Gender disparities in esports – An explanatory mixed-methods approach

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ABSTRACT

Within the last decade, esports (i.e., the competitive play of video games) has conquered substantial parts of digital entertainment with annually increasing revenue and consumer participation. Interestingly, while there exists a wide variety of esports titles, there is an observable gender disparity across them, as female esports players are substantially underrepresented at both casual and particularly at professional levels. Building on expectancy theory and achievement motivation, this study used an explanatory follow-up mixed-methods approach to explore the observed gender disparity. Using the exemplary case of League of Legends, we carried out a cross-sectional survey with both male and female League of Legends players. The results were mostly in line with expectancy theory showing no difference regarding expectancy and instrumentality between male and female players. Additionally, contrary to our hypotheses, we found higher valence and achievement motivation levels for female players. We facilitated three online focus-group discussions, each with a different gender distribution (female vs. mixed vs. male), to derive potential explanations for the findings. From the analysis of the focus-group discussions, we demonstrated that cultural and dispositional differences contribute to the observed gender differences. Among these, the differing perceptions of in-game culture and individual attributions (i.e., goal orientation, locus of control) were prevalent reasons influencing female participation.

1. Introduction

Within the last few decades, esports, commonly defined as the competitive play of video games, has become a significant entertainment phenomenon worldwide (Bányai et al., 2019; Scholz, 2019). Enabled by the newly risen opportunity of real-time interaction, the success of esports manifests on economic and societal levels. For example, the constantly growing esports industry generated $1.384 billion in 2022 for game publishers, event organizers, players, and teams (Statista, 2023). Furthermore, esports is an integral part of popular culture, and there were 532 million esports viewers altogether in 2022 (Newzoo, 2022). Nowadays, the esports industry has a professional scene of players and teams, and some universities already offer scholarships related to esports (Keiper et al., 2017; Scholz, 2019), demonstrating the increasing relevance of the topic for the pop culture, economy and our society.

From the perspective of research, the esports phenomenon includes unique characteristics that make it stand out from traditional sports and casual video game playing. For instance, previous research has produced insights focusing on (1) esports as drivers of technological innovation, e.g., online live streaming and co-production of digital goods (Cai et al., 2018; Hilvert-Bruce et al., 2018), (2) opportunities for global accessibility for people with various disabilities (Baltzar et al., 2022, 2023), (3) player experiences and need satisfaction (Mora-Cantallops & Sicilia, 2018a; 2018b), (4) innovative behaviors in online communities such as toxic behavior (Beres et al., 2021; Kordyaka et al., 2023a,b,c), (5) and opportunities for consumption of data-driven insights during and around esports broadcasts (Block et al., 2018; Kokkinakis et al., 2020) to name just a few relevant areas. These unique characteristics of esports open up important research avenues in psychology, sociology, sports science, computer science, business, and media studies (Scholz, 2019). Studying esports allows researchers to delve into the intricacies of a rapidly evolving industry and contributes to our understanding of the intersection between digital technology, competition, and human behavior.

One particularly salient aspect related to esports that requires closer inspection is the gender distribution of players in professional esports environments. In late 2022, one of the most significant esports events – the League of Legends World Championship – took place in the United States and Mexico, and more than a hundred professional players participated, but not even one was female. The asymmetric gender distribution should not be taken for granted since (1) the majority of League of Legends players are male, but a substantial part (between 5 and 20%) of the player population is female (LeagueFeed, 2022; Yee, 2017); (2) we assume that the physical attributes such as strength and athleticism - opposed to a wide array of sports such as soccer or basketball - are not as necessary for good performances in esports since the technological framework is the same for female and male players (Kordyaka & Brunnhofer, 2021; Ratan et al., 2015). Furthermore, in the intellectual sport chess, females such as Judit Polgar have competed at the very top level with male players. Accordingly, we argue that it is worth investigating further why not a single female professional player plays at the highest level of esports despite no apparent hurdles present in the tournament rules. Here a critical avenue to explore are the unwritten rules and non-apparent hurdles set for females, as there are, for example, reports that female players in esports are being treated as outsiders (Cote, 2017). This warrants further investigation into the cultural setting and psychological mechanisms for the underrepresentation of female players in esports.

Previous research has explored gender disparities in esports by, for example, looking at cultural issues, e.g., conceptualizing the phenomenon as a systematic and unfair difference in the way male and female players are treated within competitive esports games (e.g., for the most part describing so-called ranked games in which every player wins or loses points based on the outcome of each game) (Gupta et al., 2019; Kuo et al., 2019; Schelfhout et al., 2021), and socialized issues, e.g., that female players would not like violence and intense competition present in competitive esports games (Madden et al., 2021). A recent literature review summarized that cultural gender disparities in esports can be explained through the following three main themes: (1) a masculinity-dominated environment, (2) the presence of online harassment, and (3) gendered expectations of society (Rogstad, 2022). This review study concludes that the esports industry would immensely benefit from further research into making the environments more inclusive, which is the meta-framework of this study.

In this work, we address this call for further research by providing a complementary approach concerning existing work. For this, we assume that player motivation can be outlined as an intra-individual cognitive process that differs between male and female players due to different levels of external confirmation and gender-related bias. On a level of theory, we apply two approaches that both focus on how individuals' beliefs and motivations influence behavior and performance and hold a combined ability to shed light on the underlying factors that contribute to the unequal representation of both genders in esports. First, we use expectancy theory consisting of the component's expectancy, instrumentality, and valence to describe the motivational process of players (Isaac et al., 2001; Oliver, 1974). The theory explains why individuals choose one behavioral option over another (Chiang & Jang, 2008; Hopp & Fisher, 2017; Liu & Agur, 2022) and have not been applied to gender disparities in the context of esports. Second, we use achievement motivation (e.g., describing when individuals are driven, inspired, or stimulated by successes or accomplishments) to provide a better understanding of the currently ambiguous picture of current research (Rasheed et al., 2022; Sun, 2017; Yee et al., 2012).

Building on this, we make use of an explanatory follow-up mixed-methods research design consisting of a quantitative (Study 1) and a qualitative study (Study 2) that are carried out sequentially (Ivankova et al., 2006). In Study 1, we test several hypotheses regarding our theoretical framework about female and male players using a survey to collect data and co-variance-based statistics (i.e., explicitly running a one-way multivariate analysis of variance) to derive our quantitative

insights. In Study 2, we infer further in-depth qualitative explanations for the identified relationships using three focus groups of esports players (female, male, and mixed) and an adjusted version of the Colaizzi method to derive qualitative explanations. As a study context, we examine one of the most successful and salient esports titles now "League of Legends" (e.g., a viral and competitive multiplayer online battle arena video game where teams of five players battle to destroy the enemy team's base) to ensure the external validity of our findings (Kou, 2020; Sengün et al., 2019; Sun, 2017). Summarizing, our paper is guided by the subsequent two research questions (RQs).

RQ1 Do expectancy theory and achievement motivation explain gender-related differences in esports?

RQ2 How do esports players understand and make sense of these differences?

Our paper is organized as follows: First, we introduce the related work of our paper illustrating previous work related to gender disparities in esports, expectancy theory, and achievement motivation and specify corresponding hypotheses. Afterward, we provide information regarding the mixed-methods design comprising our quantitative Study 1 and our qualitative Study 2. Following, we discuss the findings of both studies and their implications for theory and practice. The paper closes with a short conclusion about the added value of our findings. Based on them, we provide a complementary perspective to capture motivation as an intra-individual process of motivation that is different across genders. Using expectancy theory and achievement motivation helps us better understand gender disparity in esports. By combining these theories, we can identify the challenges faced by women in esports and develop interventions to promote gender equality and strategies aimed at reducing gender disparities, promoting inclusivity, and creating a more equitable environment in esports.

