



Is Home Advantage Diminished When Competing Without Spectators? Evidence From the Israeli Football and Basketball Leagues

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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Abstract

Sports spectators are one of the factors that affect home advantage. The outbreak of the COVID-19 pandemic created unique conditions under which most of the leagues in the world played matches without crowds for over six months. This situation facilitated an analytical comparison of two different periods: before and during the coronavirus pandemic. The current study sought to examine home advantage in the Israeli sport domain in general, and specifically the impact of the absence of a crowd. The study consisted of 4,030 matches played in Israel's top football and basketball leagues, of which 3,589 took place with crowds from August 2015 to March 2020, while the others were held without spectators from May 2020 to February 2021. Descriptive and analyses of variance procedures indicated a home advantage independent of crowd size, density, geographic region, league level, and type of sport. However, higher-quality teams demonstrated a higher home advantage ratio for the goals conceded. The findings of the study indicate that in the Israeli context, the crowd plays less of a role in home advantage than other potential factors.

Key words: Home advantage, football, basketball, COVID-19, crowd, geographic region, crowd density

Introduction

Home advantage in sports refers to the superior performance of individual athletes and teams when playing at home rather than away (see Carron et al., 2005; Pollars, 2008). Home advantage is evident both in individual and team sports and has been reported in numerous studies since the mid-20th century (Gomez-Ruano & Pollard, 2022). This phenomenon in sports is well acknowledged and has been the topic of extensive research (Allen & Jones, 2014). In team sports leagues, such as basketball and football, the sports used in this study, home advantage is customarily identified by the fact that a team usually scores more points on its home field than at away games. Several factors contribute to home advantage. One prevalent explanatory factor is the potential impact of the crowd, such that the prevalence of home advantage is higher when more spectators are present (Nevill, Balmer, & Williams, 2002).

For the most part, games without spectators only take place under special circumstances that may include a penalty requiring a team to play without its fans, security issues, or matches held in remote locations. From this

perspective, the COVID-19 outbreak and the prohibition of gatherings created a unique situation in which professional sports matches were played without crowds for a year and a half. This made it possible to isolate the crowd factor and measure its impact on the extent of the home advantage factor.

On March 15, 2020, following the outbreak of the coronavirus pandemic, professional sports competitions in Israel were halted to prevent gatherings. A month and a half later, on May 30, 2020, the top Israeli leagues resumed playing, but without any crowds in the stands. Until March 2021, professional Israeli basketball and soccer continued as usual, but without the presence of spectators. Therefore, the aim of the current study is to examine the impact of the presence or absence of spectators on the level of home advantage in the top soccer and basketball leagues in Israel.

The Current State of Knowledge on Home Advantage

Since home advantage has been evident at all competitive levels and in all sports for over three decades (Pollard et al., 2017), researchers have proposed a wide variety of potential factors, including travel fatigue (Smith et al., 2000; Leatherwood & Dragoo, 2013), pressure on referees (Lowell et al., 2014), familiarity with field conditions and equipment (Moore & Brylinsky, 1995), physiology (Neave & Wolfson, 2003), tactics (Staufenbiel et al., 2015), and spectators (Agnew & Carron, 1994). The presence of spectators has attracted the most attention because it is perceived to be the factor with the most significant impact (Wolfson et al., 2005). The impact of the home crowd may be dependent on factors such as crowd size (Johnston, 2005), ratio between the crowd size and stadium capacity (Goumas, 2014), proximity to the pitch (Pollard, 2008), noise and cheering intensity (Fabrizio et al., 2020; Unkelbach & Memmert, 2010), and more. Nonetheless, this issue is still a matter of dispute because of the presence of many additional variables, such as the quality of the team (reflected in the size of the crowd), the personal qualities of the athletes and their ability to handle crowd pressure, and the importance of the crowd factor relative to other factors, especially considering the fundamental differences among types of sports.

Contrary to the sweeping inclusion of the crowd factor in every review of home advantage (Pollard et al., 2017), there are conflicting findings with respect to the extent of its impact. Pollard and Pollard (2006) examined the top leagues in Europe and found no differences in the degree of home advantage despite significant differences in the number of spectators for each team. Nevill and Holder (1999), in contrast, claimed that an increase in the number of spectators does indeed contribute to an increased home advantage, but even that is only up to a certain point. Ponzo and Scoppa (2018) also found that crowd size has an impact on the level of home advantage after controlling for travel distance and fatigue variables. Moreover, Inan et al. (2020) examined the top five leagues in Europe and found that larger crowd size and crowd density have a significant effect on the level of home advantage. The difficulty of measuring the crowd's contribution is related to a great extent to the difficulty of measuring the effect created by the crowd. The impact on players or referees, for example, depends on a variety of factors that were not measured, such as noise, outfit color, crowd songs, and signage. In other words, a small crowd may have a greater impact due to the nature of its cheering and behavior during the match. Therefore, matches without a crowd, sometimes referred to as *ghost games*, offer a better basis for testing the crowd's impact on the level of home advantage.

Matches Without a Crowd

One of the most extensive studies of matches without a crowd prior to the COVID-19 era was conducted by Reade, Schreyer, and Singleton (2020). The study included 20 years of professional soccer matches that for various reasons were played without a crowd. The study's findings revealed that the level of home advantage decreased when a crowd was absent and included a disclaimer regarding the low prevalence of such matches and the identity of these teams. Nevertheless, it must be noted that these matches took place under special circumstances and were not played consecutively. Therefore, the 2019-2020 season and the beginning of the 2020-2021 season in the context of the pandemic are unique. This uniqueness offers fertile ground for research about crowd impact on home advantage and led to the publication of several studies on this topic, mostly on European soccer leagues.

