore the lived experience of *League* play. Study 2 is a quantitative study that uses survey data about player experiences matched with

behavior-log data provided by the game operator (Riot Games), which allows for a broad comparative gender analysis based on 16,821 participants. Working from these distinct but complementary perspectives, we find that social and psychological factors, such as pressure on females to fulfill particular in-game roles, negative interactions between players, and the perception of female players as unwelcome and/or unskilled participants in the community, significantly contribute to the dearth of female *League* players. In particular, we draw from Stereotype Threat Theory (Steele & Aronson, 1995) to consider how female players are negatively affected by persistent stereotypes that portray the typical gamer as straight, white, and male, and position females as "outside" of gamer culture (Bryce & Rutter, 2003; N. Taylor et al., 2009). We conclude with the implications of this "unequal playing field" for the inequitable distribution of rewards and benefits associated with competitive gameplay.

Background: Gender and Digital Play

The Entertainment Software Association's (ESA, 2013, p. 5) 2013 report, *Essential Facts About the Computer and Games Industry*, states that 45% of the "game players" are female and, furthermore, that "women 18 or older represent a significantly greater portion of the game-playing population (31%) than boys age 17 or younger (19%).". We are not told, however, what females and males are playing; some research suggests that females outnumber males as players of "casual" games, while the reverse seems to still be the case for genres such as sports games and first-person shooters (Trepte, Reinecke, & Behr, 2009). Nor are we given insight into when, how often, and for how long males and females of different ages play. Similar statistics have been used by the ESA for years,[2] complicating notions that this represents a closing of the persistent "gender gap" in gaming (Jenson & de Castell, 2010). Furthermore, these facts appear incongruous when compared to the ongoing stories about a digital gaming culture that is beset by misogyny, homophobia, and racism. These stories include, among others, the backlash against the producer of a series of web videos critiquing stereotypes of females in games (Lewis, 2012; Moore, 2012), the sexual harassment of a female e-sports athlete by her male colleague on a live webcast (Schreier, 2012), and the outrage over a female game developer's comments about her dislike of combat-driven gameplay (Griffiths, 2012). Taken together, these incidents portray mainstream gaming culture as an unpleasant or openly hostile space for females (Consalvo, 2012).

Game studies scholars have, for some time now, documented these and other forms of toxicity that female game players confront, particularly when they participate in social gaming contexts, either online (Gray, 2012) or offline, particularly in public gaming contexts (N. Taylor et al., 2009). In her ethnography of *Everquest 2* players, for instance, T. L. Taylor (2006) reported on the ways female gamers have to negotiate gender stereotypes that, on one hand, portray female game characters in hypersexualized ways, and on the other hand, position females as "naturally"

inferior users of computer technology. Kelly Bergstrom (2012) outlines some possible reasons as to the large gender disparity in the space-themed massively multiplayer online (MMO) *EVE Online*, citing the connection between competencies required by the game and those associated with male-dominated domains of math and engineering. One mixed-methods study of an all-female Xbox Live gamer community reported on the kinds of harassment females confront when playing console games online (as well as the kinds of support they offer each other; T. Kennedy, 2007); ethnographic research with an Xbox Live clan comprised of Hispanic and African American females extended this exploration, revealing the "intersecting oppressions" these gamers encounter from other players (male and female) as both female and non-White (Gray, 2012). With regard to offline contexts, recent mixed-methods research reports that digital play at LAN parties and Internet cafés remains overwhelmingly male dominated, despite reported increases in the number of females playing online (N. Taylor, Jenson, de Castell, & Dilouya, 2014). This work builds on and updates earlier observations of the gender divides that characterize public gaming contexts, such as arcades (Alloway & Gilbert, 1998), competitive gaming tournaments (Bryce & Rutter, 2003; N. Taylor et al., 2009), and Internet cafés (Wakeford, 1999). This research demonstrates that female gamers routinely encounter sexism, misogyny, alienation, and harassment, both online and offline. As Helen Kennedy (2002) alluded to in her critical analysis of Lara Croft, the heroine of *Tomb Raider*, these broader social and cultural conditions arguably have as much, if not more effect on the gender gap in gaming than the well-documented ways that female characters are portrayed in games (Williams, Martins, Consalvo, & Ivory, 2009).

Approach

This research utilizes both quantitative and qualitative approaches to document and account for the gender gap in *League* play, in order to balance the benefits and shortcomings of both approaches. Namely, what quantitative methods offer in terms of deductive, objective, and generalizable contributions, they often lack in terms of the inductive, subjective, and contextual understanding provided by qualitative methods and vice versa (Lingard, Albert, & Levinson, 2008). Specifically, in Study 1 we analyzed in-depth interviews with players, observed and recorded their actual play, and invited them to discuss key moments from the video replay of their match; in Study 2, we analyzed matched server-based and survey data from a large sample of online game players.

The analysis presented reflects an exploration of specifically how these two approaches provide complementary perspectives on the gender gap in *League* play. As we discuss subsequently, qualitative and exploratory observations and interactions with participants in Study 1 provided the impetus for the hypotheses tested on Study 2 data; additionally, relationships identified in the Study 2 data were furnished with explanations provided through Study 1's interviews, in ways similar to

the mixed-methods approach to other online gaming research (Williams, Kennedy, & Moore, 2011). In short, the qualitative study finds phenomena and the quantitative study examines their generalizability.