2. Related work

2.1. Context of the study

In the course of technological progress and the spread of digital technologies in the last decades, various multiplayer online video games such as League of Legends, Defense of the Ancients 2, Counter-Strike: Global Offensive, Overwatch, Fortnite, StarCraft II and Call of Duty are enjoying a steady or growing popularity and make up a large part of the manifestations of the esports phenomenon (Kordyaka & Kruse, 2021). In this regard, the innovative merging of virtual graphics and immersive audio has created a unique gaming experience. In this regard, the increasing importance of multiplayer video games can be attributed mainly to the design element of real-time competition (i.e., multiplayer game modes), which increases player motivation and enjoyment (Y. J. Kim & Shute, 2015; Yee et al., 2012). Moreover, the global reach and accessibility of these multiplayer games have contributed to the growth of a diverse and connected esports community worldwide.

One particularly relevant genre of multiplayer video games that has so far contributed disproportionately to the success of esports is called multiplayer online battle arena (MOBA) games. MOBA games are characterized by requiring top players to have high levels of competitiveness, mastery, and teamwork (Ferrari, 2013; Kordyaka & Hribersek, 2019). A particularly notable game in this genre is League of Legends (e. g., a team-based game in which two teams of usually five players compete to destroy each other's bases). The game requires a unique combination of strategic thinking, coordination, and individual skill, and the most played game mode is ranked matches to test one's skills and move up ranks in a ladder-style competitive leaderboard. Furthermore, the game features a variety of champions (164 at the time of writing this), each with unique abilities, and offers a constantly evolving meta-game with regular updates and patches to keep it balanced and fresh. In addition, the game is known for its dedicated fan base and

vibrant social media presence, as well as its thriving esports ecosystem with organized leagues and tournaments at regional and international levels. Overall, League of Legends can be considered a spearhead of the esports phenomenon, so we decided to use it as the context of our study.

2.2. Gender disparities in esports

Ther is already some previous studies which have analyzed gender-related disparities in the context of esports. Historically, male players have largely dominated video games regarding player numbers and public representation (Scholz, 2019). However, it is critical to note that video games should not be viewed as a single homogenous bulk, since, for example, the gender disparity across game genres differs substantially from females having only 2% presentation in sports game titles to representing 69% of the entire player base for the so called Match-3 games and Family/Farm Sim Games (Yee, 2017). Moreover, gender is represented and discussed differently in video games and esports. For example, research has already shown that (1) the roles that players tend to select in e.g., MOBA games are filled to different degrees by both genders (e.g., higher prevalence of female players for support champions), (2) male characters within the game are more likely to have skills that allow them to be self-sufficient and heroic protagonists, while female characters have more skills to help other champions in the game, (3) men and corresponding stereotypical portrayals dominated the picture of the gamer identity described by the industry and culture, and (4) several dispositions (such as hedonic motivation, habit, and social influence) differ across the genders (Davies et al., 2020; Jang & Byon, 2021; Ramler et al., 2021).

Gender disparities have also been studied in relation to online communities (Dong & Zhang, 2011; Fox & Tang, 2014; Park, 2015; Roden et al., 2021; Shane-Simpson & Gillespie-Lynch, 2017). One commonly cited explanation for the gender gap in esports in this stream of research is the tendency for gender stereotypes to be overrepresented in games (e.g., particularly negative stereotypes of female gender), which accounts for the emphasis on male dominance, male norms, and gender bias (S. J. Kim, 2017). Furthermore, relevant esports games' culture is known for their toxic environments, allowing for various forms of online harassment (Beres et al., 2021; Kordyaka et al., 2020). Empirical work has shown that female players have higher perceived stress levels and lower self-report performance scores than male players (Vermeulen et al., 2014). A resulting consequence of this is that fewer women play relevant games. However, this is only partially true for popular esports titles (e.g., League of Legends, DOTA 2), as while significantly fewer women play these games casually in total, counterintuitively, the share of female players steadily decreases as we get closer to the professional level of players. Therefore, women are underrepresented at the top level, the most visible level in esports to the general crowd, and the lack of role models can be yet another factor contributing to female players' reluctance to pursue a career in esport, whether as a player or in other dominant positions within the esport industry. Bringing the previous research together, the cumulative effects of the multiple smallf hurdles that are put in front of females for esport participation can significantly contribute to the observed gender disparity.

2.3. Expectancy theory

Originating in motivational psychology, expectancy theory seeks to explain why individuals choose one behavioral option over alternatives and suggests that the intensity of individuals' applied work effort depends on the perception that this effort will result in a desired outcome (Oliver, 1974). In other words, the theory offers a lens through which we can understand individuals' decision making in situations where they have multiple options to choose from (Chiang & Jang, 2008; Hopp & Fisher, 2017; Liu & Agur, 2022). As part of the theory, expectancies are conceptualized as anticipatory expectations that an individual holds relative to a potential prospective behavior (Ajzen & Fishbein, 1977; Burgoon, 1993). For this purpose, the theory suggests a cognitive process of decision-making consisting of three sequential components: (1) expectancy (e.g., the individual belief that effort will lead to the intended performance goals), (2) instrumentality (e.g., the individual belief that a person will receive a desired outcome if the performance expectation is met), and (3) valence (e.g., the affective value of an individual that is placed on outcomes of an activity) (Chiang & Jang, 2008; Isaac et al., 2001). Expectancy theory is particularly suitable for this work since it captures motivation as a cognitive process, where we can measure the motivation for esports participation comparing female and male players regarding expectancy, instrumentality, and valence. This offers a complementary opportunity to understand gender disparities in esports.

Sporadically, previous work in adjacent contexts has already taken expectancy theory as a tool for quantitatively identifying motivational differences concerning gender. A particularly relevant study was conducted by Hassan et al., 2021. In the study, the authors sought to better understand gender motivation and perceptions of online language learning. They examined differences in the building blocks of expectancy theory (expectancy, instrumentality, and valence), and found (in parts) higher valence in female participants and no significant gender differences in instrumentality and expectancy (Hassan et al., 2021). However, the context of learning French online is different compared to the MOBA context, and thus, these findings cannot be transferred to our context directly. To explore this uncharted scientific territory, we will test possible relationships between expectancy theory variables and gender in our quantitative Study 1.

Based on the idea that the same game (e.g., using League of Legends as a context of application) can be downloaded for free for all players and that there is no possibility to get utilitarian advantages by investing money because it is only possible to purchase hedonic goods (Kordyaka & Hribersek, 2019), female and male players should equally perceive their chances to win a ranked game and be successful as part of their future play despite being female or male, we postulate that expectancy will be equally distributed across female and male players, which is an assumption that is in line with previous work conducted in other environments (Hassan et al., 2021).

Hypothesis 1. Female and male players will show the same expectancy levels.

A central concept within expectancy theory is the belief that good performances will lead to the reception of valued outcomes (i.e., instrumentality). In line with previous research (Hassan et al., 2021), we argue that female and male players should be equally convinced regarding their instrumentality during gameplay. Both men and women know that effort and performance (e.g., the number of points received from winning or losing a ranked game in League of Legends) do not depend on gender and are equally related to rewards because RIOT (i.e., the game developer and publisher of League of Legends) does not even record gender related real-life information.

Hypothesis 2. Female and male players will show the same levels of instrumentality.

Based on the assumptions of expectancy theory, we want to test whether the individual importance of consequences resulting from rewards (valence) differs between female and male players. In our study, we assume that male players will report higher levels of valence (e.g., describing the emotional value or quality associated with a stimulus). As a justification, we argue that male players may feel more accepted or valued by the gaming community because of the masculine norms present (partly exclusive because there are only male role models), which should lead to higher levels of positive emotions during gameplay. In contrast, female players may face more negative attitudes or harassment from other players, which could lead to lower levels of positive emotions. Social norms outside gaming could also impact female players, since in society gaming and esports remain and are still portrayed by large as male-dominated activities. Furthermore, this assumption is

consistent with previous research, which has already shown that gender differences regarding valence depend on the stereotypes and norms salient in a given context (e.g., the more masculine the norm of a context is, the higher the likelihood becomes that valence will be higher for males than for females) (Brooks & Betz, 1990).

Hypothesis 3. Female players will report lower valence levels than male players.

