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**ROLE AMBIGUITY AND ATHLETE
SATISFACTION IN TEAM ESPORTS**
A Study on Counter-Strike: Global Offensive

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ABSTRACT

Juhana Ojala: Role Ambiguity and Athlete Satisfaction in Team Esports: A Study on *Counter-Strike: Global Offensive*

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As the popularity of organized competitive digital gaming, or esports, keeps growing, so does its likeness to traditional sports in media presentation and broadcasting. Acknowledging the increasing convergence recognized in current research of both esports and traditional sports, this study applies role ambiguity and satisfaction measurement tools from sports research to an esports context. Data from a survey questionnaire for players of the esports game *Counter-Strike: Global Offensive* ($n=102$) was used to measure the relationship of role ambiguity and athlete satisfaction in a team esports setting using the correlation analysis tool Kendall's tau-b correlation. The results of the study imply that the measures are valid for research in the field of esports but also suggest that the nature of roles in esports contexts might differ in nature from those in traditional sports, warranting further research. The reasonably small sample size may have an effect the generalization of the results.

Key words and terms: esports, sportification, role ambiguity, athlete satisfaction, online games, *Counter-Strike: Global Offensive*

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1 INTRODUCTION

Esports, or organized competitive digital gaming (Turtiainen, Friman, & Ruotsalainen 2020), has been growing rapidly as a contemporary sporting and digital gaming phenomenon and as a form of entertainment media. Esports has already surpassed some fields of traditional sports (Merwin et al. 2018) in event viewership, sponsorships, and investment, and it is speculated to outperform other major sports in the future (Candela & Jakee 2018).

Many elements in esports such as tournament and league systems and formats, player and team sponsorships, and event broadcasting have been inspired by or adopted from traditional sports in a process referred to as *sportification* (Heere 2018). In addition, professional sports teams have entered the scene of esports and digital gaming by, for instance, sponsoring individual players and streamers and acquiring or founding their own esports teams and consequently applying their knowledge and resources to training, coaching, and other aspects (e.g., FC Barcelona 2019, Hartikainen 2019). The convergence of esports and traditional sports especially in mass popular and entertainment media has sparked conversation, such as critique from sports scholars towards the usage of the term *esports*, a derivation of its root word *sports*, to denote a gaming activity (Parry 2018). Additionally, issues regarding athleticism and sportiness, or the quality of being sporty, of esports are considered in questions such as whether the Olympic Games could have esports events (Ashton 2018).

Furthermore, scholarly discussion on the sportiness of esports and whether this phenomenon of digital gaming qualifies as sports (Parry 2018, Hallman & Giel 2018) or should be included in sports research conversations has been ongoing since the coining of the term's earliest versions, and such topics are often referred to when researchers aim to define esports or discuss its essence and scientific relevance in studies (Heere 2018, Jenny et al. 2017). Regardless of whether esports constitutes as sports by definitions and conceptualizations, the two phenomena are clearly linked to each other due to their increasing convergence as well as the sportification of esports. Therefore, it is also reasonable to assume that the vastly more explored field of sports studies may provide frameworks and tools applicable to the emerging discipline of esports research.

Like people in other group contexts, athletes in sport teams have and perform different roles, and to perform well it is important to have a clear understanding of assumptions towards one's role. Role ambiguity, referring to a lack of clear information of a person's role in a group and expectations related to it (Kahn, Wolfe, Quinn, Snoek, & Rosenthal 1964, cited in Eys, Carron, Bray, & Beauchamp 2003, p. 392), has been researched in relation to various factors and attitudes originally in industrial and organizational environments. A meta-analysis by Jackson and Schuler (1985) illustrates that higher ambiguity has been found to be related to increased stress and tendency to leave, for example, but also to lower overall job satisfaction as well as lower satisfaction concerning specific aspects of work such as co-workers, supervision, and pay. Moreover, satisfaction has been linked to aspects including performance (Judge, Thoresen, Bono, & Patton 2001) and commitment (Meyer, Stanley, Herscovitch, & Topolnytsky 2002) in job contexts.

Shifting the scope from work supervision and management to smaller interdependent groups, role ambiguity has been researched from various perspectives lately in studies of team sports (e.g., Beauchamp, Bray, Fielding, Eys 2005, Bosselut, Heuzé, Eys, Fontayne, & Sarrazin 2012, Leo, González-Ponce, Sánchez-Miguel, Ivarsson, & García-Calvo 2015, Rogalsky, Doherty, & Paradis 2016), where papers on athlete satisfaction have reported correlations between higher ambiguity and lower satisfaction (Eys et al. 2003, Bebetos, Theodorakis, & Tsigilis 2007).

As esports teams below the professional level do not usually have coaches to help players find suitable roles and perform well in them, more role ambiguity may be experienced among players, leading to less satisfaction. On the other hand, roles in esports gameplay have not been widely researched, and ambiguity as well as esports athlete satisfaction may be dependent on entirely other matters than could be imagined through lenses of sports research. Inspired by studies in sports research, this study explores the relationship of role ambiguity and athlete satisfaction in a team esports setting.

The current study utilized an online quantitative survey questionnaire for gathering data to investigate the relationship between role ambiguity and satisfaction of people who compete in one of the most popular team esports games, *Counter-Strike*:

Global Offensive (CS:GO, Valve Corporation 2012), to investigate the main research question:

Are esports athletes' perceptions of role ambiguity related to measured athlete satisfaction?

This paper is structured as follows: first, main topics of esports, role ambiguity, and satisfaction in background literature of esports and sports studies as well as the case study video game *CS:GO* are examined. The next chapter introduces the study survey questionnaire, its measures, and the method of analysis. Further, results of the analysis are presented, followed by a discussion chapter. Implications and limitations of the survey are also explored in the survey discussion. Finally, key aspects of the current study are reviewed in the concluding chapter.

2 BACKGROUND AND THEORY

This section briefly explores the most essential topics concerning this paper, starting with discussion of how esports is defined, examined as a phenomenon, and connected to the broader context of sports. Further, this chapter inspects the concepts of role ambiguity and athlete satisfaction, and especially how they are studied in sports studies. Finally, the case study video game CS:GO is discussed as a popular esports game.

Before continuing to the first topic, however, it is to be noted here for clarity purposes that the term esports is used in this paper as a singular to denote the phenomenon. Here, the term esports game refers to a video game played *as esports*, such as CS:GO. Further, the term *traditional sports* is used in this article to differentiate established, physical sports such as (association) football, cricket, boxing, and tennis from esports games, instead of referring to some archaic or heritage forms of sports or play.

2.1 Esports

Turtiainen, Friman, and Ruotsalainen describe esports in their paper as the “most popular forms of organized competitive video gaming” (2020, p. 352), and the brief definition arguably functions very well for introducing the phenomenon in practical terms. However, to better situate esports in the broader context of sports and understand why usage of the term continues to be debated (Hallman and Giel 2018, Parry 2018) in scientific conversations, its popularity, nature, and relation to sports and technology must be inspected further.