League

League is a fantasy-themed MOBA game in which players are placed into ad hoc teams which battle for dominance on a limited map, with the ultimate goal of over-running their opponents. The most commonly played mode features the two teams' bases located at either end of the map, separated by forests and streams populated by computer-controlled monsters. Three lanes connect the two bases, creating lanes that must be contested and eventually overrun. *League* is one of the most played PC video games in the world, with over 30 million players every month (Riot Games, 2012). *League* players select from a wide assortment of avatars, called Champions, each with distinctive appearance, abilities, and narrative backstories. Champion selection is done in conversation with teammates; players often attempt to claim in-game roles they prefer, and the Champion they choose will generally be suited to that role. In-game roles include the "Top" and "Mid," both named for lanes they guard (i.e., top or middle) and typically requiring a Champion that can take a great deal of damage. The "Jungler" roams between lanes to harry opponents and assist teammates when needed. The "Attack Damage Carry" (ADC) deals heavy damage against the opposing team's defenses, while "Support" players assist in that effort by boosting the ADC's strength or inhibiting enemies. Often, multiple players will want a particular role, and negotiation tends to be strategic and sometimes contentious.

Study 1: A Qualitative Case Study of *League*

Study 1 undertook an exploratory investigation of mentorship and the development of expertise among *League* players. The larger investigation was guided by the deliberately open-ended research question of how *League* players improve in general. For the purposes of this article, we focus specifically on the experiences of our female participants.

Method

Data collection for Study 1 was undertaken in the summer of 2013 and used semi-scripted interviews with participants alongside observations of participants' play in order to explore the resources and practices through which *League* players become more proficient at the game. The study took in 15 participants (2 female and 13 male) from various skill levels, ranging from players who had been playing for fewer than 2 months to those who had been playing for 4 years. The shortage of female players was an artifact of actual community statistics—female players are exceedingly rare (the

presumably representative sample in Study 2 is only 4% female). The majority of participants played in co-situated pairs, though one group contained three participants. The analysis under discussion focused on the two participants from this study who were female, with special attention paid to their interactions with male players. Although this is a relatively small number of participants, the goal of this study was not to generate generalizable claims (which is the focus of Study 2), but instead to discover what phenomena occur, and the two female participants provided sufficiently rich data to this end.

Participants were found primarily via social media, with recruitment materials posted to appropriate group sites such as Facebook and Reddit, as well as the campus-wide electronic bulletin board system. Matches were played in an on-campus studio; players logged into their *League* accounts to play one standard match in the ''Summoners Rift'' map, while video and audio of the match were recorded. Researchers watched the match via *League*'s ''spectate'' function, while taking field notes on the match and participants. Once the match ended, players and researchers watched the recorded match together, giving players the opportunity to reflect on their own in-game actions, the composition of the teams in terms of Champion and role selection, the actions of teammates or opponents, and anything else they felt was relevant to bring to our attention. Before leaving, we sought participants' vocal permission for us to spectate future play and assessed their willingness to return and play for us again.

Results

The original purpose of this research was to explore the learning and teaching practices of *League* players at different stages in their involvement. It became apparent to us over the course of the first few research sessions, however, that issues of gender with regard to *League* figured largely in participants' accounts of their involvement in this game and its community. Both male and female participants repeatedly directed us, in interviews and while watching replays, to the dearth of female players in their peer groups and in the community more generally, and the often toxic, misogynistic nature of exchanges between players during matches. To be clear, these observations are not offered as evidence of the larger state of affairs with regard to gender disparities in *League* play. Instead, they are exploratory and are followed up on more systematically in Study 2.

Annie

''Annie,[3]'' a university student of Chinese descent, came in for two separate play sessions. In the first session, she accompanied a male friend of her boyfriend (both of whom she said she plays with), and in the second session she was accompanied by a classmate of hers, another female recently introduced to the game (Poppy). In her intake interview, Annie depicted herself as being at somewhat of a crossroads in her

League play: introduced to the game through watching her boyfriend play almost a year and a half before, the first role she learned to play was Support, as a means of (literally) supporting her boyfriend's preferred role as ADC. More recently, however, and during the time of our first encounter with her, Annie had been working on improving her play in other roles, specifically Mid and Jungler, a shift that coincided with more time spent playing without her boyfriend. In the following interview excerpt, in which we ask about other female players she knows or plays with, she expresses frustration with what she seems to regard as a certain stereotyping of female players into Support roles:

Interviewer: How many other women do you know who play?

Annie: Umm, I can count them on one finger. So it's like [counting on hand] four or five?

Interviewer: Ok. Ok. And what do they usually play as?

Annie: Uhhh … I'm not too sure. Support. Sadly.

Interviewer: Ok. Why sadly?

Annie: So most girls are like, usually Support, that's how they get carried in ranked[4] games. So, I'm trying to break out of that.

As this exchange indicates, Annie sees other female players she knows (as well as herself) relegated to Support roles, something many of our participants identified as being the least popular position to play. This relegation is something Annie is pushing back against through her own attempts at acquiring the competencies necessary for the roles of Mid and Jungler, along with their associated play styles and Champions.