Cueva et al. (2020) conducted the most extensive study during the COVID-19 era. The study examined 233,666 soccer matches played in 41 countries, of which 2,479 took place without a crowd. Considering all the possible factors resulted in a significant decrease in the level of home advantage, especially in the context of the decisions of referees, in which this advantage was completely nonexistent. In an additional study, McCarrik et al. (2020) analyzed the results of 2,552 matches without a crowd in 15 European leagues during the pandemic. The study considered the performance of teams and referees. The results indicated that the home team's performance (but not that of the away team) was significantly negatively affected when there was no crowd at the stadium, leading to a decrease in

the overall level of home advantage. The absence of a crowd also affected the referees, who issued fewer yellow cards and blew their whistles for fewer penalties against the away teams.

Alongside findings of a decrease in home advantage or the absence of any difference, some studies showed a reversal result of home advantage in matches without a crowd. In studying the German league, Tilp and Thaller (2020) reported a negative home advantage during COVID-19. The authors attributed this phenomenon to a fundamental change in habits and reliance on a supportive environment, as well as the away teams' high level of motivation to take advantage of the unique circumstances. Moreover, Dilger and Vischer (2020) analyzed the results of the German league before and during the pandemic and found a significant decline in the level of home advantage and the number of cards issued by referees to the visiting team. The findings of Sors et al. (2020) also indicated a reduction of home advantage and the absence of referee bias with respect to the number of points/goals scored, ball possession, and referee influence during games without a crowd. Thus, the researchers concluded that it is likely that crowd noise has the most impact on the performance of both referees and teams.

While these studies describe a significant decrease in the various components of home advantage, many studies did not find significant results, and some even found contradictory results. Benz and Lopez (2020) analyzed game results from 17 leagues in 14 countries. In 11 cases, home advantage decreased in the context of yellow cards and goals. On the other hand, a more than 80% probability of a decrease in home advantage (calculated by point count) was found in only four leagues (German, Greek, Austrian, and the second Italian league). The findings of this study indicated that while it was possible to demonstrate a significant decrease in some indicators, the decrease in the level of home advantage was not consistent, and in some cases, there was even an increase in the home effect. According to the authors, the lack of consistency among the leagues is evidenced not due to the absence of a crowd, but rather due to additional changes that took place during the COVID-19 era, mainly changes in training routines. Bryson et al. (2021) analyzed 17 leagues throughout Europe and found no significant decrease in the level of home advantage during the COVID-19 period. Another study of eight European leagues (Jimenez et al., 2021) demonstrated that it is impossible to determine whether the absence of a crowd affects the home team or, alternatively, whether the crowd has any impact on the competitive outcome, goals, or points. Indeed, while the study demonstrated a decrease in the number of points scored at home and an increase in those scored at away games in the premier leagues in Germany and Spain, and even a decrease in the number of goals scored at home in the Austrian league, it offered no common denominator or explanation for these differences. In this vein, Fisher and Haucap (2020) analyzed the top three soccer leagues in Germany. Their findings showed a decrease in the level of home advantage only in the first league, but not in the second and third leagues. The explanation given by the authors is that in the first league, a bigger crowd was in attendance than in the lower leagues in previous seasons, and therefore the absence of the crowd was more dramatic and had a more pronounced impact on the home advantage.

In a systematic review of articles on COVID-19 and home advantage, Leitner et al. (2021) concluded that non-crowd games (i.e., "ghost games") have a considerable impact on this phenomenon. According to the authors, this effect is attributed to the referee's bias and lack of emotional support conveyed by the fans – both relate to the players' and referees' decision-making under pressure. As Dilger and Vischer (2020) suggested, several factors should be considered when measuring home advantage, such as playing style, running distance, pass accuracy, ball possession, and tackles achieved. Nonetheless, they mainly focused on match outcomes and goals scored for each team. We examined the home advantage phenomenon in non-crowd games in two sports, basketball and football. We measured game wins, losses, draws, goals scored and conceded, and additional mediating variables such as crowd size, density, geographic region, and league level.

Method

Sampling of Games

The sample used in this study included all matches played during six seasons in the following three leagues: the Football Premier League, National Football League, and Basketball Super League. Out of a total of 4,030 matches, 3,589 matches were played with a crowd present, and the rest were played without a crowd.

Data Extraction

The following categorical data were extracted for each match: teams playing, location, season, score, number of goals or baskets scored, number of goals or baskets conceded, and number of spectators (for games in which a crowd was present). The data were extracted from the published data of the Israel Football Association's website

(www.football.org.il) and the Israel Basketball Super League's website (basket.co.il). To verify the accuracy of the information, the data were compared to the information presented on the Sport5 website (Sport5.co.il).

Assessing Home Advantage

Home advantage was measured using three variables: (1) *level of general home advantage*, (2) *goals/baskets scored*, and (3) *goals/baskets conceded*. All three variables were measured using the method established by Pollard (1986), in which a team's home outcomes over one season are compared to its overall outcomes that year. The current research corpus necessitated adaptations to this calculation method because the number of home and away matches for each team sometimes differed due to the playoff games. To manage this situation, the three home advantage variables were measured as a percentage: the average of points (goals or baskets) scored at home relative to the total of these measurements at home and away. For example, in a particular season, Hapoel Haifa scored an average of 1.8 points at home (A) and an average of 1.4 points away (B). Therefore, the level of home advantage was $A/(A+B) = 0.5625$. A result of 50% indicates a lack of home advantage, and as the percentage rises, the level of home advantage rises as well.