The popularity of esports is often highlighted in informal web news outlets and blogs (e.g., Alton 2019, Krush 2020, Olya 2020) by presenting statistics such as viewership or revenue numbers of esports as one entity. Indeed, esports would already be one of the most popular individual sports when viewed from that perspective, as a report from consumer and market data provider Statista (Gough 2021) estimates worldwide spectator audience of esports to have been approximately 435 million people in 2020. However, comparing the whole esports industry to individual sports is misrepresenting because the numbers are far lower for single esports games. Still, the numbers of people who play

esports games are impressive even if most players do not compete seriously; game statistics tracker website *activeplayer.io* (2021a and 2021b) estimates that, as of April 2021, 34 million people play *CS:GO* monthly, while another top esports game that is very popular in Western Europe and South Korea, *League of Legends* by Riot Games, has approximately 120 million monthly active users. Compared with the latest, even if somewhat dated, statistics report by the football governing body FIFA (2007) claiming 265 million active players worldwide in 2006, the popularity of these esports games becomes apparent.

In his book *The Play of Man*, Groos discusses the essence of sports in relation to play and defined sports as “play pursued reflectively, scientifically” (n.d., p. 121). Groos also describes that “sportsmen”, for example, spend their time studying a game’s rules as well as practicing, training, and perfecting their form of play (ibid.). The distinction made between play and sports by Groos arguably also applies to the relationship of digital games in general and esports; a professional esports player shares similar aspirations with professional football or chess players, race car drivers, and swimmers. Additionally, like play in comparison to sport in Groos’s definition, most video games and even games developed mainly for esports purposes can be and are often played recreationally and without any intention to practice purposefully for competitions. The deep interest and involvement in a certain profession certainly connects those who compete in esports and traditional sports.

Although people have competed in digital games since the first coded games appeared on computers in universities and laboratories, the skill of contestants was originally mostly measured by playing by oneself and comparing high scores (Borowy 2012, p. 38–45). However, as home video game consoles and computers improved with technological innovations, by the end of the 1990s century head-to-head competition and online multiplayer gaming started becoming more popular and accessible for the public, also enabling larger scale tournaments (ibid., p. 66–69). The formation of Korean e-Sports Association in 2000 (Yin 2010, p. 67) was among the first occasions in which the name of esports was used in a more official context, therefore linking gaming conceptually to sports. Competitive digital gaming has since increasingly been referred to with different forms of the same term, such as *e-Sports*, *eSports*, *electronic sports*, and *esports*, and

other closely related names such as *cybersports*. Further, the name of esports suggests that it is a subcategory of sports, like ball sports or motorsports, the prefix “e-” representing *electronic* in the same sense as in *email*. At a conceptual level, then, esports connects digital gaming as an electronic, technological phenomenon to sports.

Hamari and Sjöblom, in a response to Wagner’s (2006) conceptualization, define esports as “a form of sports where the primary aspects of the sport are facilitated by electronic systems; the input of players and teams as well as the output of the eSports system are mediated by human-computer interfaces” (2017, p. 211). While their definition is theoretically sound as it focuses on the electronic aspect and the technology in competitive gaming, it does not clearly communicate the concept in practical terms. However, the authors are likely aware of the definition being complex and additionally describe esports in a similar manner as Turtiainen and her colleagues, as “competitive video gaming” (Hamari & Sjöblom 2017, p. 211). Turtiainen and co-authors, in turn, agree with Hamari and Sjöblom’s definition, further classifying esports as a *media sport* like any other sport (or perhaps sportified activity) that is broadcasted widely. Also, the nature of esports is completely mediated; more importantly than broadcasting, the gaming itself cannot be operated without human-computer interfaces for players’ input using peripherals and the games’ output through audio-visual and other possible sensory means.

Heere (2018, p. 23) illustrates how esports is considered as a form of sports today by entities such as sport teams, media outlets, various governments, and even the Olympic Council of Asia, which is planning an esports medal event for 2022 Asian Games. With professional athletes wearing team jerseys, player transfers and star performances being discussed in the media, and success stories circulating on the web, the process of sportification is easily understood when discussed; Heere defines sportification as a way to either attract audiences by adding elements familiar from sports to existing activities or to “view, organize[,] or regulate a non-sport activity” (ibid.) to make it resemble sports and enable fair competition as well as tracking of performance (2018, p. 23).

Taylor (2018, pp. 3–4) describes how the live broadcasting of gameplay and other content, or streaming, has gained traction explosively in the 2010s mostly due to the success of streaming service Twitch currently owned by Amazon. Alongside other gaming content creators, esports competitors and tournament organizers have been

among the first to adopt the new technologies of online broadcasting with platforms such as Twitch, which has arguably enforced the status of gaming and esports as main phenomena of the contemporary digital era. Consequently, a pursuit of new audiences and possible customers to interact with explains the increasing interest and participation in the field of esports by actors from various industries and, in turn, presenting esports like sports to validate it as an activity further attracts new institutions and businesses.

2.2 Role ambiguity

Eys, Schinke, Surya, and Benson (2014, p. 131) state that the study of roles in groups originated in the fields of psychological and sociological research in the early 20th century and became prominent by the 1950s. Bales and colleagues (1955, cited in Eys et al. 2014, p. 132) propose that there are task-related and social roles, while Mabry and Barnes (1980, cited in Eys et al. 2014, p. 132) make a distinction between formal roles, or those assigned by an authority, and informal roles that emerge through team interactions. Team captain in many traditional sports or in-game leader in many esports games represent task-related and formal roles, whereas roles such as team joker, also present in esports teams (Voorhees & Orlando 2017, p. 220), are arguably social and more informal. Carron and Hausenblas (1998, p. 133, cited in Eys et al. 2003) indicate that norms, positions, status, and roles are key components in expressing the presence of groups' psychological structures. In this study, focus is placed on roles, and specifically esports players' role ambiguity.

Beauchamp, Bray, Eys, and Carron (2002) studied role ambiguity as a construct consisting of four dimensions: ambiguity concerning (a) the scope, or extent, of one's responsibilities, (b) behaviours needed to fulfil role responsibilities, (c) how responsibilities are evaluated, and (d) consequences of failing to fulfil these responsibilities. Beauchamp and his colleagues, in their study about role ambiguity, efficacy, and performance, (ibid., p. 238) found role ambiguity in scope of responsibilities to be a major predictor for role performance. Additionally, ambiguity of role consequences also correlated significantly with offensive role performance (ibid.).

Eys, Carron, Beauchamp, and Bray (2005, p. 386) describe that the state of role ambiguity is often the result of two actors, the *focal person* and the *role sender*, and

interactions between these two. Usually, in sports, the focal person is an athlete, and the role sender is a coach. Concerning esports, it is therefore interesting to note that coaches are somewhat rarely found in teams outside higher levels of play. In fact, esports programs for children and youth are still very much in their infancy and face challenges like national or regional age ratings for games such as *CS:GO*. Consequently, many aspiring esports players might not have clear ideas of who places and evaluates expectations on whom inside their team, which in turn likely leads to social and performance issues. In addition, the absence of coaches in many amateur and semi-professional teams might contribute to issues in training, as behaviours needed to fulfil responsibilities might be unclear or the players do not know how to practice for these responsibilities.

Additionally, the field of esports is still emerging and the amount of people trained for coaching is presumably low. Therefore, non-professional teams probably encounter issues with identifying roles that suit aspiring player's talents and skills best. In consequence, it may be easier for teams to search for new players that seem to fit the team better instead, leading to lesser commitment and satisfaction for players left without a team.