2.4. Achievement motivation

As an outcome variable of the cognitive process of expectancy theory, we apply achievement motivation that can be understood as the desire to strive for success, excel, and accomplish goals involving individuals' orientation towards achieving mastery, competence, recognition, or surpassing previous accomplishments (Boyle et al., 2012; Cheah et al., 2022; Ong, 2019). We consult previous work on video games and esports to capture achievement motivation. We use one dimension of a widely used multi-dimensional motivational approach from Yee et al. (2012) called the online gaming motivation scale (Yee et al., 2012). The instrument consists of three dimensions: (1) immersion (describing interests in narrative, expression, and world exploration of a player), (2) social (e.g., interaction with other players), and (3) achievement motivation (describing energization and the direction of competence related behaviors of players). We selected achievement motivation because the variable explained the differences between female and male players in the relevant context of our study (Rasheed et al., 2022; Sun, 2017; Yee et al., 2012).

Research in neighboring contexts regarding the relationship between achievement motivation and gender is ambiguous. Exemplary, most studies showed that achievement motivation is more relevant for males compared to females in various contexts, such as education and sports (Adsul et al., 2008; Hassouneh & Brengman, 2014; Ong, 2019). However, other studies indicated that achievement motivation is more relevant for females than males (Shekhar & Devi, 2012) and equally important across genders (Farmer, 1987). Whether achievement motivation differs between female and male players in esports is an open question. However, some previous studies have indicated the persistence of stereotypes and biases in esports, suggesting male players as more competitive than female players (Rogstad, 2022). Accordingly, we hypothesize that female players will report lower levels of achievement motivation compared to male players in the context of esports.

Hypothesis 4. Female players will report lower achievement motivation levels than male players.

3. Mixed-methods-design

In order to address our two RQs, and to ground the research in a rigorous and methodologically sound way, we applied an explanatory follow-up mixed-methods research design (Ivankova et al., 2006). Its two-phase structure makes it straightforward to implement, and the researchers can conduct two methods in separate and sequential phases, collecting one type of data at a time, allowing us to triangulate our findings in a comprehensible and in-depth manner. As a theoretical framework, we drew from the assumptions of expectancy theory (Isaac et al., 2001; Oliver, 1974) and achievement motivation (Adsul et al., 2008; Shekhar & Devi, 2012), which we used to connect our findings to existing knowledge specifying hypotheses. As a context of our study, we focused on the most popular esports title, League of Legends. Our procedure was structured as follows. First, we collected data from a global sample of League of Legends players to test differences between female and male players within expectancy theory and achievement motivation (n = 396). We used co-variance-based statistics to test the hypotheses specified in our Study 1. In Study 2, we aimed to find in-depth qualitative explanations of the identified gender differences from Study 1 that go beyond the existing theoretical knowledge. For this, we conducted

three follow-up focus groups with different lineups about the gender distribution of participants (only female vs. mixed genders vs. only male). Afterward, we interpreted the findings of both studies. Our research process is summarized in Fig. 1.

4. Study 1: quantitative appraisal

4.1. Methodology

4.1.1. Aim

To identify relevant points of reference embedded in previous work and (expectancy) theory that we could qualitatively elaborate on in more detail in Study 2, we carried out a quantitative appraisal in Study 1 using the individual player as a unit of analysis.

4.1.2. Quantitative analytic approach

For this purpose, we used a cross-sectional survey approach collecting self-reported data from League of Legends players using an online questionnaire. Furthermore, we analyzed the data with covariance-based statistics and one-way multivariate analysis of variance (MANOVA) using the software SPSS 28 to test potential gender differences in expectancy, instrumentality, valence, and achievement motivation), while controlling for demographics (see Fig. 2).

4.1.3. Data collection and participants

To collect the quantitative data necessary to test the hypotheses of our study, we have programmed a digital questionnaire in the English language with the software Unipark. Before collecting data in the field, we derived a suitable data collection strategy comprising two different distribution channels using the networks of the authors related to esports. First, since one of the authors had a history as a professional League of Legends player and access to several relevant networks, we used the Twitter account of this author to send a message during the League of Legends World Championships that took place from October 5th to November 6th, 2021. The initial post was shared by 22 other people, whereby only four were known. Second, we used our access to one of the world's leading esports research networks (i.e., https://e sportsresearch.net/) to share the link to our study. As an incentive and to increase the participants' motivation, we have given the opportunity at the end of the questionnaire to participate in a raffle of five Amazon vouchers worth 30 € each.

With a response rate for the digital questionnaire of 49%, we collected 428 survey responses. We carried out several measures to ensure the quality of the collected responses. First, we excluded twelve participants with inconclusive answers (e.g., reporting a single-digit or three-digit age). Second, we excluded five participants who reported their gender as "other", since in this work our focus was on comparing males and females. Third, to ensure participants had relevant knowledge of League of Legends, we asked them to specify their three favorite in-game champions in an open text field. After inspecting the plausibility of the answers, we excluded fifteen more participants. After doing so, the final sample consisted of 396 participants. The subsequent Table 1 shows the demographic information of our sample.

Regarding the demographic characteristics of our sample, most participants were either American (106) or German (84) and stated that they were either in the process (147) or had already finished their bachelor's degree (124). Furthermore, they reported playing League of Legends for almost five years (M = 4.87, SD = 2.69) and around 3 h a week (M = 2.79, SD = 1.25). In addition, most participants specified playing either on a gold (148) or platinum (90) level as their respective rank. Summarizing, the demographic characteristics of our sample represented a relatively young group of players that, on average, is familiar with competitive aspects of League of Legends (see Table 1 as well). Furthermore, the proportion of female players in our sample corresponded approximately to the proportion of the primary population (Yee, 2017).
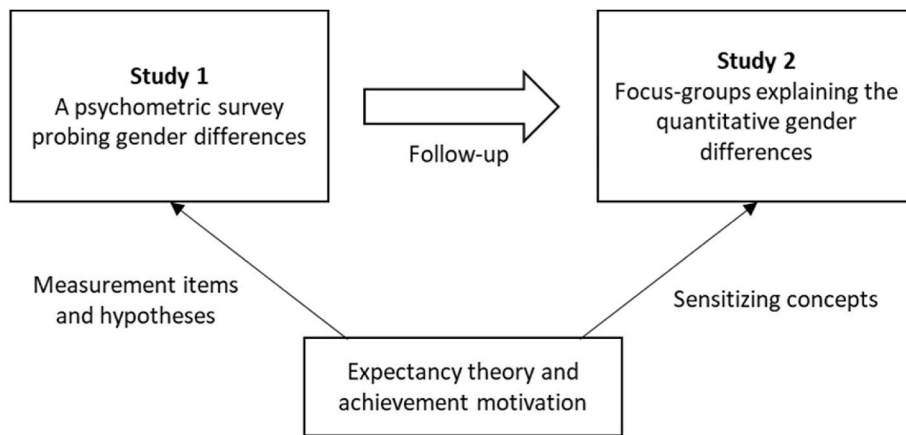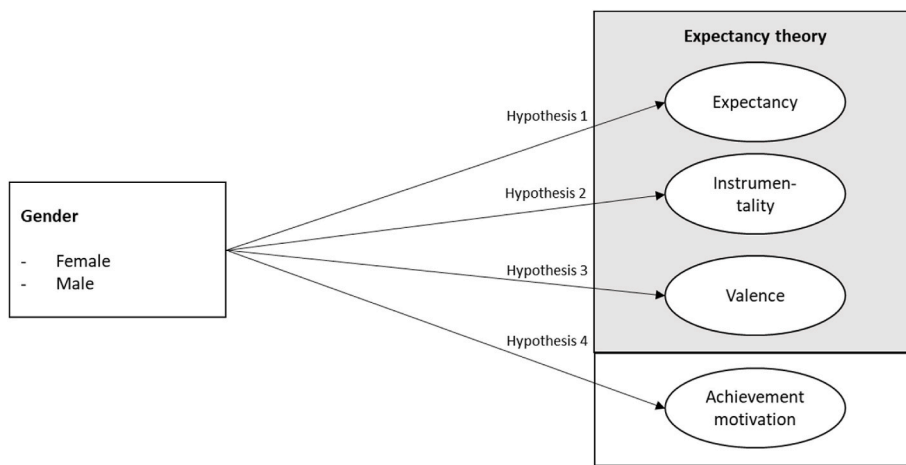
Fig. 1. Mixed-methods approach.