Confounding Variables

Apart from the home advantage indicators, the analysis also included additional variables which may have affected the home advantage outcomes. The first was geographic location – whether the team was in the Israeli periphery (South and North) or in a large city (in Gush Dan, the biggest Israeli metropolitan area, or in one of the other large cities – Jerusalem, Haifa, or Beer Sheva). Several studies pointed to differences in the level of home advantage attributed to geographic and cultural differences (Pollard, Prieto, & Gomez, 2017; Pollard & Gomez, 2009). The average attendance for each team was extracted to examine the impact of crowd size on the home advantage. The final variable considered in the analysis was the ranking of the team at the end of the season, which reveals the most about the teams' quality and points to the association between team strength and home advantage (Pollard & Gomez, 2007; Allen & Jones, 2014).

Statistical Analyses

Descriptive analyses were performed for each of the three home advantage variables. In addition, two-way ANOVAs were performed separately for each of the three home advantage indicators (e.g., points gained, goals conceded, and goals scored). For each analysis, the team's performance (ranking of the team) was considered as the first independent factor, and the crowd presence/absence or type of league (football or basketball) was considered as the second factor. Finally, the three home advantage determinants were subjected to a series of one-way ANOVAs considering geographical location, league type, presence/absence of spectators, and the average attendance separately as independent factors. The significant results are presented in the figures.

Results

At the outset, we tested the notion that home advantage would manifest differently in the three leagues (e.g., elite soccer, first league soccer, elite basketball) and in the presence/absence of a crowd with respect to the teams' quality. A two-way ANOVA was performed separately for each of the three home advantage indicators (e.g., points gained, goals conceded, and goal scored). For each analysis, the team's performance was considered the first independent factor, and the crowd presence/absence or type of league was considered as the second factor.

The analysis revealed that the presence/absence of a crowd did not affect any of the three home advantage indicators ($p > .05$). However, a team status X crowd presence/absence significant interactional effect on goals scored emerged, $F(22,228) = 2.25, p < .01$. This interaction is presented in Figure 1. In most of the cases, the percentage of goals scored was lower in the absence of a crowd except for the teams in 2nd, 3rd, and 10th places. An additional main effect was that of crowd presence/absence on the percentage of goals conceded, $F(2,216) = 3.47, p < .03$. Figure 2 demonstrates that the percentage of goals conceded when the crowd was present was 0.89% higher than when the crowd was absent.

The descriptive analysis pertaining to the three components of home advantage is shown in Figure 3. It revealed that across all seasons, geographical locations, leagues, and sports types, as well as crowd presence/absence, the home advantage determined by the percentage of points gained and percentage of goals scored was slightly above 50% (52.47% and 51.30%, respectively), and the percentage of goals conceded was 48.23%. One-way analysis of

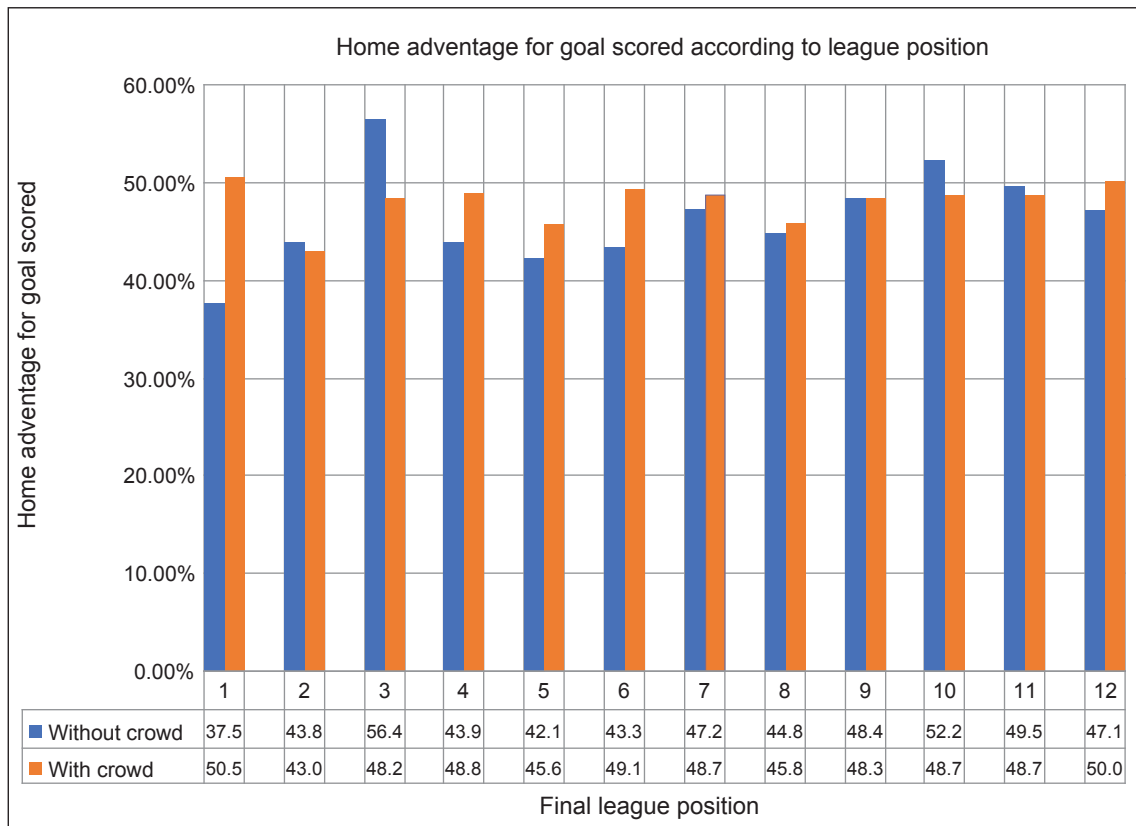


Figure 1. Means of the percentage of goals scored as a function of the teams’ final placement at the end of the season