This study focuses on role theory since teams in esports much resemble those in traditional sports, at least in appearance, and group dynamics have not been explored as much in the field of esports research. Additionally, some video games including *CS:GO* remove players from the playing field because of game events more often than traditional team sports, for instance in shooter games where players are eliminated, and variations on asynchrony may rapidly alter the responsibilities of a player multiple times mid-game. Therefore, the effect of role ambiguity is especially interesting in the setting of esports such as *CS:GO* where a player often must fulfil responsibilities outside their initial or general scope of tasks; clarity and knowledge of skills for performing a very specific role and its tasks might not perhaps be as useful as other qualities such as adaptability and performance under stressful situations. Role ambiguity may then arise more from social and communicational aspects of teamplay in esports, instead of issues with individual in-game tasks or responsibilities being unclear.

2.3 Athlete satisfaction

In his doctoral dissertation, Riemer (1995, p. 1) claims that satisfaction is perhaps the most researched of psychological attitudes, and that the state of being satisfied might even be considered a need. Consequently, many sub-constructs like job satisfaction and life satisfaction have been greatly explored already before the 21st century (ibid.). Naturally, sports researchers have been increasingly interested in athlete satisfaction, which Chelladurai and Riemer define as “a positive affective state resulting from a complex evaluation of the structures, processes, and outcomes associated with the athletic experience (1997, p. 135). Burns, Jasinski, Dunn, and Fletcher (2012, p. 280) clarify athlete satisfaction, as a variable in sports psychology, to show how content athletes are with their experience.

Instead of athlete satisfaction, *athlete satisfaction of esports athletes* is measured in the current study, referring to discussion of whether esports fit into the definition of sports and gaming competitors should be referred to as athletes; Jenny, Manning, Keiper, and Olrich (2016, 6–7) discuss that while esports competitors are increasingly recognized as genuine, professional athletes, older views of sports and athleticism where an opponent needs to be bested physically, in the physical realm, are still prominent. Indeed, perspective in defining what an athlete is should continue to shift from a fixation in the physical body to a more general acknowledgement of the word’s etymology, of competing for a prize, as described in Merriam-Webster dictionary (“Athlete” n.d.). Thus, the talents, work, and dedication of professional competitors could be recognized better. However, as the concepts of player and athlete are not mutually exclusive, players of football, chess, and *CS:GO*, for example, could naturally still be referred to as both.

In addition to satisfaction being linked earlier to positive aspects in job environments (e.g., Meyer et al. 2002, Judge et al. 2001), Burns and co-authors (2012, p. 280) summarise that participation and success as well as improved well-being are linked to satisfaction in sports research. As esports and gaming in general are increasingly popular as forms of leisure and labour, interest towards health and well-being of players is naturally growing. Further, examining the satisfaction of players may consequently provide insight on what seems to work and how to improve conditions in these environments. Adapting a scale for athlete satisfaction by Riemer (1995), this paper studies satisfaction of *CS:GO* players in relation to two aspects, team affiliation and individual performance.

2.4 Counter-Strike: Global Offensive

CS:GO is a competitive online multiplayer first-person shooter game mainly played on the PC platform. The game is developed by Hidden Path Software and Valve Corporation and was initially released by the latter in 2012. Image 1 illustrates what a first-person shooter game generally looks like: the game events are displayed from the point of view of the player's character.



Image 1. *CS:GO* (Valve Corporation, 2012) is a first-person shooter. Screenshot by author.

Building on the popularity of its predecessors in Valve's *Counter-Strike* game series, *CS:GO* is currently the second most popular esports game based on viewership numbers (Newzoo 2021) and prize money (Esports Earnings 2021). Additionally, it is broadcasted regularly and at times even in prime-time television by the Finnish national television and radio broadcasting company YLE and commercial channels, an example of its prominence especially in northern European countries. Generally, *CS:GO* has been more popular in Europe than other parts of the world (HolyDiver 2020).

In a single round of *CS:GO* using the standard competitive rules, two teams of five players fight over two bomb sites on one of many differently themed game maps.

The Terrorist team, starting the round farther from the bomb site, needs to either eliminate (or *frag* in the game's lingo, to use instead of kill or eliminate) all the opposing team's players or plant a bomb on one of the bomb sites and defend it until detonation. The Counter-Terrorist team must prevent the bomb being planted within a time limit, eliminate all opponents, or if the bomb is set up by the Terrorists, defuse it before its detonation timer runs out. A team must win 16 of 30 rounds and if the game results in a 15–15 round tie, the match is often decided with an overtime where teams need to win 4 out of 6 rounds, all further 3–3 ties leading to new possible 6 rounds of gameplay. Furthermore, in a match, teams play first play a 15-round half on the Terrorist or Counter-Terrorist side, then switch sides and play the remaining rounds on the other side. In overtime, players switch teams after three rounds.

Players receive in-game money for eliminations, planting or defusing the bomb, and for winning the round or as a loss compensation in *CS:GO*. Each round starts with a small period to purchase weapons and equipment such as flashbang and smoke grenades, armour, or defuse kits to shorten the time needed for the bomb defusing process on the Counter-Terrorist side. Therefore, in addition to tactical positioning of players around the map and the mechanical execution skills needed to eliminate enemy players, teams need to make strategical decisions on, for instance, whether to save money after a lost round when their economy is lacking. Consequently, they may lose another round but increase their chances on the next one.

In *CS:GO* and most other team esports, members of a team are in constant voice contact with their peers through different chat options using headsets equipped with microphones, and that arguably adds to the importance of in-game communication. Instead of having to rely on yelling to each other across the field or using visual signals like in sports such as baseball or football, *CS:GO* players can convey information very accurately and clearly to their teammates regardless of their avatar's position on the virtual playing field. Communication is therefore vital for all members of a team, while some players talk more, and others focus on using the knowledge relayed to them. In *CS:GO*, communication can also happen after a player's avatar is already eliminated on the round, though most players remain silent afterwards to let their teammates focus on playing.

Table 1. In-game task-related role mention frequencies in web articles

Role	AWPer	Entry Fragger	In-Game Leader	Lurker	Playmaker	Support
Frequency (n=10)	10	10	10	9	6	10

Sources: Bridges 2018, Chiu 2020, Delorme 2017, Dignitas 2018, Dyer n.d., Fedorov n.d., Hernandez 2018, Lopez 2021, Max 2017, Umaril 2019

If the bomb is not planted and the round time ends with at least one player alive on both sides, Counter-Terrorists automatically win. Therefore, gameplay revolves around control of the bomb sites and the Terrorist side must be the aggressors. Due to the asymmetric starting situation, the categorization of gameplay roles in *CS:GO* is mostly focused on players of the Terrorist side and the roles are therefore considered offensive. In the following paragraphs, roles that appear most often in *CS:GO* gameplay will briefly be introduced. In this study, the roles studied are offensive, *in-game*, *task-related* roles, indicating that they concern gameplay behaviours and communication and do not assume social roles outside of the game.