Annie's Gameplay

Interestingly, in her first play session (with her boyfriend's friend, ''Kennen,'' a self-identified Caucasian male of similar age), Annie took on a Support role, possibly because it is the role with which she is most familiar, given that she was playing in an unfamiliar setting and under conditions of observation. Compared to other participants, Annie seemed to be a competent and experienced player as demonstrated by her item purchases, leveling, protection of other Champions, map awareness, and low kill score (all markers of Support competency); in addition, she demonstrated an understanding of intricate game mechanics and strategies not shared by all participants.

In contrast to these numerous demonstrations of competency—particularly in her role as Support—Annie's communicative actions during the match suggested a reticence to interact extensively with other players. Although she did a fair degree of "pinging" (using the game's repertoire of predefined statements to alert teammates; in her case, primarily to indicate "Enemies are missing" and "Be careful"), she mostly refrained from using the text-based in-game communication system to "speak" with her teammates (or opponents). However, Annie proved to be one of our more vocal participants, with many of her verbal utterances during the match being directed at her teammates, who of course, cannot hear her (with the exception of Kennen who is beside her). These include comments urging her teammates to pursue a particular course of action (Watch out, Udyr) or criticizing them after a bad play (What is Jayce doing?[5]). When we asked why she does not actually type these comments into the game's chat channel instead of directing them verbally at an unresponsive screen, she responded that she did not feel confident enough in her judgment or abilities to warrant the attention (and possibly, negative responses) that such exchanges might solicit from teammates.

Poppy

In contrast to Annie, "Poppy"—the other female (and also of Chinese descent) player in our study—was a novice at the time we met her. As with Annie's early experiences with the game, Poppy plays with her boyfriend and primarily in the role of Support. During her intake interview, she described getting involved in the game at the insistence of her brother and her boyfriend. By her own account, her involvement with League and with the game's community is largely mediated by her boyfriend; she watches his matches, plays almost exclusively with him, and when they are both spectating other matches, he decides what to watch.

She was accompanied by Annie, who came in for a second session. Their match also involved Poppy's boyfriend, playing remotely (he was not part of the study). Throughout the match, Poppy followed Annie's lead in everything from item purchases to skill upgrades, and even in movement around the map. As Support to Annie's ADC, Poppy frequently indicated that she was confused by some of the primary tenets of the role; Annie had to direct her in the placing of "wards" to provide vision of enemy movements, as well as guide her through the process of "leashing," in which several team members assist the Jungler in obtaining an early kill. Poppy also followed Annie's lead in item purchases, skill upgrades, and movement around the map.

Discussion

Several aspects of these players' experiences, as described in their interviews and observed in their lab-based play, resonate with qualitative research previously carried out with heterosexual couples playing massively multiplayer online role-playing

games (MMORPGs) together (Carr & Oliver, 2009; Nardi, 2010; Williams et al., 2006). Like the female participants in these MMORPG studies, both Annie and Poppy were introduced to the game by male partners. Annie, despite her increasing self-taught competency in other roles, learned the game primarily through playing the Support role for her boyfriend. Poppy was, at the time of her involvement in the study, also playing as Support for her boyfriend; but unlike Annie her involvement was almost exclusively contingent on her boyfriend's play. This is consistent with the MMORPG research, where female participants in those studies started off as healers or as party support, essentially parallel to the Support function in *League* (Carr & Oliver, 2009; Nardi, 2010; Williams et al., 2006).

Although Annie and Poppy are at different phases in their *League* career, they share key similarities. In addition to both playing in Support roles with male partners, both females largely refrain from using in-game chat functions, aside from Annie's use of pings, which are preprogrammed and reveal nothing of the player issuing them. They are hesitant to communicate extensively with online teammates, whereas our male participants consistently used the chat function for a variety of purposes, from strategizing to trash talking. For Annie in particular, this suggests that game-based competence does not necessarily lead to a willingness to actively communicate in these team-based competitive situations. With the exception of pings and short (often one word or acronym[6]) utterances, these females were effectively silent—behavior at odds with the game's reputation for boisterous and often inflammatory communication between players (Carlson, 2013).

In summary, the qualitative insights about these two female players are as follows: Both respondents were introduced to the game by their male partners; both began playing as Support, directly assisting their male partners' (and in Poppy's case, brother's) efforts to play the more central and dominant role of ADC; both were observed to participate in text chat far less than study male participants; and both were unwilling to openly criticize other players (particularly in the case of Annie). These observations inform the hypotheses articulated subsequently with regard to Study 2, in an effort to see whether and to what extent the experiences of these female Study 1 participants are indicative of the experiences of female *League* players more generally.

Study 2: A Quantitative Complement

Study 2 complements and extends the qualitative approach of Study 1 by providing a deductive approach to understanding the gender gap in competitive gaming, informed both by Study 1 and by the consistent prior research on gaming's gender gap. The findings in Study 1 illustrate the prevalence among *League* players of certain stereotypes related to females and gaming (e.g., females as less competent gamers and females typically play the Support role), but also suggest ways in which players may individually resist these stereotypes (e.g., by playing less with their boyfriends). It is important to understand these dynamics because such stereotypes are

easily reinforced through psychological factors (e.g., reminders of the stereotype; Steele & Aronson, 1995). Conversely, this also suggests the potential to systemically counteract such stereotypes by avoiding such reinforcement, or even to use positive stereotypes to encourage behavior that is beneficial to all players.