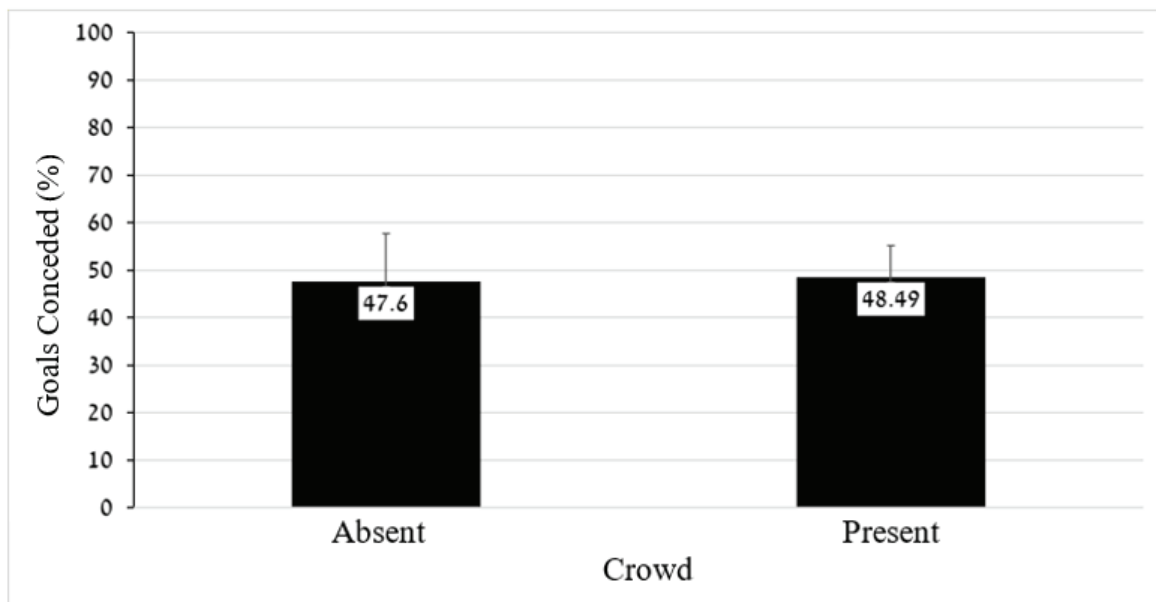


Figure 2. Means of the percentage of goals/baskets conceded (home vs away games) by crowd presence/absence

variance (ANOVA), which was applied to each of the home advantage components separately considering the team’s league status at the end of the season, indicated a significant team status effect for goals conceded, $F(11,240) = 1.78, p < .05$, and for goals scored, $F(11,240) = 1.92, p < .04$, but not for points gained, $F(11,240) = 1.43, p = .16$, although the tendency to gain more home points remained.

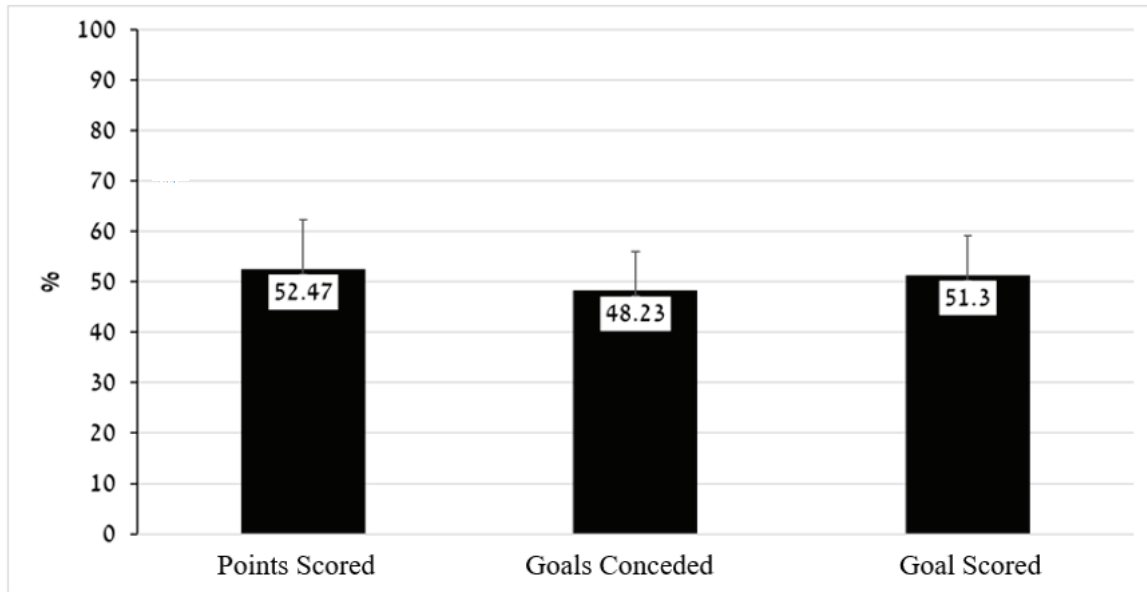


Figure 3. Home advantage in % for points scored, goals/baskets conceded, and goals/baskets scored