Some of the described roles are not necessarily found in all competitive teams, and individual players often have secondary and even tertiary roles. Additionally, some of the roles relate to special behaviours and therefore overlap with roles that describe general functions of gameplay. The roles are approached through empirical knowledge and online articles, as well as a single scientific source where player roles of the professional *CS:GO* team Cloud9 were described (Voorhees and Orlando 2017).

There are general ideas on how players might position themselves round-initially, depending on the game maps and what kinds of actions are expected from them. However, there is no definite list of player positions or roles in *CS:GO* that appear in every team. Instead, different strategies employ varying positions for players as in football, for instance. Therefore, a set of 10 online posts as well as Voorhees and Orlando's (2017, pp. 217–20) article were reviewed to identify six in-game roles of the game: In-game Leader (IGL), Entry Fragger (named after fragging, or killing), Playmaker, Support, Lurker, and AWPer. Table 1 shows the frequencies of roles being mentioned in the web articles.

Of these roles, the IGL's most important task is to process information received from teammates about the changing game states on the field and communicate tactics updates to teammates, whereas the AWPPer is named after a specific sniper rifle weapon they prefer over other options when possible. The remaining four roles, such as the Lurker who attempts to sneak and hide by themselves in another part of the game map mostly to gather information about opponent movements, refer most clearly to specific gameplay tasks and behaviours required from the players. Players except the AWPPer, whose weapon is one the most expensive in the game, generally equip automatic rifles if there is sufficient money to buy them and necessary equipment.

The Entry Fragger is the first one to enter a fight, relying on fast reactions and precision to try and eliminate as many opponents as they can. More importantly, though, the Entry Fragger is often the first to be eliminated but provides information for the rest of the team and is usually followed to action by the Playmaker, who attempts to frag remaining opponents weakened and spotted by the Entry Fragger. The Support player usually carries most equipment and assists team members mainly perfectly timing the use of equipment such as flashbang grenades that blind and deafen players in proximity and smoke grenades that provide obstructions to lines of sight, and by being the last player to enter a fight. Usually, though, all players carry some equipment and optimally, teammates work together in the use of various grenades to gain an advantage.

If a team in *CS:GO* consists of only five players as explained earlier in this chapter, then how do these six available roles behave in relation to each other? As mentioned previously, in-game task-related roles are highly fluid and overlap; the IGL, while being responsible for tactics, also acts in the playing field and therefore plays another role such as that of the Support. Indeed, Voorhees and Orlando (pp. 217–220) only mention five roles in the Cloud9 team, Playmaker missing from the list, but the IGL's actions outside the communicational responsibilities are left undiscussed. Additionally, for example, an AWPPer IGL could even act as the Lurker and enable more creativity for the remaining players.

Defensive roles of *CS:GO*, particularly in situations where the Counter-Terrorist team protects bomb sites and where the Terrorist team has planted the bomb and prevents it from being defused, have been less explored in gameplay analysis and guides.

Accordingly, articles that were used to identify the offensive roles described no or varying concepts of defensive roles, while a consensus of sorts (Max 2017, Umaril 2019) concerned the protection of the two bomb sites and how players act when either of the sites are under attack by the opposing team.

3 METHOD

A quantitative survey questionnaire was used to collect data from *CS:GO* competitors ($n=102$) for the purpose of examining the relationship between esports athlete's perceptions of role ambiguity and satisfaction. Correlation analysis was used to measure correlations of role ambiguity and satisfaction dimensions. The foremost hypothesis of the study was that dimensions of role ambiguity, measured on a 9-point scale from high to low ambiguity (i.e., low to high role clarity), correlate positively with dimensions of satisfaction, measured on a 7-point scale from low to high satisfaction.

The first subchapter briefly discusses the details of the questionnaire, reasoning for choosing the research method, and the outline of the current survey. The second subchapter addresses the processes of survey distribution and participant recruitment. Next, the two measures used in the study are introduced, followed by description of the analysis method.

3.1 Quantitative survey

Performing correlation analysis on data gathered from an online survey questionnaire was chosen as the research method to facilitate testing the application of two measures used in sports studies, namely Role Ambiguity Scale (RAS, Beauchamp et al. 2002) and Athlete Satisfaction Questionnaire (ASQ, Riemer 1995), to a team esports setting. Having minimal background in statistics, conducting a quantitative study was considered a learning opportunity for the author to improve theoretical comprehension and practical understanding of statistical studies, including questionnaire design and analysis as well as studying statistical research papers.

The survey was open from December 10, 2020 to April 22, 2021. In accordance with the principles of informed consent, possible participants were informed that the survey is voluntary to participate in and could be withdrawn from at any time. Information about the study and statements regarding the survey's privacy and data policies were also presented before informed consent for participation was acquired from the respondents. By checking a box on the end of the survey landing page, participants confirmed that they were of sufficient age, had understood the information provided to them, and gave their

voluntary consent to participate. The participants did not benefit from the survey financially or in any other manner, and the survey did not contain incentives. Additionally, risks resulting from participation were minimised by anonymisation and grouping of sensitive demographics categories.

Multiple national and international data protection laws as well as national ethics guidelines were reviewed before the recruitment process. Furthermore, since there are many underaged players in esports and it was reasonable to assume that some respondents could also be underaged, to respect various national guidelines the age of 18 was required from all respondents to begin the questionnaire unless they reviewed an additional document clearly stating from which countries and at what age an underage player was considered able to give informed consent themselves to answer the questionnaire. Additionally, Tampere University Research Data Services were consulted about data and privacy guidelines before initiating the survey. Eligibility criteria required that participants play *CS:GO* competitively and are over 15 to 18 years of age, depending on the country they live in.

The survey was designed and implemented using a version of the open-source LimeSurvey tool modified for Tampere University students, which offered advanced features on anonymisation and exporting of data, for instance, and provided a professional appearance. In total, 315 responses were received. 209 incomplete responses were removed, and 4 responses were removed for being highly inconsistent, suspectedly due to careless and superficial filling of the questionnaire. Additionally, some individual items in responses were deleted or corrected for containing impossible data or data in wrong format. The final dataset consisted of 102 records.

The questionnaire consisted of four question groups: preliminary questions concerning playing experience of *CS:GO*, skill level, and identification of player roles, sections for measuring role ambiguity and esports athlete satisfaction, and demographics. General demographic information about *Gender*, *Age*, and *Nationality* were collected from participants. Gender, a nominal item, included the following answer options: female, male, “prefer to self-describe as:”, and “prefer not to answer”. Nationality, also a nominal item, was selected from a list of countries. Age was recorded as a numeric input with no pre-defined age ranges, resulting in continuous data.

Demographic data related to *CS:GO* was also gathered in the questionnaire. Continuous data was collected with items concerning *Counter-Strike Playing Experience* (including *CS:GO* and other *Counter-Strike* games) in *Years played*, optionally also in *Hours Played*, which is a statistic that can be seen when launching *CS:GO* on PC, and *Experience with the Player's Current Team*. Additionally, ordinal data was collected from questions on *Salary or Other Compensation* and *Level of Play*, with the answer options listed followingly: no pay or compensation, compensations for smaller expenses, salary and/or compensation for e.g., equipment, practice, or living expenses and smaller costs; casual, amateur, semi-professional, professional. Finally, nominal data was gathered through a general question on whether the player's team had a *Coach* and a radio button question on what player role participants identified the most with, answer options to the latter question being described in Table 1 and in the current chapter's other subsection about player roles. IBM SPSS Statistics 26 software was used to analyse data for this study.