We start by drawing parallels between the accounts of female *League* players' experiences presented in Study 1 to generalizable claims that can be tested with quantitative data. Although females are demonstrably absent from the *League* community (4% of our sample), the responses from Study 1 also suggest that males generally tend to play the game more intensively,[7] which would be consistent with the stereotype of the average gamer as an adolescent or young adult male (Griffiths, Davies, & Chappell, 2003; Kahn, Ratan, & Williams, 2014). Thus, if this stereotype is supported in *League*, we would expect that male players spend more time playing the game. With this in mind, we formulated and tested a series of hypotheses in order to explore and unpack these expectations.

Hypothesis 1: Male players have a higher average number of matches played than females.

Game skill (the ability to perform well in the game) is an important factor to consider, as players with more skill should tend to perform better, and may take on the roles that require more experience. If males play more matches than females (Hypothesis 1), then it would follow that males should have a higher average skill level than females. Further, if males are, as the stereotype suggests, more adept at playing video games in general, then for males and females who have played the same number of matches, males should still have a higher average skill level. This expectation was expanded for exploration in our second hypothesis.

Hypothesis 2: (a) Male players' average level of skill is higher than that of female players, (b) even for females and males who have played the same number of matches.

As suggested by our observations of Annie and Poppy, female players may express less confidence in their abilities—even when (as with Annie) they are as good as, if not better than, their male counterparts with similar experience and time investment in the game. If females are not inherently less skilled than men, then how can we account for this apparent lack of confidence?

One potential explanation comes from Stereotype Threat Theory, which posits that when people are reminded of a negative stereotype about a demographic to which they belong, they are more likely to conform to that stereotype (Steele & Aronson, 1995). For example, African Americans were found to perform worse on an intellectual test when asked to report their race before the test (compared to not reporting it), which served to remind them of the negative stereotype about African American intellectual performance. Stereotype Threat Theory has been examined with respect to other social categories (e.g., gender; Spencer, Steele, &

Quinn, 1999) as well as on other types of performance, such as math (Nguyen & Ryan, 2008), sports (Stone, Lynch, Sjomeling, & Darley, 1999), and automobile control (Yeung & von Hippel, 2008).

In our review of the literature, we could find only two studies that examined how stereotypes about gaming ability may impact play behaviors. Richard and Hoadley (2013) found that among a sample of over 100 gamers, females had lower gaming self-concept than men, which they explain as a result of the threat induced by the stereotype of females being inherently less skilled at gaming than males. In an experimental study, Vermeulen, Núñez Castellar, and Van Looy (2014) found that females who thought they were playing a game against a male (as opposed to a female) felt more stress and perceived their skills as lower. Both studies suggest that the stereotype that females are not meant to be gamers may hinder female players' ability and willingness to achieve and compete within such games. In a combat-driven game such as *League*, killing opposing players is both a marker of competency and a crucial element of winning. Thus, we would expect that female *League* players are less confident in their ability to kill opponents than males, an expectation we specifically examine in our third hypothesis.

> **Hypothesis 3:** Females are less confident in their ability to kill opponents than males.

If female players are treated poorly by the overwhelmingly male player community and not expected to compete well, why do they play such games at all? One common stereotype, which ignores the potential that some females actually enjoy playing such games, is that of the "girlfriend gamer," the female who enters the game space only as a tagalong with a romantic partner (Carr & Oliver, 2009). Both female participants in Study 1 became involved in the game at the behest of their romantic partners; while this is certainly not the case for every female player, we would expect to see a larger proportion of females who are brought into the game by male partners than who come to it on their own, or via other social relationships. We would also expect, and hypothesize subsequently, that the proportion of female players who play with a romantic partner is larger than that the proportion of male players.

> **Hypothesis 4:** (a) There is a larger proportion of females who play with a romantic partner than those who do not and (b) females are more likely to play with a romantic partner than males.

Due to the ways they are typically introduced to the game (i.e., via male partners) and the persistent stereotypes about females' gaming abilities and predispositions (Carr, 2005; Jenson & de Castell, 2011; T. L. Taylor, 2003; Thornham, 2008), females are relegated to game roles that are perceived as less aggressive, and more collaborative than other in-game roles. In other words, females are discouraged from playing roles that enhance the skills related to the more competitive elements of the

game (e.g., killing opposing players) and instead encouraged to facilitate other (male) players' pursuit of more aggressive roles. In Study 1, both Annie and Poppy's experiences illustrated this phenomenon: Poppy was recently brought into the game by her boyfriend and told that she would make a good Support player, and while Annie expressed a desire to learn more central roles in future matches, such as Mid and Jungler, she told us that she had spent most of her time in the game playing Support for the other members of her teams (and in particular, during play with her boyfriend). If the experiences of these females are reflective of a general phenomenon, then we are led to hypothesize that female players tend to play Support roles more than males.

> **Hypothesis 5:** (a) Females play Support more than males, and specifically, (b) the more frequently a female plays with a romantic partner (as a proportion of her total play), the more likely she is to play a Support role.

If one of the reasons that females choose Support roles is the behest of their male romantic partners, then it is possible that females who do not play with romantic partners are less likely to play Support. For instance, Annie's expressed desire to change roles in the game was coupled with a sense that playing with her boyfriend hindered her ability to choose more competitive roles; this led to a desire to play less frequently with her boyfriend and more frequently on her own. So, by reducing the proportion of playtime she shared with him, she anticipated being able to increase her competitive abilities.