The descriptive data of these effects are shown in Figures 4a-c. Figure 4a demonstrates the home advantage in points gained by the teams in positions 1-12 in soccer and basketball. Except for teams in 12th place, the points gained decrease from the top teams to the lower teams. However, the decrease is small and remains slightly above 50% throughout the status leader. The descriptive data pertaining to the significant effects of goals conceded (Figure 4b) and goals scored (Figure 4c) show that a decline in the team’s final status is associated with an increase in the team’s conceded goals and a decrease in its home goals.

Finally, the three home advantage determinants were subjected to a series of one-way ANOVAs considering geographical location, league type, presence/absence of spectators, and the number of spectators separately as independent factors. The analyses revealed that for the effect of the number of spectators (three categories for soccer

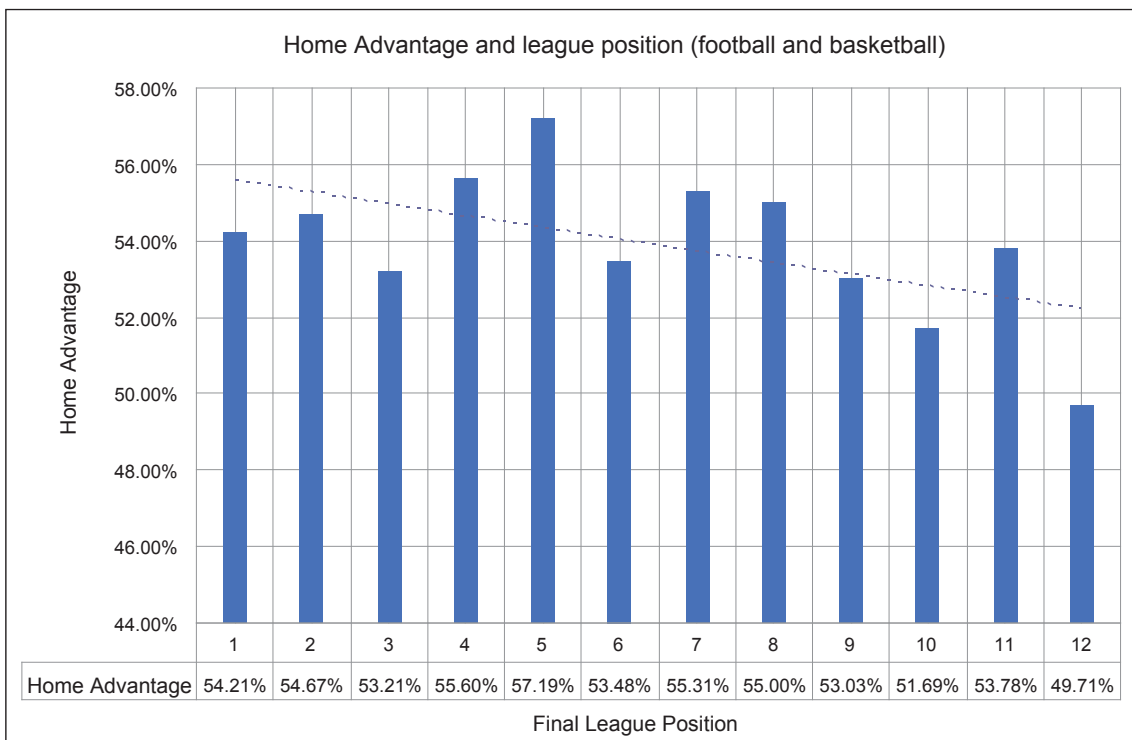


Figure 4a. Home advantage in % for points/baskets scored and final league position