The data collection was conducted through a computerized, self-administrated questionnaire (CSAQ) on the internet, which arguably offered many advantages over other manners of administration or survey execution in an esports context. Firstly, concerning coverage, *CS:GO* is mostly played online, especially during the current COVID-19 pandemic, and on the PC platform, and it is therefore reasonable to assume that all competitors have access to a computer and internet to play. In addition, tournament and league organizers already use web and social media channels to inform and contact teams, which means that players are on various platforms and could be reached there. Secondly, as the survey was anonymous and there was no interviewer to disturb the respondent's privacy, increased sense of privacy and comfort may have resulted in less biased responses. Indeed, Tourangeau, Conrad, and Couper (2013) note that while internet surveys are not without issues, they often present less measurement errors than traditional modes.

Thirdly, the questionnaire was made concise and simple, allowing for speedy completion and perhaps increased spontaneity concerning the answers. Even though a computerized questionnaire could incorporate elements such as embedded media or interactive sections, the effects of such additions should be thoroughly investigated

beforehand. Rather, answer options in the current questionnaire used traditional response manners of short text or numeric inputs, selecting items from a radio button list, and selecting a point on a Likert scale. Fourthly, item nonresponse errors were mostly eliminated by making all necessary questions mandatory for proceeding to the next section. Finally, an internet survey might not require as many resources to gather a large amount of data as other methods, and it is easily distributed across various devices.

3.2 Participants and procedure

Volunteer *CS:GO* players ($n = 102$) participated in the study, people describing themselves as males ($n = 96$) accounting for most of the responses. The average age of respondents was 22.7 ($s = 0.5$) and respondents' average experience playing for their current team was 1.2 years ($s = 1.2$). Average experience of playing *CS:GO* games in years was 7.21 ($s = 3.8$) and 5,123 in in-game hours ($s = 3,034$). Majority of the respondents considered themselves amateurs ($n = 55$) or semi-professional players ($n = 32$), while 11 players identified as casual players and 4 as professionals. Only 27 players, slightly more than a fourth of the sample size, reported that their team has a coach. Of the offensive player roles, the role of IGL ($n = 28$) was represented the most in the dataset whereas least players identified as Lurkers ($n = 7$). The other roles, AWPer ($n = 18$), Entry ($n = 15$), Playmaker ($n = 15$), and Support ($n = 13$), were quite equally represented, while 5 participants could not identify primarily with a single role.

Finland ($n = 44$) had the most representation in the sample, most likely due to best identification of possible distribution channels as well as proximity and networks on Twitter, for instance, because the author is also Finnish. 19 other nations' representation ranged from 1 (multiple countries) to 10 (United Kingdom).

Respondents were recruited by the author through various ways of contacting people online. Methods included sharing a general invitation in social medias such as Twitter, Discord channels, and Reddit subreddits, contacting esports organizers that operate league or tournament competitions in *CS:GO* and asking the organizations to share a pre-written invitation letter for the survey questionnaire, contacting individual esports teams and asking them to distribute the survey to their players, and contacting other actors

in the esports community to help with distribution of the survey. Esports teams with female players were approached by email alongside other individual teams to increase the chances of receiving responses from women players, as well.

As there were no examples of sample frames covering target populations, information of contacts and possible participants was scattered around the internet. Additionally, many leagues and tournament statistics websites had no contact information of organizers or participating teams available. Moreover, it was not possible to completely determine whether, for instance, a member of a *CS:GO* channel of an esports league organizer's server on the community platform Discord is active on that media or even playing in a team in that league. Thus, it was difficult not only to approach but also to even identify many possible participants and therefore to calculate a total sample size. A further issue of framing concerning this study was that several league or tournament organizers could, or would not want, to share a general invitation to teams and players competing on those environments, and understandably many could not share any lists or contact information details of their participants to a third party.

The author estimates that 3,000 current team esports players of *CS:GO* had had the possibility of noticing the general invitation on various media but that the total target population is at least twice and perhaps even three times that number. The estimation is based on empiric knowledge from searching for teams and players across the world to contact and consulting statistics considering the regions competitive-oriented *CS:GO* players generally come from (HolyDiver 2020, SunTzuYAO 2021). With 102 complete responses, the response rate ranges from 3% to 1%, which is reasonable, considering that web surveys often have lower response rates than surveys of other modes (Lozar Manfreda, Bosnjak, Berzelak, Haas, & Vehovar 2008).

A pilot survey was conducted for several ($n = 8$) Finnish *CS:GO* players before initiating the final survey. Comments from pilot participants on some of the preliminary questions, made after completing the survey, were used to clarify wordings and intentions, and statements on the RAS and ASQ items were deemed sufficiently understandable for use with non-native speakers of English. Additionally, timing statistics of pilot survey completion were examined to provide the official survey respondents an es-

timation of time required for filling the questionnaire. The participants from the pilot survey were requested not to participate in the official survey to avoid biased answers from knowing the survey items beforehand. Concerning the measures, participants of the pilot survey commented that the role ambiguity questions were too similar.

3.3 Measures

3.3.1 Role ambiguity

In this study, role ambiguity was studied using an adapted version of the scale by Beauchamp and his colleagues (2002). The instrument was chosen because it is concise but accurate, and because it has been employed in several more recent sports role studies as well (e.g., Bosselut et al. 2012, Eys et al. 2003, Karamousalidis, Laparidis, Galazoulas, Bebetos, & Zaggelidis 2009, Leo et al. 2015), adding to its validity and credibility. Confirmatory factor analyses have been conducted by Beauchamp and colleagues (2002) as well as Eys and co-authors (2003), for example. The scale is multidimensional, assessing four dimensions of ambiguity and lack of clarity concerning a player's role: Scope of Responsibilities, behaviours necessary to fulfil role responsibilities (Role Behaviour), evaluation of role performance (Role Evaluation), and consequences of failing to fulfil role responsibilities (Role Consequences).

Each of the four categories contained five items where players rated their agreement with statements such as "I understand how my role is evaluated" on a 9-point Likert scale, spanning from strongly disagree (1) to strongly agree (9). Therefore, role ambiguity was measured on an inverse scale, higher ratings representing lesser ambiguity and higher clarity. To reduce method bias, one statement concerning each dimension was inverted in the original scale, and the inverted statements were maintained in the items of the current questionnaire.

Additionally, while the original application of the instrument assessed both offence and defence with separate instances of the 20-item scale, totalling to 40 items, (Beauchamp et al. 2002), the current study did not incorporate a division into offensive and defensive measuring of ambiguity and instead presented 20 statements that did not specifically mention offensive or defensive responsibilities. However, as discussed in the *CS:GO* subchapter of the previous chapter and in the next subsection below, the roles

from which players were asked to choose which one they primarily identify with in the first question group are still conceptually offensive roles. In consequence, players were more motivated to think about their responsibilities from an offensive perspective.