Fig. 2. Research model Study 1.

Table 1
Demographic information of survey participants.

Variable	M
Mean age	23.18
Started to play	4.87
Frequency of play	2.79
Sum	
Education	
Less than a high school diploma	22
High school diploma, no college	65
In some college, no degree	147
Bachelor's degree	124
Master's degree (or better)	38
Rank	
Silver (or worse)	79
Gold	148
Platin	90
Diamond	56
Master (or better)	23

4.1.4. Operationalization of variables

To measure the constructs of our study, we used validated scales and items from previous research adjusted to the context of our study as necessary and demographic variables (e.g., age, education, country) as well as control variables (e.g., rank, frequency, experience of play). Most scales used a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). As a strategy for selecting appropriate operationalizations of variables, we considered three criteria: (1) feasibility (e.g., resource constraints, participant burden, and ethical considerations), (2) contextual relevance (e.g., to minimize possible imprecision and maximize connectivity), and (3) validity indicators of the instrument (e.g., considering content, construct, and criterion validity).

Gender. To measure our independent variable gender, we provided a single nominal item asking for the gender of participants (female vs. male vs. other). After excluding participants who specified others as their gender, the two groups comprised 370 male and 26 female participants.

Expectancy. To measure expectancy, we adapted two items (e.g., "I expect to be satisfied with my future performance playing League of Legends") from previous research to the context of our study (Colquitt & Simmering, 1998). We combined both items into a mean expectancy score (M = 4.73, SD = 1.45).

Instrumentality. To measure instrumentality, we adapted three items (e.g., "If I perform well in League of Legends, I am usually rewarded") from previous research to the context of our study (Colquitt, 2001). We combined all three items into a mean score of instrumentality (M = 3.96, SD = 1.54).

Valence. To measure valence, we adapted three items related to the desirability of outcomes (e.g., "Getting good results while playing League of Legends feels very pleasant") from previous research (Colquitt & Simmering, 1998). We merged all three items into a mean valence score (M = 6.02, SD = 0.97).

Achievement motivation. To measure achievement motivation, we adapted four items (e.g., "I play League of Legends to compete with

other players" from previous research (Yee et al., 2012). We combined all items into a mean score of achievement motivation (M = 2.85, SD = 1.41).

All items related to expectancy, instrumentality, valence, and achievement motivation are included in Table 2. Furthermore, descriptive numbers and validity indicators of all latent constructs are depicted in Chapter 4.1.

5. Results

5.1. Validation of the measurement instrument

To derive validity indicators of our measurement model, we assessed several validity indicators. For convergent validity, we used the composite reliability (CR) and the average variance extracted (AVE) (Gefen et al., 2000). To test discriminant validity, we used the Fornell-Larcker criterion (Fornell & Larcker, 1981).

To derive validity indicators of our measurement instrument, we carried out a principal component analysis (PCA) using varimax rotation. For this, we specified the extraction of four factors and inserted two items of expectancy, three items of instrumentality, three items of valence, and four items of achievement motivation. After inspecting the initial results, we excluded one achievement item (i.e., v_AM_1 "… to compete with other players") because the item showed an unclear loading pattern across factors (e.g., with high loading on expectancy). We reason that achievement motivation is usually defined as the desire to perform well and succeed in challenging situations, which can include but is not limited to competition in the case of our application context. After the item exclusion, we re-ran the PCA in which all composite reliabilities exceeded 0.7 ($\geq$0.79), the AVE of each construct was more significant than 0.5 ($\geq$0.69), and all items loaded on the intended factors ($\geq$0.71). Accordingly, convergent validity was satisfied. Additionally,

Table 2
Questionnaire items.

Construct	Id	Wording	Reference
Expectancy	v_E_1	"I expect to be satisfied with my future performance playing League of Legends."	Colquitt and Simmering (1998)
	v_E_2	"I expect my practice playing League of Legends to be successful."	
Instrumentality	v_I_1	"If I perform well in League of Legends, I am usually rewarded."	Colquitt (2001)
	v_I_2	"I see a clear linkage between my League of Legends performance and the rewards I receive."	
	v_I_3	"There is a definite relationship between the quality of my League of Legends gameplay and the rewards I receive."	
Valence	v_V_1	"Getting good results playing League of Legends feels very pleasant."	Colquitt and Simmering (1998)
	v_V_2	"Performing well playing League of Legends feels very pleasant."	
	v_V_3	"Achieving success playing League of Legends feels very pleasant."	
Achievement motivation	v_AM_1	"I play League of Legends to compete with other players."	Yee et al. (2012)
	v_AM_2	"I play League of Legends to become powerful.	
	v_AM_3	"I play League of Legends to acquire rare items."	
	v_AM_4	"I play League of Legends to advance my profile as much as possible."	

the square root of the AVE of each construct ($\geq$0.75) was more significant than the correlations between each construct and the other constructs ($\leq$0.36), and no meaningful cross-loadings were found to satisfy the conditions for discriminant validity. The subsequent Tables 3 and 4 summarize the validation of the measurement instrument.

5.1.1. Hypothesis testing

To test the hypotheses of our study, we carried out a one-way multivariate analysis of variance (MANOVA), inserting gender (female vs. male) as our independent variable and expectancy, instrumentality, valence, and achievement motivation as dependent variables. Prior to conducting the MANOVA, a series of Pearson correlations was performed between all of the dependent variables in order to test the MANOVA assumption that the dependent variables would be correlated with each other in the moderate range, whereby the literature suggests correlations between 0.20 and 0.60 to be suitable (Cole et al., 1993). After the calculations depicted in Table 3, a meaningful pattern of correlations between 0.22 and 0.36 was observed amongst the dependent variables, suggesting the appropriateness of applying a MANOVA. Furthermore, both gender groups included more cases than the number of dependent variables, a necessary precondition for applying a MANOVA (French et al., 2008).

To test the assumption of homogeneity of variances and covariances in MANOVA, we used the Box's M test (Hahs-Vaughn, 2016). The Box's M test showed a value of 15.10 and was associated with a non-significant p-value of .16. Thus, the covariance matrices between the two gender groups (despite the unequal sample sizes of both groups) were assumed to be equal across dependent variables and suitable for the MANOVA (Tabachnick et al., 2013).

Following this, and to test our specified hypotheses, a MANOVA was conducted, inserting gender as an independent variable and the dependent variables expectancy, instrumentality, valence, and achievement motivation. Results indicated a significant (small to medium-sized) effect of gender on the four dependent variables; $F_{(4,391)} = 2.842$, p = < .05; Wilks' λ = 0.972, η^2 = 0.028). Furthermore, post hoc tests for every dependent variable showed non-significant effects on expectancy and instrumentality and significant differences in valence and achievement motivation (corresponding numbers are illustrated in Table 5). Based on the results, we are now able to answer our hypotheses. In line with our Hypotheses 1 and 2, male and female players showed the same levels of expectancy and instrumentality. Contrary to this and unexpected, female players showed higher levels of valence and achievement motivation than male players contradicting our Hypothesis 3 and 4.

6. Study 2: qualitative explanation

6.1. Methodology

6.1.1. Aim

Since the results from Study 1 cannot be fully explained by theory, in the subsequent qualitative Study 2 we probed the topic further with three online focus groups. We sought to identify occurring themes that are relevant describing the gender differences regarding valence and achievement motivation in a natural setting. We decided to use the focus-group method to consider the complexity of gender disparities and provide a more granular stage (about the quantitative questionnaire) to derive more honest and in-depth information about the relationships and underlying rationales. Additionally, compared to individual interviews, focus groups allowed us to derive more significant amounts of information more efficiently and enabled the observation of interactions between participants, providing additional insights.