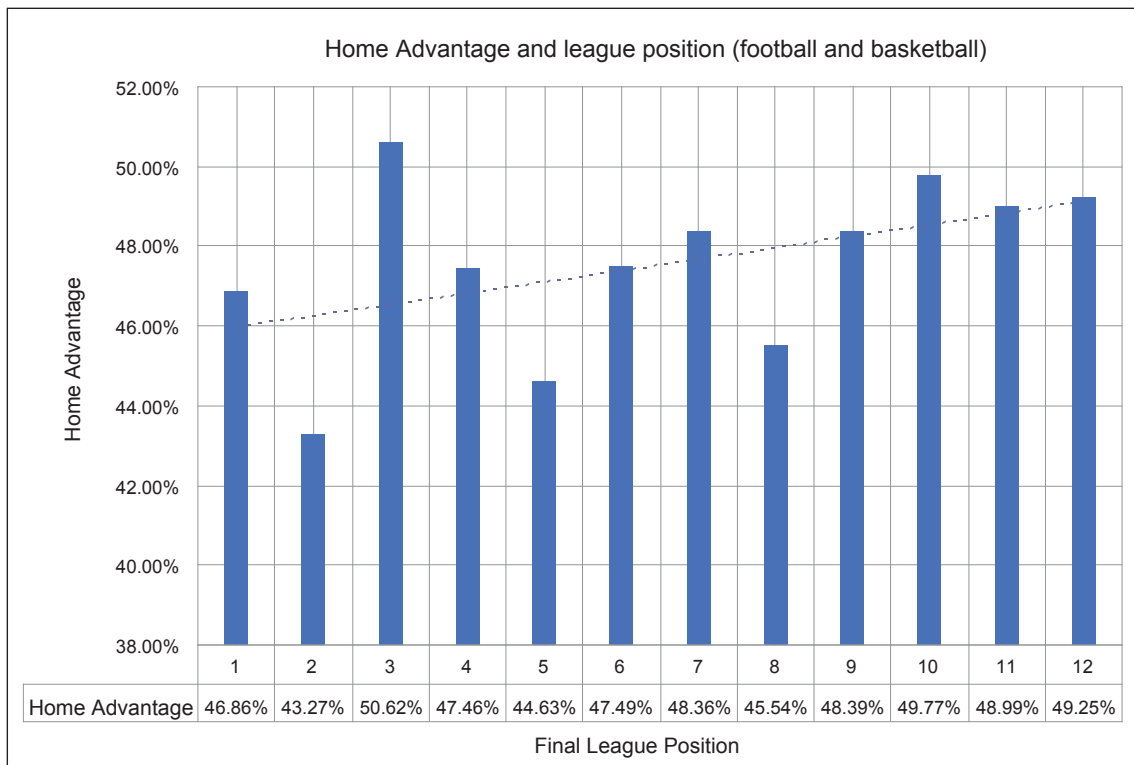


Figure 4b. Home advantage in % for goals/baskets conceded and final league position

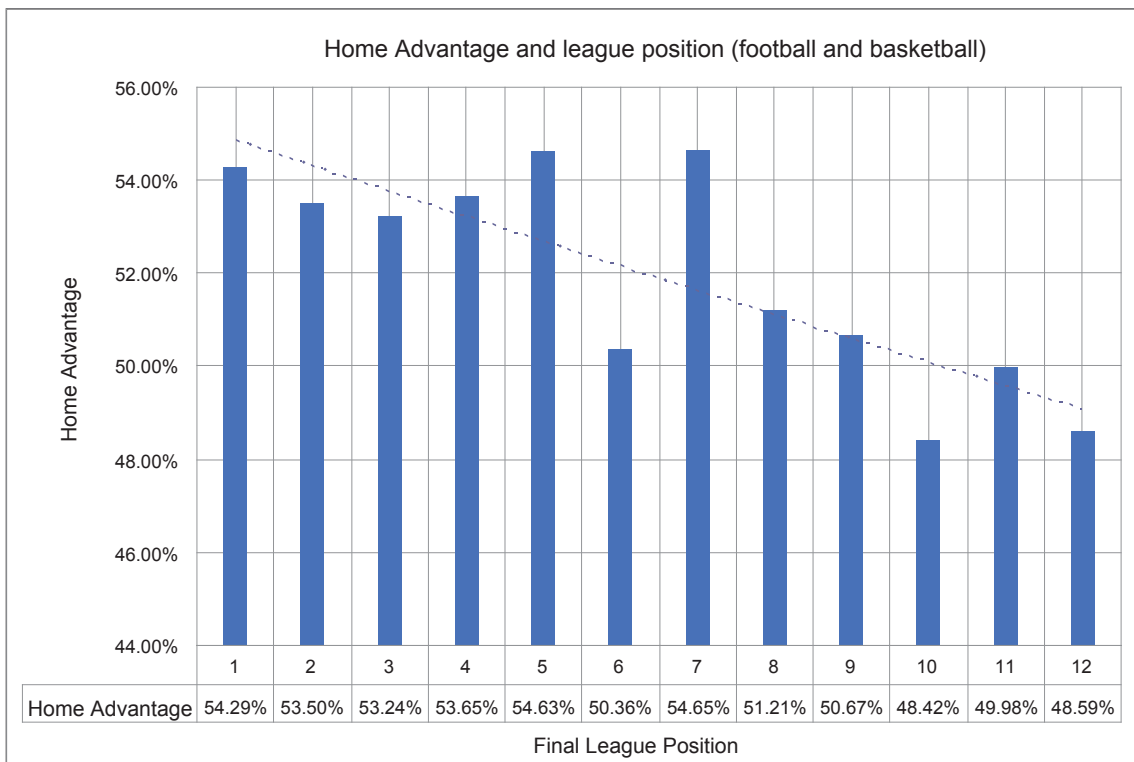


Figure 4c. Home advantage in % for goals/baskets scored and final league position

and basketball) on the percentage of goals conceded, none of the factors affected any of the home percentage determinants. The significant effect, $F(2,280) = 2.25, p < .01$, revealed that the mean percentage of moderate crowd attendance resulted in a higher percentage of goals conceded than when a large or small crowd was present.

Discussion

The findings of this study show that home advantage exists in the top soccer and basketball leagues in Israel. This advantage is reflected in points gained, goals scored, and goals conceded. It should be noted that the total level of home advantage measured in this study (52.47%) is 5% lower than the world average in soccer and even lower than the Israeli average of 58.03% in the 1998-2004 seasons as measured in Pollard's earlier study (2006). The lower home advantage level emerging in this study reflects a gradual decline in home advantage over the years (Pollard & Pollard, 2005). The second reason is that during these years, the VAR system was introduced to assist referees. Therefore, referees' mistakes were reversed following a review of the event. The use of VAR reduced the scope of referee bias, and consequently reduced the home advantage in soccer (Hen et al., 2020).