Further, if this hypothesis is supported, and given that Support roles (compared to more competitive roles) are expected to contribute less to the competitive play experience, then we would expect that females who play with a romantic partner in the majority of their playtime have weaker competitive abilities than those who do not. Conversely, for male players, we might expect to see those who play with their female partners in the majority of their playtime exhibit a higher degree of competitive abilities than those who do not since they would be likely to benefit from the dedicated support of their female partners. To examine these expectations, we formulated our final hypotheses:

> **Hypothesis 6:** (a) Females who play with a romantic partner more frequently (as a proportion of total play) have weaker competitive abilities, while (b) males who play with a romantic partner more frequently (as a proportion of total play) have stronger competitive abilities.

Method

Although the qualitative study was able to hone in on specific, lived experiences of both female and male *League* players, the quantitatively focused Study 2 was able to make use of a unique data set to explore these hypotheses in the larger gaming community. The developer of *League*, Riot Games, provided data from


the game's back-end databases, and distributed a survey to a large sample of players. Such large-scale cooperation between an academic research team and a major game company is rare (but see Williams, Consalvo, Caplan, & Yee, 2009). The collected data were then used to perform statistical analyses in pursuit of our hypotheses.

Procedure and Data

Results from a survey conducted in November 2010 were linked with unobtrusively collected game-based behavioral data, all of which was privacy-protected and anonymous. The survey link was sent via e-mail to a randomly selected set of 113,579 players from the North American *League* server. Within 1 week, 22,521 completed the survey, with 18,627 deemed as valid (i.e., not a duplicate and sufficient time—12 min—spent answering questions) for a final response rate of 16.4%. All respondents were compensated with an in-game "boost" that doubled the rate at which they accrued points in their next four victories, a form of compensation that appeals to both male and female players of all experience and skill levels. The survey included approximately 150 questions, all of which were in multiple-choice or Likert-type scale format, and many of which required simple ratings of single words (e.g., adjectives describing the self). The topics of most of these questions are not relevant to this research (e.g., personality traits and play motivations) but are being explored in other studies. Similarly, the log data set contained approximately 100 variables, most of which are also not related to this research (e.g., choices of specific characters and types of damage dealt). The specific measures of interest for this study are described subsequently.

Participant Sample

Of the valid respondents, the average age was 21.90 ($SD = 5.22$), with 93.6% reporting being male, 4.1% reporting being female, and 2.3% not reporting on this variable. Because we are primarily interested in the comparison of males and females, we removed those who did not report their gender from the sample. Further, in order to increase the likelihood that our sample was representative of the population of *League* players at the time of data collection, we removed respondents who had played fewer than 15 matches, a cutoff point arrived at first by examining the frequency distribution of matches played (see Figure 1), which indicated that a large segment of the sample had fewer than 15 matches. In support of this finding, experienced players we consulted confirmed that players with fewer than 15 matches were, given the steep learning curve and time requirements of the game, unlikely to be representative of more invested players. After these adjustments, our final sample included 16,821 players.
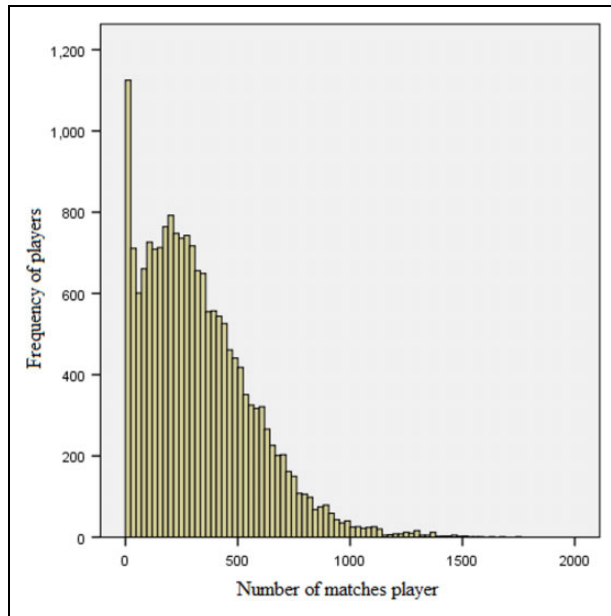
Figure 1. Frequency distribution of number of matches played across all respondents.

Measures

In addition to self-reported gender (what is your gender), the present analysis considered two survey-based measures, namely, confidence at killing opponents and frequency of playing with a romantic partner. For the measure of confidence at killing opponents, which we developed in consideration of the notion of self-efficacy (Bandura, 1977), participants were asked "How confident are you in your ability at killing the opponents champions," to which they responded on a 5-point scale ranging from *not confident at all* to *very confident*. For the measure of playing with a romantic partner, participants were asked "How often do you play with a romantic partner (e.g., spouse, fiancé, and boyfriend/girlfriend)?" to which they responded on a 5-point scale ranging from *never* to *always*.