6.1.2. Qualitative analytic approach

Since qualitative work is always interpretive by nature, both facilitation and observations during the focus groups, as well as subsequent

Table 3
Descriptive statistics and construct correlations.

		CR	AVE	M	SD	1	2	3	4
1	Expectancy	.83	.71	4.73	1.45	.84			
2	Instrumentality	.87	.69	3.96	1.54	.22***	.83		
3	Valence	.90	.75	6.02	.97	.36***	.24***	.87	
4	Achievement motivation	.79	.90	2.85	1.41	.25***	.26***	.22***	.75

Notes: (a) CR: Composite reliability; (b) Diagonal elements are the square root of the shared variance between the constructs and their measures; (c) Off-diagonal elements are correlations between constructs; ***p < .001, **p < .01, *p < .05.

Table 4
Loadings and cross-loadings of items.

Item	Expectancy	Instrumentality	Valence	Achievement motivation
v_E_1	.82			
v_E_2	.86			
v_I_1		.74		
v_I_2		.89		
v_I_3		.85		
v_V_1			.90	
v_V_2			.82	
v_V_3			.88	
v_AM_1 (deleted)				
v_AM_2				.75
v_AM_3				.71
v_AM_4				.78

Note: Values below 0.30 are suppressed for clarity and comprehensibility.

Table 5
MANOVA results of the post-hoc-tests.

Dependent variable	Female Mean (SD)	Male Mean (SD)	F	p
Expectancy	4.60 (1.41)	4.74 (1.45)	.224	.636
Instrumentality	3.87 (1.34)	3.96 (1.55)	.084	.773
Valence	6.42 (.59)	5.99 (.99)	4.842	.028
Achievement motivation	3.39 (1.60)	2.81 (1.39)	4.115	.043

Table 6
Modified Colaizzi method.

Step	Instruction	Actors involved
1	Transcribe the focus-group interviews.	Two students
2	Extract significant statements.	Authors A and B
3	Create formulated meanings.	Authors A and B
4	Build relevant themes.	Authors A and B
5	Develop an exhaustive description.	All authors
6	Identify the fundamental structure.	All authors
7	Find themes that show different characteristics of the focus group interviews.	All authors

relevant themes. Afterward, all authors were part of steps 5 to 7, in which discussions in the group solved cases without matches of levels 2 to 4.

Initially, to ensure that our method would provide us with the opportunity to derive the information we wanted, a pilot study was conducted to get an impression of the kind of approach and questioning and what structure feels most comfortable. For this, we carried out the modified Colaizzi method with two of the authors and three students (one female, two male) as participants. A discussion after the focus group between the two authors only suggested some minor changes (mostly related to wording), which we included.

6.1.3. Data collection and participants

Following the guides of focus-group research, we carried out two single-gender groups (one for each gender) and one mixed-gender group. This approach allowed us to create an open and unbiased conversational atmosphere for the single-gender focus groups and promote discussion and arguments between genders. Participants of all three groups showed comparable demographic characteristics and had similar levels of game-related experiences. As inclusion criteria, we specified potential participants to be older than 18 years, speak German, and have substantial experience regarding the ranked gameplay of League of Legends. After discussions with the group of authors, we decided to map the focus groups consistently in German (the native language of all authors that were involved with an active role in conducting the focus groups) in order to avoid confounding possible intragroup discussions due to different pronounced language skills and speakers, to ensure effective communication as well as a consistent understanding of the interactions of a focus group speaking the same native language. Therefore, the members of the focus groups came either from Switzerland, Austria, or Germany. To contact potential participants, we used flyers and email solicitation within the existing esports networks of the authors (e.g., https://esportsresearch.net). All participants received a 15 Euro Amazon voucher as a reward for participating in our focus group. The subsequent Table 7 illustrates the demographic information of all three focus groups, whereby participants were relatively experienced League of Legends players with a rather high skill level.

interpretation, are based on the researchers' own epistemic and ontological beliefs and viewpoints. In the following, we include some statements in this regard. These statements are not all-inclusive, but they may help the reader understand the researchers' origin. As a research paradigm, the researchers took a post-positivist approach, as they were interested in explanations of actors dealing with the subjectivity of their realities. Three researchers were actively involved in collecting and analyzing the focus-group data and all had substantial prior experience with the context of the study League of Legends. In this regard, they all had more than ten years of active playing experience, whereby two of the three played at a medium to good performance level (Gold to Platinum), and one had experience of several years as a professional player. The other researchers involved had less experience, and took the roles of observing the data from a higher vantage point.

All three focus group interviews were videotaped, had notetakers and timekeepers, and were moderated by one of the authors. Code names were used for participants to maintain anonymity. Approximately 60 single-spaced pages of transcription were checked by two of the researchers for accuracy against the videotapes. The transcripts were then analyzed using a modified Colaizzi method using MAXQDA to arrange words, phrases, and quotes based on expectancy theory and achievement motivation, as grouped in the moderators' guides (Colaizzi, 1978). The steps and the involved authors of the modified Colaizzi method are illustrated in Table 6. After the transcription of the focus groups by two students, two of the authors proceeded with a reflexive analysis in steps 2 to 4 of the method, inductively extracting significant statements, creating formulated meanings, and building

Table 7
Demographic information of focus-group participants.

Variable	Focus-group 1	Focus-group 2	Focus-group 3
Number of participants			
Male		3	6
Female	5	1	
Duration	95 min	87 min	106 min
Mean age	26.8	24.75	24.67
Education			
Less than a high school diploma			1
High school diploma, no college	1	1	1
In some college, no degree	1	1	
Bachelor's degree	3	1	2
Master's degree		1	2
Started to play			
Season 4 (2014) or earlier	1	1	1
Season 5 (2015)	1	2	1
Season 6 (2016)	1		
Season 7 (2017)	2		3
Season 8 (2018)			
Season 9 (2019)			
Season 10 (2020) or later	1	2	2
Rank			
Silver	1	1	1
Gold	1		1
Platin	1	1	
Diamond	1	2	2
Master (or better)	1		2

6.1.4. Procedure

Since the authors (and participants) lived in different countries during the execution of the focus groups (June and July 2022), we decided to carry out the focus groups digitally. For this, we used the software Zoom and recorded all sessions. In practice, the focus-group procedure progressed five sequential parts, which we briefly explain in the following. First, we welcomed the participants and introduced the group of authors and the focus group's scope, purpose, and desired outcome. For this, we provided information regarding the different parts of the focus group and the relevant game mode (i.e., ranked game). Afterward, we asked participants to answer a short online questionnaire collecting demographic (e.g., age, education) and control variables (e.g., started to play, rank). We asked for confirmation of our informed consent for data processing. Following this, we asked participants for some basic information regarding general information related to the context of our study League of Legends. Third and fourth, we asked participants about potential reasons for the identified gender differences regarding valence and achievement motivation. Following this, we provided the opportunity to elaborate more on potential change requests (see Table 8).

Table 8
Questions discussed during the focus-groups.

Part	Topic	Exemplary questions
1	Introduction	Illustrating the scope, purpose, and desired outcome.
	Short questionnaire collecting demographic and control variables.	
2	Basics	What are the reasons to play League of Legends for you? When did you start to play League of Legends?
Expectancy theory		
3	Valence	How do you feel about getting good results playing League of Legends? How do you feel about having success playing League of Legends?
4	Achievement motivation	What motivates you to play League of Legends? How relevant is it for you to become powerful playing League of Legends?
Additional topics		
5	Change requests	Do you have any ideas on how to close the gap between women and men in League of Legends player numbers?

To ensure a structured and comparable environment across all three focus groups, we followed recommendations from previous work related to focus groups (Krueger, 1997; Morrison-Beedy et al., 2001). Specifically, we decided that at least three of the authors needed to be present during every focus group filling out the three roles of (1) a moderator (e.g., guiding and facilitating discussions during the focus group), (2) a note-taker (e.g., recording the focus-group and taking notes), and (3) an organizer (e.g., managing logistics and inviting participants). In the case of the mixed focus group, we had initially planned to have both genders equally represented. Unfortunately, we could not implement this plan due to two confirmed female participants' last-minute cancellations (on the event day). Furthermore, at least one male and one female author were present during all focus groups.