In contrast to previous studies in Israel (see Levental, 2015; Pollars, 2006), attendance, crowd density, geographic region, league level, and type of sport failed to impact home advantage. This could be explained by the fact that in Israel, the number of spectators at games is relatively small, and there are only negligible cultural and geographic differences among the various teams.

While these variables failed to affect home advantage, the findings of this study indicate that team ranking (an indication of a team's quality) has a significant impact on two home advantage measures, the percentage of goals conceded and the percentage of goals scored, although not on the general level of home advantage. In other words, the better a team is, the more goals it scores and the fewer goals it concedes at home matches compared to away matches. Nevertheless, the match results in terms of points gained remained unchanged. A stronger home advantage associated with teams possessing a higher skill level corresponds with findings reported in earlier studies (Madrigal & James, 1999). Better teams attract more spectators, which may influence the players and the referees. In addition, a team that plays in the home field of a superior team adopts more defensive tactics.

Moreover, in cases where an inferior team is leading during a match, players wish to maintain the score and gain points. In this context, Staufenbiel, Lobinger, and Strauss (2015) found that the location of the match (home or away) affects coaches' tactical decisions as an expression of their expectations and goals. In other words, the awareness of home advantage influences coaches' decisions with respect to tactics, and thus in practice affects home advantage.

With respect to the matches played before and during the COVID-19 pandemic, the findings show that the presence or absence of a crowd did not influence home advantage levels. Since the absence of a crowd at the stadiums failed to change home advantage, we conclude that the presence of spectators has a low impact on home advantage relative to other factors. As noted in other studies, the absence of crowds at stadiums during the COVID-19 period had a different impact in different countries and even in different leagues within the same country. Benz and Lopez (2020) explain the negligible impact of the crowd by more significant processes that took place simultaneously during COVID-19, and mainly by the change in teams' training regimens. In this regard, Fischer and Haucap (2020) claimed that a decrease in home advantage levels due to the absence of crowds occurs only in the case of a significant decline – that is, mostly for teams accustomed to high attendance numbers. This explanation is appropriate for the Israeli league as well, where the average attendance is low compared to the top leagues in Europe and the rest of the world.

Despite the lack of a significant change in the level of home advantage, the absence of crowds did affect the number of goals conceded. This finding indicates that the crowd influences the efforts a team invests in defense compared to its efforts in offense. Two reasonable assumptions are that the home crowd places substantial pressure on its team's defensive players and exerts a generally negative influence on the defense, and that home teams attack more and expose themselves to counterattacks when spectators are present.

The current study revealed a significant interaction between team quality (ranking) and the presence of a crowd on the home advantage level in the area of goals conceded. When the crowd was absent, teams that were ranked higher at the end of the season had conceded relatively fewer goals at home than at away matches. Superior teams usually have more fans accompanying them to away matches. The crowd's presence at away games creates an additional commitment to the defensive game. When the matches were played without a crowd, the teams of a lower ranking, which would typically receive less support from the crowd, did not demonstrate any change in the number

of goals conceded. Finally, the descriptive findings indicate that the home advantage in terms of goals conceded is higher for teams with a large spectator base or a small spectator base than for teams with a medium-sized spectator base. In the absence of preliminary theoretical explanations, we assume that this is related to the quality of the team and to tactical aspects in which teams tend to continue the offensive move when they play at home against inferior teams and play a more defensive game against superior teams on their home field. On the other hand, teams with a medium-sized spectator base do not face either of these two situations.

Conclusion

This study sought to examine the impact of the absence of a crowd on home advantage in elite soccer and basketball in Israel. The findings of the study demonstrate that while home advantage exists in all the leagues examined with respect to all three measures – goals scored, goals conceded, and number of points – it is not affected by variables such as crowd size, density, geographic area, league level, or type of sport. Furthermore, even the COVID-19 period, during which all matches took place without a crowd in attendance, did not bring about a significant change in the home advantage phenomenon. In other words, with respect to the examined case, the presence of spectators in the stands does not affect home advantage, even when there are no spectators at all or when there are many or few spectators. These findings suggest that considering the marginal contribution of spectators, other factors may influence home advantage, such as the factor of the perceived quality of the rival team that emerged from the current study.

These findings point to a couple of practical implications. First, they highlight the significance of the local aspect of sports culture. While the home advantage phenomenon is constant across the globe, the differences between the various leagues show that the magnitude of each factor is embedded in the local setting. Second, in the Israeli context, the absence of a crowd has an economic effect instead of an impact on performance. These findings can therefore be a tool for decision-makers, such as when considering necessary adjustments for situations in which crowd reduction is required for safety or security reasons.

Ethics approval and informed consent

The study did not include human participants.

Competing interests

The authors declare no competing interests.

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Students' Attitudes Toward Assessment in Physical Education

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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Abstract

Despite the recent increase in attention on studies focusing on different types of assessment of student participation in physical education (PE), there is little research concerning students' attitudes toward the PE assessment process. This study aimed to investigate students' attitudes toward assessment procedures in PE by developing and validating a quantitative instrument concerning crucial areas of pedagogy such as curriculum, teachers, grading, and fitness tests. It further investigates important attitude determinants such as grade level and gender differences. The scale was distributed to 1,403 students in the 5th, 6th, 7th, and 10th grades. Principal components analysis showed an eigenvalue factor greater than 1, which accounted for 47% of the total variance. Confirmatory factor analysis yielded satisfactory indices that confirmed the unidimensional model with high internal consistency ($\alpha = .84$). A two-way analysis of variance revealed a significant difference between the 7th and 10th grades. At the same time, students expressed a high level of positive attitudes toward the different aspects of assessment procedures. The study examined various aspects of students' attitudes toward assessment and resulted in a reliable, valid, and easy-to-use quantitative instrument that can be used by educators and researchers to assess students' attitudes toward assessment in PE.