The present analysis of the behavior log data focused on aggregated information over the lifetime of each player's account. The "number of matches" variable was a count of the number of matches played over the account's lifetime. The "skill" variable was based on the game company's proprietary algorithm for rating the skill level of each player (a type of Elo rating[8]), which takes a variety of gameplay elements into account (e.g., wins, kills, etc.). Likelihood of playing Support was derived from a count of the number of kills and assists, indicative of contributing to an opponent player's death but not dealing the final blow (thus, bolstering another player's kill count). Specifically, we calculated an assists-to-kills ratio (number of

Table 1. Descriptive Statistics for All Variables.

	N	Min	Max	M	SD
Opponent kill confidence	16,491	1.00	5.00	3.89	1.06
Play w Partner	16,087	1.00	5.00	1.45	1.02
Number of matches	16,821	16	1749	344.57	237.26
Skill	16,821	508	2091	1,273.82	167.55
Assists-to-kills ratio	16,821	0.22	9.88	1.41	0.53
Kills-to-deaths ratio	16,821	0.06	4.86	1.02	0.36

assists divided by number of kills). This reflects the extent of playing a Support role because the Support player is expected to deal some damage to opponents, but refrain from dealing the final killing blow (and are often scolded quite severely by teammates when they do so). Finally, as a measure of competitive abilities, we calculated a kills-to-deaths ratio because an adept competitive player is likely to kill more opponents, and to and die fewer times, in a given match. The descriptive statistics for all variables can be found in Table 1.

Results

Our analyses relied mostly on a series of t-tests (to compare means between groups), analyses of covariance (ANCOVAs; to compare means between groups while also considering other continuous factors that may influence these means), χ^2 tests (to compare the number of individuals within different categories), and regressions (to examine relationships between multiple continuous variables). For Hypothesis 1 (male players have a higher average number of matches played than female), we found that males had played an average of 347.44 matches ($SD = 237.83$), while females had played an average of 275.66 matches ($SD = 212.23$), and this difference was statistically significant, $t(744.10) = 8.55$, with a small effect size (Cohen's $D = 0.30$). This supports our hypothesis: male participants played more matches than female participants.

Similarly, we found that the average skill rating was slightly higher for males ($M = 1276.15$, $SD = 167.00$) than for females ($M = 1217.94$, $SD = 171.23$), and this difference was statistically significant, $t(16819) = 8.85$, with a small effect size (Cohen's $D = 0.35$), supporting Hypothesis 2a (male players' average level of skill is higher than that of female players). To examine whether this difference held even for males and females who have played the same number of matches (Hypothesis 2b), we conducted an ANCOVA with gender as a fixed factor, number of matches played as a continuous factor (to control for number of matches played), and skill rating as the dependent variable. The results (Table 2) suggest that for females and males who have played the same number of matches, gender significantly predicts player skill level (as previously defined), with skill rated

Table 2. ANCOVA analysis on skill.

	Sum of Squares	df	Mean Square	F	η^2
Number of matches	1,107,267.47	1	1,107,267.47	39.71***	.00
Gender	2,001,266.35	1	2,001,266.35	71.78***	.00
Error	468,901,841.97	16,818	27,880.95		
Total	27,766,384,390.45	16,821			

Note. ANCOVA = analysis of covariance.
***p < .001.

Table 3. ANCOVA Analysis on Opponent Kill Confidence.

	Sum of Squares	df	Mean Square	F	η^2
Skill	10.78	1	10.78	9.72**	.00
Gender	131.79	1	131.79	118.89***	.01
Error	18,277.48	16,488	1.11		
Total	267,635.00	16,491			

Note. ANCOVA = analysis of covariance.
**p < .01. ***p < .001.

higher for males (estimated M = 1,276.05, SE = 1.31), 95% CI [1,273.48, 1,278.63], than for females (estimated M = 1,220.30, SE = 6.45), 95% CI [1,207.66, 1,232.94]. However, the effect size was negligible (η^2 = .00), which suggests that this difference was not meaningful, and thus that females accrue skill at the same rate as males.

For Hypothesis 3 (females are less confident in their ability to kill opponents than males), we conducted an ANCOVA with gender as a fixed factor, skill rating as a continuous factor (in order to compare the effects of gender across players with the same level of skill; i.e., as a control variable), and the measure of confidence at killing opponents as the dependent variable. The results (Table 3) suggest that females are indeed less confident about killing opponents (estimated M = 3.45, SE = .04), 95% CI [3.37, 3.53], than males (estimated M = 3.91, SE = .01), 95% CI [3.89, 3.92]. This effect size was very small (η^2 = .01), so the hypothesis was only marginally supported. In other words, females' confidence in their ability to kill opponents was not meaningfully lower than that of male players with similar levels of skill.

For Hypothesis 4a (there is a larger proportion of females who play with a romantic partner than females who do not), we found that 73% of the female players reported playing with a romantic partner at least rarely, while 27% reported never doing so. This difference was significant, $\chi^2(1, N = 553) = 68.76$, $p = .00$, and had a medium effect size (φ = .33), supporting the hypothesis: more female participants played with a romantic partner than those who did not.

Table 4. ANCOVA Analysis on Assists-per-Kills Ratio.

	Sum of Squares	df	Mean Square	F	η^2
Skill	235.51	1	235.51	912.62**	.05
Gender	185.52	1	185.52	718.90***	.04
Error	4,340.12	16,818	.26		
Total	38,248.80	16,821			

Note. ANCOVA = analysis of covariance.
**$p < .01$, ***$p < .001$

Table 5. Regression on Assists-to-Kills Ratio for Female Players Only.