The choice to study offensive rather than defensive roles was made in consideration to previous literature; Eys and colleagues' (2003) as well as Beauchamp and co-authors' (2002) discuss that role ambiguity concerning offensive responsibilities has been more important in predicting athlete satisfaction than ambiguity about defensive responsibilities. In addition, Beauchamp, Bray, Eys, & Carron's (2003) study measured significantly more focus being placed on offensive responsibilities over defensive ones in field hockey players' practices, what indicates that defence is often less explored and perhaps less appreciated in sports contexts.

After the correction of inverted items, Cronbach's alpha for dimensions of role ambiguity ranged from 0.758 (Scope of Responsibilities) to 0.848 (Role Consequences), and all values are sufficient to accept the internal consistency of dimension scales. Table 2 lists means, standard deviations, and Cronbach's alpha values for the four factors of role ambiguity.

Player roles

In the questionnaire, players were asked to select a role they most identify with from a list of six options and an option of "Other:" to help them think about their responsibilities for the role ambiguity scale statements. The available answer options listed in Table 1 on the background and theory chapter, which were identified as offensive player roles in a review of articles and online informal web guides, were AWPPer, Entry Fragger, In-Game Leader (Strat Caller), Lurker, Playmaker (Secondary Entry), Support. While Beauchamp

Table 2. Descriptive statistics of the dimensions of role ambiguity and satisfaction

Variable	Dimension	Mean \pm s	Alpha
Role Ambiguity ^a	Scope of Responsibilities	7.23 \pm 1.13	0.758
	Role Behaviour	7.26 \pm 1.26	0.770
	Role Evaluation	6.88 \pm 1.43	0.839
	Role Consequences	7.44 \pm 1.39	0.848
Satisfaction ^b	Team Affiliation	5.25 \pm 0.80	0.899
	Individual Performance	5.32 \pm 0.83	0.819

Note: ^a Responses were measured on a scale from 1 to 9 (from high to low role ambiguity). ^b Responses were measured on a scale from 1 to 7 (from low to high satisfaction).

and colleagues (2002) required athletes to identify their main responsibilities for offence and defence in writing for the purpose of measuring role ambiguity, players in the current study answered statements from a more general viewpoint.

3.3.2 Athlete satisfaction

To measure the satisfaction of *CS:GO* esports players, or athletes, Warren Smith's (2010) modified version of the Athlete Satisfaction Questionnaire (ASQ) by Riemer (1995) was adapted to this study. ASQ was chosen as a measure since it was developed to be useful across various settings in addition to being moderately brief and easy to comprehend (Riemer 1995, p.64). Smith (2010) also assessed the factorial validity of his modified version multiple times during its development. Smith's version of the ASQ contains 56 items measuring satisfaction on 6 dimensions, of which 27 items across 2 factors, Satisfaction with Team Affiliation (STA) and Satisfaction with Individual Performance (SIP), were deemed relevant to the current study and thus employed in it.

The omitted question groups consider coaching and organizational matters such as facilities, equipment, and medical personnel, and it would have been interesting to learn about these factors in the emergent field of esports where many teams are newly established, and players' associations are only recently forming. However, maintaining those questions in the questionnaire would have possibly decreased the number of responses since non-professional teams in smaller leagues do not have coaches or belong

to organizations, and therefore organizational or coaching questions would have been irrelevant for these players.

ASQ measured satisfaction on different items using a 7-point Likert scale. Each item was formed by completing the sentence 'I am satisfied with...' (e.g., the improvement in my skill level) and providing answer options for participants to rate their agreement with. The first option denoted extreme dissatisfaction, middle option indicating neither satisfaction or dissatisfaction, and the last answer option represented extreme satisfaction. Cronbach's alpha values of 0.90 (STA) and 0.82 (SIP) were measured, indicating that the internal consistency of scale items was acceptable. The descriptive statistics for satisfaction are shown in Table 2.

The main argument for Smith's version of ASQ over Riemer's original was Smith's choice of assigning extreme dissatisfaction and extreme satisfaction as the polar ends of the scale, whereas in the original ASQ the lower end indicated the state of not being satisfied, upper end still denoting extreme satisfaction. While the decision to measure only positive satisfaction is argued by Riemer (1995, p.70), Smith's questionnaire is more beneficial for the current study, because the items for measurement of role ambiguity use similar extremes, of complete disagreement or agreement, and a neutral mid-point as items in Smith's ASQ. Thus, it is reasonable in this questionnaire survey to provide respondents with scales that have resembling answer option choices to lower chances of measure errors due to comprehension, especially as English is not the first language of many respondents.

3.4 Analysis

This work used correlational analysis to study the relationship between role ambiguity and satisfaction dimensions. Kendall's tau-b correlation, a variation of the Kendall's tau nonparametric correlation measure that acts as an alternate to popular Spearman's and Pearson's correlations (Puka 2011), was run to determine relationships between dimensions of role ambiguity and athlete satisfaction. The dataset had several outliers, but because they naturally belonged to the target population, instead of plausibly containing input errors or impossible measurements, they were maintained in the dataset. There were also some tied ranks in variable means. In consequence, Kendall's Tau-b correlation was

used to detect relationships between dimensions of role ambiguity and athlete satisfaction because the measure is efficient, robust for outliers (Croux & Dehon 2010) and suits small sample sizes with some tied ranks (Brophy 1986). The direction of a monotonous relationship between two variables is indicated by the sign of the coefficient, and larger absolute values indicate stronger relationships between (Puka 2011).

Additional analyses to explore the variables further were contemplated. Because the sample size ($n = 102$) of the dataset was rather small and participants were not chosen randomly, some of the main assumptions for running confirmatory factor analysis were not met. Additionally, multivariate normality could not be properly achieved without skewing the results in the process of removing outliers, which were naturally part of the population and would likely fit into normal distance thresholds with a larger sample size. Therefore, no further analysis such as multiple linear regression to identify unique effects of role ambiguity variable on satisfaction dependents were conducted on the dataset.

4 RESULTS

Descriptive statistics for role ambiguity and satisfaction variables are presented in Table 2. The averages for dimensions of satisfaction were higher than the 7-point scale's mid-point values (5.25 for STA, 5.32 for SIP), indicating moderately high satisfaction among players. Mean scores of perceived role ambiguity, measured on a 9-point scale and ranging from 6.88 (Role Evaluation) to 7.44 (Role Consequences), indicated reasonably high clarity, that is, low ambiguity. Scores for both role ambiguity (e.g., Beauchamp et al. 2002, Eys et al. 2003) and satisfaction factors (e.g., Eys et al. 2003, Hoffmann & Loughhead 2016, Rodahl, Giske, Peters, & Hoigaard 2015) were reasonably consistent with results from studies on traditional sports.

Bivariate correlations between the variables of satisfaction and role ambiguity are shown in Table 3. Role ambiguity dimensions were intercorrelated with weak to moderate correlations ($0.37 \leq r \leq 0.58$) and the two dimensions of satisfaction were moderately ($r = 0.45$) correlated. Results from Spearman's rank-order and Pearson's product-moment correlations, which measure correlations in different manners to Kendall's tau-b correlation, were also consulted in estimating the significance of the relationships.