6.1.5. Findings

From the three focus-group interviews, it became clear that participants' perceptions leading up to each interview differed substantially regarding valence and achievement motivation. After applying the Colaizzi method and analyzing the focus groups individually, two primary themes were identified holding the potential to explain the gender-related differences regarding valence and achievement motivation from Study 1.

1. In-game culture (i.e., the ways and characteristics of the beliefs of League of Legends players regarding the game).
2. Individual attributions of players consisting of (1) goal orientation (i.e., the individual disposition of players towards developing or validating one's ability in achievement settings contrasting learning/mastery and performance orientations) and (2) locus of control (i.e., the degree to which players believe that they have control over the outcome of events in the game contrasting internal and external attributions).

Subsequently, we illustrate the divergent sense-making within these themes. We illustrate where the groups tended to agree and disagree and highlight the commonalities and expectations of players about the themes.

6.1.6. In-game culture

Noted and discussed by all three groups was the toxic atmosphere being part of nearly every (ranked) game of League of Legends as a part of the ordinary game-related culture. This can be mainly attributed to the League of Legends game design, in which two teams of five players play against each other, and a team's success is mainly dependent on your performance and your teammates. Playing a good game individually might not be sufficient to win matches and climb ranked ladders which can lead to animosity in team environments harming in-game experiences (Kordyaka & Kruse, 2021). Nonetheless, there was a substantial difference in understanding the target of corresponding behaviors of the three groups. The all-female group (focus-group 1) underlined the unwelcoming in-game culture that was generally seen as prejudiced or even toxic behaviors towards female players. Those prejudices lead to females trying not to unveil their gender (e.g., choice of in-game names) to be left alone. Most of the statements described aspects related to gender stereotypes and prejudice towards female players within the game, as suggested by P2:

> "... if I want to play with someone new, there are stereotypes, many prejudices, and claims against me as a female player ... I find that stupid because I would find it much nicer if the community would first play with you and then judge you on this basis." [P2, female group]

Opposed to this, in the mixed group (focus-group 2) and the male group (focus-group 3), discussions arose towards the League of Legends in-game culture being somewhat toxic in general and that it is not only by being female that a player can make themselves a target of toxic behaviors. To our surprise, females in the mixed group reported a high

acceptance of toxicity. According to the participants, the game resembles a schoolyard where any outstanding behavior can get a person to be the target of toxic remarks. The following quotes illustrate this line of thinking:

> *"So compared to other games, I think League is relatively toxic, but in every game, there is a certain toxicity, but in League … it depends on what and how you play. I feel that people at League generally have a low frustration tolerance."* [P7, mixed group]

> *"… League is a very toxic game in general … there are several reasons for this. Many people let out their frustration when something bad happens … there is always a reason, and the big problem is that even this toxicity is not punished and thus continues."* [P11, male group]

Interestingly, some participants in all three focus groups mentioned that it is sometimes hard to identify the gender of other players participating in ranked League of Legends games. They challenged the idea of other players recognizing female players solely based on player names. For example, P3 stated after being questioned regarding the recognition of the gender of other players by one of the participants:

> *"Very rarely, I recognize other female players. How can you even do it reliably based on the summoner's name?".* [P3, female group]

Opposed to this, some participants in all three focus groups reported that they most of the time have an idea regarding the gender of other players. As a manifestation of this, one of the participants in the female group answered that there is always a decent chance of knowing the gender of others:

> *"I do not think so. Suppose you combine summoner name and champion pick behavior, adding communicative stimuli before and during the game. In that case, I feel that the likelihood of knowing the gender of my teammates is not that bad".* [P1, female group]

Participants in the mixed (focus-group 2) and male (focus-group 3) group continued discussing how the players' gender is not an issue to them and even marginalized the challenge, sharing their views of not having witnessed sexism in-game as follows:

> *"I do not think there is much sexism in League of Legends. Everyone gets the same amount of hostility, regardless of gender. People start hacking if a woman's voice appears in voice chat in CS: GO or Valorant. League of Legends is less bad".* [P7, mixed group]

> *"… I honestly do not care who is playing as long as they are playing properly. I do not care if someone is a woman or a man … I also do not know anyone who would have a problem with having a woman on the team. Or the other way around, a man or whatever".* [P15, male group]

Discussions in the female group continued towards potential countermeasures. To deal with this issue and avoid becoming the target of gender-related prejudices, participants discussed multiple measures. As an example, participants changed their usernames. They gave teammates who know their real-life identities (playing together in duo-queue games) the instruction to not talk about their gender to avoid becoming the target of being discriminated against as a female player.

> *"It has me just so annoyed … but my username was just crap because you knew I am a girl. I then changed my username because it was so annoying that I had to read the same comments in every game, although I have done nothing wrong."* [P4, female group]

> *"To avoid becoming the target of gender-related toxicity, before playing ranked duo-queue games with others who know me outside the digital world, I ask them not to make any comments (in the chat) to reveal my gender."* [P3, female group]

In summarizing the focus group discussions, it became apparent that participants in the all-female workshop perceived the culture in the game differently (more targeted to their gender, more dominant, and

ultimately more dangerous). This additional toxic attention that female players receive in the game is partly due to the masculinity-driven culture of the game, in which male players are the dominant group (not just numerically). One possible explanation this may provide in relation to Hypothesis 3 could be that salient stereotypes create an environment in which female players feel additional pressure to prove themselves or conform to male norms to be accepted. This mechanism, in turn, may lead to increased stress and frustration for female players. Accordingly, they report higher valence levels to prioritize their emotional well-being over trying to fit into the toxic culture. The increased perceived pressure of female players can also explain Hypothesis 4, as female players exhibit higher achievement motivation due to increased striving for recognition and respect (through good performance).

6.1.7. Individual attributions

Second, another theme that became apparent at different stages of all three focus-group interviews was attributions made by the players concerning valence and achievement motivation. The first attribution that became apparent was the goal orientation of participants. Notably, participants of the female group portrayed a focus on performance goal orientation (as opposed to learning goal orientation) to succeed in the game, driven by a desire to win ranked games. As an example, participants stated that they play the game to reach a higher Elo (level of play), become proud of their performance, and gain respect from other players, as P1 illustrated in one of her statements:

> *"The primary reason for me to play is to have the chance to be proud of my performance (directly available on my OPGG profile) and the feeling of being better than the opposing team. Especially because I want to show that female players can succeed".* [P1, female group]

Opposed to the first focus group, participants in the second and third focus group stated to have less ambitious goals connected to their gameplay, reporting fewer performance and higher learning goal orientations. Accordingly, some participants reported that the primary reason to play the game was to get better and improve despite the outcome of each game indicating several learning goals.

> *"I was always more focused on my style of play and performance, at least in retrospect. The result was then only secondary to me … a game in which I played bad, and we won was worth less than a game in which I played great, and we still lost".* [P6, mixed group]

> *"… if things go wrong within a game, I then not directly throw away the whole game, so mentally, but maybe still can enable others and then still go out somehow with a positive feeling from the game even if my performance was now maybe not so good."* [P12, male group]

In the further course, some participants in the male group underlined the entertainment function of playing League of Legends marginalizing and relevance of the outcome of games providing several indicators regarding the identified gender-related differences in Study 1. Accordingly, male players reported to rather play out of hedonic reasons.

> *"I have had entertaining games that I have lost simply because it was even, and it went back and forth, and you did not know in minute 5 who was going to win … I have also won very boring games. So, I would say it just depends. A good result for me is half an hour where I had fun."* [P13, male group]

Another apparent attribution during the focus groups was the locus of control. Noted and discussed, particularly by the second and third focus group, was a strong external locus of control about the attribution of success and failure. Moreover, participants justified this based on the relatively limited influence a single player has in an ordinary ranked game in League of Legends about the outcome of each game, which is reflected in the subsequent statements of P6 and P8:

> *"You do need an almost perfect game to impact the game. If you "only" have a good game, but even if you have a bad game, it usually*

does not matter. Only a terrible game again influences the result … otherwise, it almost does not matter." [P6, mixed group].