	Unstandardized Coefficients	Standardized Coefficients			
	b	SE	β	t	η^2
Constant	0.20	0.28		0.71	
Play w Partner	0.09	0.02	0.16	4.14***	.03
Skill	0.00	0.00	0.21	5.44***	.04

Note. $N = 673$.
***$p < .001$; $F(2, 650) = 21.206$, $p < .001$, $R^2 = .061$, adjusted $R^2 = .058$.

For Hypothesis 4b (females are more likely to be playing with a romantic partner than males), we found that females rated the frequency of their play with a romantic partner as significantly higher ($M = 3.30$, $SD = 1.61$) than did males ($M = 1.38$, $SD = .90$), $t(669) = 30.33$, with a large effect size (Cohen's $D = 2.07$). Thus, this hypothesis was strongly supported: female participants played with romantic partners more regularly than male participants did.

We tested Hypothesis 5a (females play Support more than males) in an ANCOVA with the assists-per-kills metric as the dependent variable in each, gender as the fixed factor, and skill rating as a continuous factor. The results (Table 4) suggest that females play more Support roles (estimated $M = 1.93$, $SE = .02$), 95% CI [1.89, 1.96], than do males (estimated $M = 1.39$, $SE = .00$), 95% CI [1.38, 1.40]. This difference is significant and has a small effect size ($\eta^2 = .04$), supporting the hypothesis: female participants played Support more than males.

Because only female players were of interest for Hypothesis 5b (the more frequently a female plays with a romantic partner, the more likely she is to play Support), we restricted the sample to only females ($N = 673$) and ran a linear regression analysis with the measure of playing with a romantic partner as the independent variable of interest, the measure of skill as a control variable, and the assists-per-kills metric as the dependent variable. The results (Table 5) suggest that for female players, playing with a romantic partner significantly predicts playing Support, with a small effect size ($\eta^2 = .03$). This supports the hypothesis: female participants who

Table 6. ANCOVA Analysis on Assists-per-Kills Ratio.

	Sum of Squares	df	Mean Square	F	η²
Gender	15.80	1	15.80	127.06***	.01
Ever play w Partner	1.78	1	1.78	14.27***	.00
Gender × Partner play	2.85	1	2.85	22.88***	.00
Error	2,010.08	16,161	0.12		
Total	18,805.72	16,165			

Note. ANCOVA = analysis of covariance.
**$p < .01$. ***$p < .001$.

played with a romantic partner played Support more than female participants who did not play with romantic partners.

Because of their parallel structure, we tested Hypothesis 6a (females who play with regularly with a romantic partner have weaker competitive abilities) and Hypothesis 6b (males who play with regularly with a romantic partner have stronger competitive abilities) in the same ANCOVA, with gender, a dichotomized measure of playing with a romantic partner (*never* = 0 and rarely through *always* = 1), the interaction between the two as the fixed terms, skill rating as a continuous factor, and the competitive abilities measure as the dependent variable. As the results (Table 6) suggest, the interaction term was significant, but the effect size negligible ($\eta^2 = .00$), and so neither hypothesis was supported. In other words, whether or not they played with a romantic partner, there was no meaningful difference in competitive abilities for males or females.

Discussion

The findings from Study 2 suggest that *League* is largely male dominated, with males playing more matches than females and having higher skill level on average; this is of course consistent with the gamer-as-adolescent-male stereotype. However, the difference in actual skill between males and females was found to be negligible for those who have played the same number of matches. This is inconsistent with the stereotype, which suggests that males accrue game skill more readily than females. Thus, this suggests that females are not at an inherent disadvantaged with respect to developing game skills, a finding consistent with previous research examining the relationship between gender and gaming expertise, both from qualitative (Jenson & de Castell, 2008) and quantitative (Lucas & Sherry, 2004) studies. Nonetheless, females were found to demonstrate less confidence in their ability to kill opponents than males, albeit this is a very small effect. Together, these findings suggests that the stereotype of females as being less adept at gaming than males, affects their perception of their own abilities, even when those abilities are no different from males. This finding is consistent with previous research on stereotype threat in gaming (Richard & Hoadley, 2013; Vermeulen, Núñez Castellar & Van Looy, 2014) and

supports the claim that gender disparity in gaming may result more from cultural perceptions of gender and gaming, rather than from actual differences in ability or performance.

The study also found that the portion of females who play the game with a romantic partner is larger than those who do not, as well as larger than the portion of males who play with romantic partners. These findings are consistent with the girlfriend-gamer stereotype, which helps explain the further findings that females are more likely to play Support than males, especially those who play with romantic partners, suggesting that female players are relegated to play Support, often in support of the male romantic partners who brought them into the game. In other words, female players of *League* find themselves expected, if not required, to stand by their man.

However, while the findings of Study 1 led us to expect that playing with a romantic partner would have an influence on the competitive abilities of females, this was not borne out by the results of Study 2. This suggests that female players may not necessarily be prevented from improving their competitive performance just because they are fulfilling an expected role within the *League* community. Future research should examine this issue more directly, comparing situations in which playing with a romantic partner can be helpful or detrimental to the performance of female players.