Table 3. Bivariate correlations between the dimensions of role ambiguity and satisfaction

Variable	1	2	3	4	5	6
1. Scope	-	.52**	.58**	.45**	.15*	.23**
2. Behaviour		-	.52**	.37**	.19**	.27**
3. Evaluation			-	.43**	.14*	.21**
4. Consequences				-	-.03	.11
5. STA					-	.45**
6. SIP						-

Note: Scope = Scope of Responsibilities, Behaviour = Role Behaviour, Evaluation = Role Evaluation, Consequences = Role Consequences, STA = Satisfaction with Team Affiliation, SIP = Satisfaction with Individual Performance. * $P < 0.05$, ** $P < 0.01$.

There were weak ($0.14 \leq r \leq 0.27$) significant correlations between dimensions of role ambiguity and satisfaction, of which the Role Behaviour dimension had the strongest and most significant correlations to both STA ($r = 0.19, P < 0.01$) and SIP ($r = 0.27, P < 0.01$). Overall, STA was slightly less correlated with the dimensions of role ambiguity: its relationship to the Scope of Responsibilities ($r = 0.15, P = 0.33$) and Role Evaluation ($r = 0.14, P = 0.45$) dimensions were weak, while being statistical significant on the 0.05 level, whereas SIP's relationships to Scope of Responsibilities ($r = 0.23, P < 0.01$) and Role Evaluation ($r = 0.21, P < 0.01$) were slightly stronger and also more generalisable to the population due to greater significance. In the current data, the Role Consequences dimension was not significantly related to either STA ($r = -0.03, P = 0.63$) or SIP ($r = 0.11, P = 0.11$).

5 DISCUSSION

This study examined the relationship between *CS:GO* players' (that is, esports athletes') perceptions of role ambiguity and satisfaction. Lower levels of role ambiguity were related to higher satisfaction when measured concurrently with the Kendall's tau-b coefficient, consistent with the primary hypothesis. Scores on both satisfaction and role ambiguity dimensions were generally high, indicating good overall satisfaction and clarity concerning player roles. SIP had slightly stronger correlations with each of the dimensions, suggesting that an individual's satisfaction relates more to their own performance than issues concerning teammates.

The Role Consequences dimension, however, was not significantly correlated with either STA or SIP, according to this dataset. In the study by Eys and his colleagues (2003), Role Consequences also had the smallest number of significant connections to dimensions of satisfaction, suggesting that the dimension is not as linked to satisfaction as the other aspects of role ambiguity. The results of the current study, then, while with a smaller set of satisfaction factors to examine, further validate the role ambiguity measure. Additionally, low strengths of the significant relationships between role ambiguity and satisfaction dimensions, ranging from 0.14 to 0.27, are not surprising because there are other factors contributing to satisfaction and low to moderate results have been found earlier (*ibid.*), as well.

The infant state of coaching and youth programs in esports is likely an issue that affects various aspects, such as role ambiguity. In the absence of a coach, how does the team assign and communicate roles? Problems can easily arise between players in a team if they do not know who evaluates them and whom should they evaluate or give guidance to. Further, the Role Consequences dimension might have irregular data because teams handle failures in fulfilling role responsibilities in an unknown manner, details or thoughts being unclearly communicated between members.

The demographics of this study's sample confirm that less teams on lower levels of competition have coaches but also that it is not very uncommon for a team to have one. Still, the state of coaching in esports is improving, with, for instance, the increase of programmes and guides for coaching education in Finland (e.g., Rönnerberg 2019,

Ögland, Nylund, & Tukia 2017). However, reported role clarity scores are still high, which indicates that coaching may not be as important in esports if players understand their function in a team. Perhaps some player-driven, independent teams might in fact have very strong leaders, simplifying the interpersonal relationships in such teams, or the opposite; teammates may identify and communicate roles between each other in a highly collaborative manner, improving everyone's clarity.

Nonresponse, manifesting mostly in unit nonresponse, or refusal to participate altogether, was frequent in this study. If approximately 3,000 players have been possibly exposed to invitations of the survey, only 11% visited the survey. Furthermore, nearly two thirds of responses were interrupted during the process, attributing to partial nonresponse. Item nonresponse, or not answering certain items, was mainly avoided by assigning most items as mandatory, and was not a large issue in this study.

An additional reason for nonresponse issues could be found in devices used to access surveys; if players enter surveys with smartphone browsers through links in social media applications and the page is not optimised for their device, they might not want to answer the questionnaire. Modifying the LimeSurvey tool used in the development of the current study's questionnaire was restricted, and therefore additional themes that featured mobile, and tablet or reader optimisation could not be installed to it. Still, the survey tool was well suited for large quantitative data collection and data privacy, which is why it was maintained. Optimisation of a survey questionnaire across various devices should be a high priority in further studies.

The average age of respondents as well as experience averages were rather high, mostly due to multiple very high scores in several individual reports of data. There were, in fact, multiple responses with 10 to 20 years of experience playing *Counter-Strike* games, for instance. Still, players aged 25 and under accounted for 80.3% of the responses, and players aged 20 to 21 for over a third (34.3%), what represents player bases of esports games and that of *CS:GO* well (ESPN Stats & Info 2017).

Defensive responsibilities were not considered in the analysis of this survey, nor were they focused much on existing *CS:GO* role categorisations. Still, in *CS:GO*, for

example, players might have to assume defensive responsibilities during any round because of game events, and these responsibilities should be far more investigated. On the Counter-Terrorist side, defensive responsibilities currently appear to be defined in relation to the protection of bomb sites and movement after either of the two bomb sites are assaulted.

The questionnaire design was simple, even if the web survey mode would facilitate advanced features. One purpose of maintaining forms familiar from pen-and-paper surveys was to enable people with less language skills to participate through easy comprehensibility of the question types. Additionally, the nature of interactive or other features facilitated by web surveys would have to be thoroughly researched before their application to studies. After all, issues can arise from the design of the survey, the participant, and the survey mode itself, what suggests that adding less studied new types of items could further complicate the correct measurement of variable data.

In the piloting, respondents claimed that the role ambiguity questionnaire had too similar statements. Indeed, fairly many of the items, such as “I understand *all* of my responsibilities”, “I understand *the scope* of my responsibilities”, and “I understand *the extent* of my responsibilities” were constructed using very similar wordings. While Beauchamp and co-authors (2002, p. 233) explained that, upon the development of the questionnaire, awkwardly worded items or items which contained jargon were removed, the remaining items might be too uniform to motivate respondents. Additional screening of incomplete responses on the LimeSurvey tool indicated that more people withdrew from filling the questionnaire after completing the satisfaction questions and when on the role ambiguity questions ($n = 15$) than vice versa ($n = 9$). Numbers being far too small to be meaningful, they might still hint to greater loss of interest during the role ambiguity scale questions when considered with the previous notes. Consequently, wordings of the role ambiguity scale could be considered in its further implementations.

Issues relating to the question group of role ambiguity dimensions, however, may also relate to preliminary questions regarding player roles in *CS:GO*, and perhaps there could have been an additional open text item, for instance, to assist players in establishing their foremost role responsibilities. Still, most ($n = 97$) of the participants clearly identified with a single player role, which suggests that they also have an idea of

required behaviours and responsibilities concerning that role. Future research could first focus on qualitative approaches to esports role theory and mixed mode studies with exploratory objectives.