"I also find the cost-benefit effect is not in proportion. Especially when you reach the level you belong to, you have to invest much effort to move up … you can influence about 10% in the game … for me, the benefit-cost ratio was not worth it at all at some point." [P8, mixed group].

Opposed to the second and third focus groups, the all-female group reported a more balanced understanding of being responsible for success and failures during games accentuating internal and external attributions as equally as important. Statements such as the following of P4 and P2 indicate this tendency:

"I always try to accept my mistakes, for example, if I did not position myself far enough behind when a team fight starts. I always try to remember things like that and implement them in the next game". [P4, female group]

"After watching a lot of League of Legends-related streams, I realized at some point that my item build needed to be more flexible when I play Jungle depending on the situation in the game. After working on this aspect for a few months, this showed in my Elo". [P2, female group]

Based on the patterns identified in the focus groups, the attributions in the game seemed to be different for all three groups. As a result, experiencing negative and stressful situations in the game has different consequences for different player groups. Our qualitative data suggests that adequate coping with stressful in-game situations may be more challenging for female players, who tend to attribute their actions more internally and are instead driven by their achievement. Furthermore, performance goal orientation in an environment with a substantial degree of randomness involved (such as ranked games in League of Legends in which the majority of players wins/loses games between 40 and 60% of the time) poses additional risks of experiencing negative und uncontrollable consequences and hurting female players' self-concept. In summary, based on the insights of our qualitative Study 2, it can be stated that the tendencies of female players toward performance (i.e., goal orientation) and internal attribution (i.e., locus of control) both provide reasonable explanations why they reported higher levels of valence (Hypothesis 3) and achievement motivation (Hypothesis 4) in our Study 1.

7. Discussion

7.1. Main findings

Based on the findings of the two studies we now offer answers to the two RQs: (1) Do expectancy theory and achievement motivation explain gender-related differences in esports, and (2) How do esports players understand and make sense of these differences? In doing so, we also summarize thr key findings from our mixed-methods research (Study 1 and Study 2).

1. Our quantitative analysis in Study 1 showed that expectancy theory can potentially explain gender-related differences in esports. Specifically, and in line with our hypotheses, instrumentality, and expectancy did not differ across genders. However, unlike our hypotheses, valence was higher for female players.
2. In Study 1, we also found empirical indicators that achievement motivation was higher for female players than male players, contradicting our hypothesis.
3. Based on the insights of our qualitative analysis in Study 2, we identified two relevant themes (i.e., the game-related culture and individual attributions) that likely hold the potential to explain

higher preferences of female players for valence and achievement motivation compared to male players.

7.2. Implications for theory

The results of our study allow for several implications that are relevant on a theoretical level. Below, we elaborate on them.

First, we contribute to existing research dealing with gender disparities in esports. Complementary to the existing body of scientific knowledge in the context of esports (Beres et al., 2021; S. J. Kim, 2017; Vermeulen et al., 2014), our study provided empirical references that the conceptualization of motivation as a cognitive process of decision making adds-value to explain gender disparities in esports. Furthermore, our results indicate that expectancy theory is a suitable approach since female and male players were equally convinced regarding their instrumentality and expectancy playing the game, increasing the external validity of previous related work (Hassan et al., 2021). However, unlike predicted by our theory-driven hypothesis, female players scored higher in valence than male players. Accordingly, there seem to be other reasons why female players' motivational advantage (based on expectancy theory assumptions) cannot be exploited to become part of the professional esports scene. One theoretical explanation is provided by prospect theory and the concept of diminishing marginal utility (Kahneman & Tversky, 1979). Given the unequal distribution of both genders of potential role models in games such as League of Legends, where there are almost exclusively male players, female players should be more sensitive to positive emotions and valence and perceive the ranked game environment as more stressful and hostile, which is an insight in line with previous research (Qian et al., 2022; Yu et al., 2022). Building on this, future research could seek to further differentiate valence into the two sub-dimensions of first-order valence (i.e., describing the importance of achieving good outcomes) and second-order valence (e.g., the individual importance of consequences resulting from rewards) or test the dark side of valence (Shuman et al., 2013) exploring more granular insights.

Second, achievement motivation was more important for female and male players. This finding also ran against our derived hypothesis, as we expected based on theory male players to report higher levels of achievement motivation enabling behavioral success and competitive advantages across genders. This finding aligns with a fraction of previous work in education (Shekhar & Devi, 2012). Nonetheless, we argue that several context-specific explanations exist for this finding in esports' innovative and disjunctive context, specifically the MOBA game genre. As an example, considering the older contexts of original work that dealt with video games and achievement motivation (e.g., games such as World of Warcraft; Yee et al., 2012) that we used to derive our hypotheses, we argue that the player experience in ranked games in League of Legends is much more competitive and the challenge of gender disparity is well known, which puts additional pressure on female players to withstand this challenge (Johnson et al., 2015; Mora-Cantallops & Sicilia, 2018a). This leads female players to perform exceptionally well in response, as evidenced by higher levels of self-reported achievement motivation. We take this result as a call for future scientific work to conduct more research to explore the quality of the culture of appropriate games. Furthermore, we see potential in exploring gender differences about the other two dimensions of the game motivation scale (i.e., social and immersion) to better understand the potentially gendered relationships between players and motivations.

Third, as part of our qualitative Study 2, we identified the two themes (1) understanding of the game-related culture and (2) individual attributions that seemed to be able to explain the identified differences between female and male players about valence and achievement motivation.

Concerning gaming culture and perceptions of toxicity, we increase the external validity of previous work showing that female players are more likely to be sexually harassed (as a specific manifestation of

toxicity) than male players (Ruvalcaba et al., 2018) and perceive problematic behaviors emerging from gender biases (Madden et al., 2021). Complementing existing findings, our results indicate that female and male players' understandings of toxicity differ. Female players understood toxicity as a manifestation of sexism. In contrast, toxicity was a common manifestation of aggressive behavior for male players. Moreover, previous research primarily examined the frequency of negative behaviors by perpetrators of toxicity (Adinolf & Turkay, 2018; Blackburn & Kwak, 2014, pp. 877–888; Kou & Gui, 2021) and just started to consider other roles Kordyaka et al., 2023a,b,c). We take our findings as a call to look more closely at the perceived severity of toxicity considering potential gender disparities regarding valence and achievement motivation.

Regarding individual attributions (i.e., goal orientation and locus of control), our findings support previous work's external validity, indicating a substantial positive correlation between goal orientation and achievement motivation (Shafizadeh, 2007). Accordingly, the performance goal orientation of female players is a suitable predictor of achievement motivation in the context of esports. An initial starting point could be to quantitatively replicate our qualitative finding by testing the postulated relationship as potential mediators. Referring to our finding that the internal locus of control was related to achievement motivation (the female group reported more internal attributions than the other two groups, however, qualitatively), we extend the validity of previous work to the context of esports (Fini & Yousefzadeh, 2011; Karaman & Watson, 2017).

7.3. Implications for practice

From a practical perspective, several aspects of our findings are also relevant. First, we understand the surprisingly high need for positive emotions (i.e., valence) of female players as a potential factor that may make it more difficult for female players to progress in the League of Legends ranking system (elo-based) due to the high requirement of positive emotions and the resulting increased pressure, which becomes even more substantial due to the randomness of the outcome involved in ranked games (e.g., in general, the winning percentage of players varies between 47% and 53%). This can be comprehended as a continuation of previous work that showed the disjunctive player experience while playing League of Legends (Johnson et al., 2015; Mora-Cantallops & Sicilia, 2018a). On a level of the individual player and to buffer this, techniques of cognitive reappraisal could be used to lower the need for valence or acquire additional coping techniques of female players (McRae et al., 2012). One starting point could be techniques from sports psychology, such as visualization or self-talk (Kyllo & Landers, 1995; Locke & Latham, 1985), to reduce the likelihood of emotional setbacks due to negative game experiences. In addition, at the level of game developers, ways could be created to mitigate the negative side of valence-which is particularly challenging for female players-by encouraging players to remain positive during a losing game and then rewarding such behaviors with rare or unique items (e.g., champion skins) (Kordyaka & Kruse, 2021). Lastly, associated communities could seek ways to make female role models more salient, which could then ease the competitive grind of female gamers.