Overall Discussion

This research draws from two complementary studies, one qualitative and one quantitative, to examine the possible social and psychological factors that may discourage females from playing *League*, and that prevent those who do from playing as intensively as their male counterparts. The insights gained from the qualitative observations were mostly consistent with quantitative data. As explored in Study 1 and supported by Study 2, many female players may be compelled, pressured, or otherwise directed toward playing the Support role that, though requiring no less competence than other in-game roles (and arguably more), is nonetheless seen by many players as subordinate to, and less desirable than, the role of ADC.

Both studies also suggest that females are not as confident in their gameplay ability as males. This could be construed as a cause of the gender disparity in the game—because females are not confident in their abilities, they do not play the game or they choose to play Support—but we find it unlikely that this is the whole story. Two other factors, which likely contribute to the systematic gender gap in competitive games as a whole, are the social climate that is hostile to females, and the stereotype that females do not belong in, or are not skilled at, the game.

These factors likely hinder the female players from gaining confidence in the game, much as reminders of a negative stereotype induce people associated with that stereotype to conform to the negative expectation (Steele & Aronson, 1995). In other words, many female *League* players may face a vicious cycle by believing that they are suitable only for Support roles or, more problematically, that they do not belong

in the game, female players may refrain from intensive play and/or experimentation with other game roles, which in turn perpetuates these very stereotypes. Such a cycle may indeed be demonstrated by the lived experiences of Annie: although she is trying to expand her competencies beyond her normal Support role, she is constantly compelled to adhere to the gender-normative behaviors we have identified here by two major pressures, that is, the stereotype of the "Female Support player" (which she herself identifies) and social interactions with male players (e.g., her boyfriend, other male friends, and online players perceived to be male). Although this research did not test such theoretical explanations directly, future work in this area could do so by specifically examining whether reminders of the stereotype that females are unskilled players has a negative influence on their performance.

As previous research has demonstrated, there is no quick and easy fix to bridge the gender gap in gaming (Jenson & de Castell, 2010; Lucas & Sherry, 2004). However, beyond the theoretical implications, our findings suggest that game companies have the potential to reduce this gap by addressing the social dynamics that propagate these stereotypes, as well as facilitate hostility toward female players. Making the game more hospitable—both for female and for male players—is at least partially a matter of addressing and curbing the toxicity and negativity that characterizes the majority of players' in-game verbal communication. Riot Games has actively taken steps in this direction (McWhertor, 2012), having introduced both "Honor" and "Reform card" systems through which players can either commend each other for positive and supportive behavior or report each other for abusive behavior, respectively. Further, Riot Games has instituted a "Tribunal System" in which community members (i.e., players) review cases of repeated abuse reports and decide whether to pardon or punish the offending player.

Although encouraging females to join and participate in competitive gaming spaces would appear to be a worthy goal, we should be cautious of how female gamers are channeled into these arenas. When we play with others—whether with a friend, family member, or romantic partner—we must consider whether and how the existing relationship shapes game play, and one's experiences within it. As we have suggested here, playing with a male romantic partner may simultaneously afford female players entry into the gaming community, while at the same time limiting their participation to remain along stereotypically gendered lines. Moreover, prior research has found that playing with a romantic partner in general can have negative impacts on the male partner (Williams et al., 2009). One compelling avenue for future research is therefore to examine other forms of preexisting player relationships (nonheterosexual romantic couples, nonromantic dyads, etc.) to see whether and how gender dynamics play out in these different configurations.

Conclusion

These two studies on the perceptions and experiences of female *League* players examined the barriers they experience to more equitable participation in, enjoyment

of, and benefits derived from, the play of competitive games. Evidence continues to mount that digital gaming can be greatly rewarding for many players, not just in terms of a pleasurable and sociable leisure activity, but as a pathway to positive interpersonal, vocational, and educational outcomes. As this study documents with regard to gendered participation in one of the most popular PC games on the market, these rewards are not distributed equitably. More research is required to not only document but also possibly help intervene into this current state of play, if female players are ever to stand apart from their male gatekeepers.

Declaration of Conflicting Interests

Funding

Notes

1. Although our focus is on the ways heteronormative relationships play out in the game, we acknowledge that similar explorations could (and should) be undertaken with regard to the experiences of Gay, Lesbian, Bisexual, Transgender, and Questioning players (see, e.g., Shaw, 2009).
2. In 2007, "women age 18 or older represent a significantly greater portion of the game-playing population (31%) than boys age 17 or younger (20%)" (ESA, 2007, p. 5).
3. To protect anonymity, we have replaced participants' names with the names of popular *League of Legends* Champions.
4. "Ranked" games refer to games that count toward players' officially designated status going from Bronze (lowest) to Platinum (highest). Many participants in Study 1 expressed frustration with ranked *League of Legends* play, claiming that these matches included higher incidences of grievances between players.
5. Both Udyr and Jayce are the names of champions chosen by her teammates.
6. Like many online games, *League of Legends* has spawned and appropriated a variety of these short discursive elements (e.g., "GLHF" for "Good Luck, Have Fun" or "Mid" to indicate a players' desire and intention to fill that role on the team). As with pings, these statements carry little potential of revealing any personal information about the issuing player.
7. As seen in the overwhelmingly male player base, as well as the tendency of male players to play, watch, and in general engage with the game with more frequency.
8. http://leagueoflegends.wikia.com/wiki/Elo_rating_system

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