5.1.1 Implications

Contrary to earlier studies (Eys et al. 2003, Bebetos et al. 2007), the Scope of Responsibilities dimension was less related to the factors of satisfaction than the dimension of Role Behaviour was. Thus, the results of the current study did not agree with Eys and his colleagues' (2003) proposition that the Scope of Responsibilities dimension, which has been the dimension most associated with several other models as well (e.g., Beauchamp et al. 2002, Beauchamp et al. 2003), may represent role ambiguity more generally, situating the other dimensions into subcategories in a hierarchical model. The Scope of Responsibilities dimension might not be as important in esports contexts as it is in traditional sports for unknown reasons, which should be investigated further. Such reasons could include communicational gameplay aspects, social relationships within teams, or possible fluid natures of roles in many esports games.

The slightly lesser importance of the Scope of Responsibilities in the results might also relate to an absence of communication of the player's role by a role sender; as coaching is not as prevalent in esports, the question of who acts as the role sender in esports teams becomes apparent and should be placed on focus in future theoretical approaches of esports roles. As mentioned in the discussion section, esports teams may have strong player leaders, or team captains, or instead be highly liberal in the absence of coaches.

Another interpretation of the Scope of Responsibilities being less important in predicting satisfaction is that, indeed, an assigned in-game role or its specific responsibilities are not as important in esports than the capability to assume new behaviours or adapt to situations rapidly in changing game states, for example. It is also likely, however, that the small sample size and the presence of several outliers in the current dataset had minor effects on the results, explaining the rather small differences. In future quantitative research of role ambiguity in esports contexts, emphasis could be placed on collecting larger datasets, where data on variables is more normally distributed and allows for more

sensitive, parametric analyses to assess the factorial validity of the role ambiguity constructs. Additionally, qualitative research should explore the possibility that roles in esports behave differently in esports than in traditional sports, responsibilities pertaining to other matters than strictly offensive or defensive contexts.

As mean values for dimensions of both satisfaction and role ambiguity (role clarity) were reasonably high, it can be assumed that majority of the players, in fact, consider themselves to be clear about their responsibilities and moderately satisfied with their current situation. This is in accordance with earlier studies on football and handball players (Eys et al. 2003, Bebetos et al 2007). In practice, players should reflect on their state of satisfaction and team responsibilities often, to identify when behaviours needed to carry out role responsibilities become less clear, for example. Additionally, if players actively and openly discuss with their teammates about responsibilities and evaluation, they may collectively decrease ambiguities within the team.

5.1.2 Limitations and future work

An issue concerning survey administration related to non-probability sampling. Possible participants that had the possibility to encounter a general invitation to the survey belonged to specific groups identified during the target population screening process; comprehensive lists of target population members are extremely difficult to create, leaving many possible participants out of the survey's sphere. Furthermore, respondents were not chosen randomly from the available pools of participants, leading to self-selection bias. In the current survey, there were very few respondents who identified as other than male or preferred not to answer to the question about gender ($n = 6$). In addition, the current survey was distributed globally but it was only available in English, which may well illustrate why no South Americans responded to the questionnaire.

Because of framing, non-probability sampling, and nonresponse issues, the current study had a small sample with data that is less heterogeneous in terms of, for example, gender and language-related cultural influence. Thus, there is a limitation to the generalization of the survey results to the entire population. For example, the high measured means in dimensions of role ambiguity and satisfaction might not represent the entire population and a larger, more heterogeneous sample size could slightly lower the means.

Multiple subgroups of the population are still present, and it is reasonable to assume that the measures are still valid. Yet, in the future it would be beneficial to analyse more heterogeneous samples where, for example, women and people of various nationalities would be better represented. Therefore, establishing adequate sample frames for better sampling in esports studies should be a priority, and working in close cooperation with various competition organizers, as an example, could facilitate the identification of accurate sample frames. It still must be noted that only studying players of only one or few leagues would likely present issues relating to homogeneous sampling and independence of samples. Additionally, efforts to increase response rates with measures like financial incentives (Görizt 2006) could provide larger sample sizes.

As *CS:GO* leagues operate on very different schedules and match times are often negotiated by participants, it was unavoidable that some participants could have competition bias, of succeeding well or poorly in a match in recency to answering the survey. Competition bias could lead to extreme high or low scores in survey data for both role ambiguity and satisfaction dimensions. These biases could be avoided or minimised if leagues had specific match days and questionnaires could be filled during practice periods, which can hardly be affected by researchers.

It is beyond the current study's scope to research relationships between all role ambiguity satisfaction dimensions. Four out of six factors of the athlete satisfaction were ignored in the current questionnaire for receiving more responses from players that are not part of larger teams, resulting in a lack of data about these aspects of satisfaction. Smith's (2010) factors two and five, relating to coaching interaction and strategy, contain similar items to factors in Riemer's ASQ (1995) that have been found to be related to role ambiguity (Eys et al. 2003). These should receive large priority in future studies set to learn more about the nature of role ambiguity and coaching satisfaction. As quantitative data of variables pertaining to coaching and the remaining satisfaction factors might currently be difficult to collect because of framing questions, qualitative interviews, for example, could be conducted for members of professional esports teams and esports divisions of traditional sport teams, which have the highest probabilities of having staff such as coaches, managers, and medical personnel, as well as facilities. Investigating the or-

ganization and professionalisation of gaming further through the most professional esports teams, many of which are part of larger traditional sports teams, may additionally provide insight into structures underlying the convergence of esports and traditional sports.

6 CONCLUSION

This paper investigated how two constructs from the field of sports management studies, role ambiguity and athlete satisfaction, function when applied to a team esports setting. Data for analysis was gathered in a web survey questionnaire for *CS:GO* players ($n = 102$). The phenomena and concepts of esports, role ambiguity, and player satisfaction as well as the case study video game *CS:GO* were introduced before proceeding to the method section that focused on the case study. Additionally, a taxonomy of offensive, task-related in-game player roles in *CS:GO* was presented in the theory and background section.

The results of the current study indicate that lower role ambiguity, which manifests as higher clarity in the multidimensional model, was associated with higher satisfaction among esports athletes. Kendall's tau-b correlation, capable of calculating data with tied ranks, outliers, and non-normality, was run to determine weak, positive correlations on simple relationships between three dimensions of role ambiguity and two dimensions of satisfaction. Additionally, high mean scores of role clarity and satisfaction were measured. The correlations and scores agree with earlier research (Eys et al. 2003, Bebetos et al. 2007), preliminarily confirming that the measures for assessing role ambiguity and athlete satisfaction are suitable for esports studies. However, contrary to results in earlier studies on traditional sports, the Scope of Responsibilities role ambiguity dimension, which has best predicted scores in dimensions of satisfaction in earlier studies (Eys et al. 2003, Bebetos et al. 2003) was less related to Satisfaction with Team Affiliation and with Individual Performance than another dimension, Role Behaviour.

The results of the study imply that esports team roles may differ in nature from traditional sports roles, and exploration of this implication requires further research into many aspects of team roles. Additionally, the position of the role sender needs to be further examined in esports contexts and especially in teams without coaches, since the role sender, most often a coach in sports, is a central factor for a focal person's state of role ambiguity (Eys et al. 2005). The most important limitation of the survey is the reasonably small sample size, which has a slight chance to affect the generalization of the survey results.

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