Second, various tools could be used to buffer this mechanism, our finding that female players score higher on achievement motivation challenges the stereotype that female players are less motivated to succeed in playing League of Legends, which is one of the least sophisticated explanations for gender disparity that is often brought forward. It instead shows the opposite in our sample, indicating high levels of effort put into the game by female players. Furthermore, female players face more challenges, such as discrimination or stereotyping (Rogstad, 2022; Ruvalcaba et al., 2018). This may motivate some of them even more to succeed (e.g., *"I want to prove the haters wrong."*), leading to a tautological circle of increasing motivation. Work could be done at the individual player level to set more realistic expectations and achievable

goals and redefine success and failure in the game, which can help reduce the pressure to perform at the highest level constantly. This could be achieved, for example, by players sharing ways to be less achievement oriented. Game developers could support This intervention by offering design features related to goal-setting techniques, such as creating SMART goals (Jeong et al., 2021). This could be implemented during game loading screens to encourage players to set more realistic goals, reducing the need for achievement motivation. There could also be goals other than winning the game, which players could instead focus on.

Third, the identified themes in Study 2 (i.e., game-related culture and individual attributions) offer the potential to advance existing esports-related practices for female players. One important avenue here is to reduce player toxicity. This could be done, for example, by (1) encouraging positive player behaviors through transparent rewards for good sportsmanship, or by (2) offering perspective-taking techniques to lay out the perspectives on the culture of both genders of the other group in a comprehensible way (Kessler et al., 2014; Skorinko et al., 2014). In addition, matchmaking before games could be a fruitful avenue for potential interventions by pointing out teammates who have behaved better if their past behavior has improved the mood and behavior within a team (e.g., displacing toxic players in more competitive environments with higher ranks). Recent research has proposed similar measurements (Kordyaka et al., 2023a,b,c). Furthermore, female players reported a higher performance orientation than participants of the other two focus groups, whereby social comparisons became the driving force. To address this point, game developers could promote teamwork by designing game mechanics that reward cooperative play (e.g., team-based rewards) or provide in-game resources that encourage players to work together using artificial intelligence and real-time data (Pirker, 2020). Taken together, a combination of game design, community management, and in-game resources is required to address female players' internal locus of control, allowing them to be more motivated to participate in esports.

7.4. Limitations and outlook

While our study has shed light on essential findings to understand gender disparities in esports better, several limitations must be acknowledged to classify the derived knowledge accurately. Subsequently, we illustrate the most important of them and show potential ways in which future research can deal with them.

First, our methodological approach in Study 1 only looked at differences between female and male players regarding expectancy theory and achievement motivation. While doing this, we did not consider relationships and their directions between the variables. This was intended as we wanted to explore potential differences between female and male players. However, future research could build upon our findings and test the relationships between the variables sequentially using structural equation modeling within a quasi-experimental approach contrasting female and male players.

Second, sampling our two studies also offers potential for future research. On the one hand, to contact participants for our quantitative Study 1, we used Twitter and a globally operating network related to esports research, which entails several limitations. However, this was required based on the feasibility to ensure our results' high external validity. Regardless, future research should use other sampling channels and compare their results with our study. In addition, the sample sizes of the two gender groups in Study 1 were quite unequal (370 men versus 26 women), although this was consistent with the distribution of the two genders in the general player population (Yee, 2017). As a countermeasure to this problem, we were able to show that our approach was statistically reasonable and that the derivation of the results was valid based on relevant criteria for the use of a MANOVA (by significant correlations between the dependent variables, more cases in each group than the number of dependent variables, a nonsignificant Box M test).

However, we encourage future research that builds on our study to conduct further studies with female gamblers within their sample. On the other hand, our qualitative Study 2 consisted only of German-speaking participants. Consequently, future research is needed to explore how our results can be generalized to other regions and cultures of League of Legends. Accordingly, it is an open question to what extent we can still assume that our (local) results largely retain their validity across contexts. This is particularly important because previous work related to MOBAs already showed that national and cultural specifics of the player base need to be considered (Kordyaka et al., 2023a,b, c). Accordingly, we encourage future researchers to conduct cross-cultural research and compare their insights to the results of our study. Finally, the sample may suffer from some survivor bias, since those females that participated in our study were all active players, and hence, not representative of the general female population.

Third, our study only looked at one specific game (League of Legends) as an operationalization of esports, not including other video games and video game genres to avoid potential confounds and derive spurious results. While it is one of the most popular video games worldwide, it includes a unique player experience mixing team collaboration with higher levels of competition and frustration, leading to a particularly toxic atmosphere (Johnson et al., 2015; Mora-Cantallops & Sicilia, 2018a). As an implication, we strongly recommend future research to further explore the insights of our study in other video games and genres relevant to the phenomenon of esports, such as first-person-shooter and location-based games that provide a rich and connectable portfolio of current research work (Laato et al., 2021, 2022).

Fourth, we compared only female and male players in our quantitative Study 1. Because only five participants reported "other" than their gender, and the resulting sample was too small regarding inferential statistical procedures, we, unfortunately, had to exclude them from the sample. A resulting limitation is the exclusion of non-binary players, who represent an increasingly significant and relevant subgroup of the player base. Accordingly, as a reference for future work, we strongly recommend that future research include relevant LGBTQ groups and compare the results of our study with findings obtained at that time.

Lastly, several definitions of "esports" are currently used (Jenny et al., 2017; Pluss et al., 2022; Reitman et al., 2020). Some of them assume as part of the definition that the players need to be professional (Cunningham et al., 2018). In contrast, we follow a broader understanding of esports (Pedraza-Ramirez et al., 2020; Scholz, 2019). As a justification for this, we rely on understanding real-world sports (here, we also refer to a soccer player, even if he or she does not play soccer for a living). However, we encourage future researchers to conduct research according to specific understandings of esports and to consider only real professional players, not semi-professional and casual players of competitive esports games.

8. Conclusion

In this research, we aimed to understand gender disparities in esports better. Drawing from the theoretical lens of expectancy theory and achievement motivation, we conducted an explanatory follow-up mixed-methods design using the exemplary case of League of Legends. Based on the results of a cross-sectional survey (n = 396) using co-variance-based statistics (Study 1), we found that female players have higher valence and achievement motivation compared to male players (partially supporting our hypotheses). Thereupon, we carried out a set of three online focus groups (Study 2) comprising different compositions of the gender of participants (female vs. mixed vs. male). The focus group results indicated a different understanding of toxicity in the game, contrasting toxicity as a form of sexism from the female players' perspective and toxicity as a general form of aggression from the male players' perspective. Additionally, individual attributions of goal orientation and locus of control suggest that female players could be

more likely to feel responsible for adverse outcomes in the game, which increases the likelihood that they will stop playing such games. In other words, these findings suggest that those female players who do survive to play esports games competitively may want to prove themselves more in ranked games and are in fact more competitive than their male counterparts. This observed competitiveness may also have a negative side, since those players who take more responsibility for their playing also face more pressure, which can be psychologically tasking. Finally, our findings suggest that toxic culture and individual attributions are particularly suitable areas to focus on for addressing the observed differences in valence and achievement motivation among the genders in esports and to improve the social dynamics in the largely growing esports ecosystem.

Credit author statement

Bastian Kordyaka: Writing – original draft, conceptualization, formal analysis. Luisa Pumplun: Writing review & editing, conceptualization, formal analysis, supervision. Marlies Brunnhofer: Writing review & editing, conceptualization, data sourcing. Bjoern Kruse: Writing review & editing, data sourcing. Samuli Laato: Writing – original draft, review & editing, supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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