Key words: Assessment; physical education; reliability; validity

Introduction

Assessment is a crucial and indispensable part of the teaching and learning cycle (Chróinín & Cosgrave, 2013) that "influences the teaching and learning process and defines its product" (Tolgfors, 2018, p. 311). The term assessment has historically been criticized, as many use it to refer to grading, while others claim that assessment and grading do not encourage students to maintain an active lifestyle after finishing school (Leirhaug, 2016). Despite all of this, assessment is one of the three interrelated message systems that transfer formal knowledge in schools, the others being curriculum and pedagogy (Bernstein, 1975). Furthermore, assessment has been suggested to be the most powerful of the three (Chan et al., 2012). The assessment process should place children at the center and include them in decision-making to make assessment a meaningful experience that enhances their learning and motivation (Chróinín & Cosgrave, 2013; Tolgfors & Öhman, 2015). Recently, studies have increasingly focused on

different assessment types regarding student participation in PE (Lorente-Catalan & Kirk, 2014). However, there is little research concerning students' attitudes toward the PE assessment process. Leirhaug and Annerstedt (2016) underline students' greater involvement in assessment processes as a crucial area of development.

A range of assessment strategies have been formed for the needs of PE. On the one hand, traditional assessment with the use of physical fitness tests is a popular and mandatory part of the curriculum, with supporters arguing that it promotes a healthy lifestyle and physical activity and motivates and encourages goal-setting, self-monitoring, and self-testing skills while contributing to positive attitudes that increase cognitive and affective learning (Cale & Harris, 2009; Simonton et al., 2019). Despite their benefits, there is some controversy concerning the type, validity, and reliability of fitness tests and whether they promote healthy and active lifestyles (Cale & Harris, 2009; Simonton et al., 2019). On the other hand, alternative assessment forms such as self-assessment, peer assessment, teacher observation, event tasks, portfolios, checklists, essays, and oral discourses have attracted attention (Mintah, 2003). Quality assessment includes different strategies (López-Pastor et al., 2013) and focuses on assessment for learning that is authentic and integrated, valid, and socially just while contributing to quality curriculum and pedagogy (Hay & Penney, 2009). Transformative assessment is another critical pedagogical approach in the assessment process; it involves negotiation between the teacher and student (Tolgfors, 2019). The assessment practice can be adapted to different students' needs and circumstances through student influence, thus achieving "social justice" (Tolgfors, 2019).

A review of the recent literature reveals that most of the studies dealing with PE assessment examine teachers' perspectives through qualitative methods (Chróinín & Cosgrave, 2013; Leirhaug & MacPhail, 2015; Leirhaug et al., 2016; Svennberg et al., 2018). In contrast, quantitative methods have been used by only a limited number of studies to test teachers' attitudes toward fitness tests (Keating et al., 2008; Keating & Silverman, 2004). Teachers' perceptions of different assessment practices were examined using questionnaires developed and validated by the researchers (Mintah, 2003; Borghouts et al., 2017), with missing steps of validity.

There is limited research concerning students' views of PE assessment. On the one hand, qualitative methods were used to demonstrate students' beliefs about different assessment processes or grading in PE, understand students' thoughts on the researched subject, or reveal what different types of assessment promote (Leirhaug, 2016; Redelius & Hay, 2009; Tolgfors, 2018; MacPhail & Halbert, 2010). Researchers have used a range of qualitative methods such as interviews, semi-structured interviews, focus groups, and lesson observations (Redelius & Hay, 2009; Tolgfors, 2018; MacPhail & Halbert, 2010). Despite the remarkable value of assessment in pedagogy, it has been established that the assessment of students does not always serve the pursued outcomes, as accountability mechanisms influence the messages transmitted (Chan et al., 2011). Instead of having a pedagogical and educational orientation, they turn to value participation, effort, and behavior (Chan et al., 2011).

While the quantitative methodology has been the most common form used in education research, especially with Likert-type scale questionnaires (Phillips & Silverman, 2012), the use of quantitative questionnaires in research on students' perceptions of assessment in PE is also quite limited. A literature review detected quite a few studies that used a questionnaire. The researchers developed tools for the specific research purpose to explore students' perceptions of different assessment forms or attitudes toward fitness tests (Leirhaug, 2016; James et al., 2005; Mercier & Silverman, 2014). While the analyzed questionnaires offered several valuable findings, some of them did not follow all of the necessary validation steps.

It is important to understand students' attitudes as attitudes can mediate student achievements (Subramaniam & Silverman, 2000). Understanding what students think and feel toward assessment in PE can assist PE teachers in planning a more effective educational process, meaningful assessment, and curriculum for students. Although we can form a reasonable opinion of what teachers think of different assessment methods through modern research, the same does not apply to students' views.

Purpose of Research

The primary purpose of this study was to assess and investigate what students think and feel about assessment procedures in PE. Due to the lack of validated quantitative measurements, an instrument was developed and validated according to the rules of psychometry. Because the validity and reliability of the measurements could depend on factors such as the respondents' age and gender (Jansson et al., 2019), the second purpose was to investigate the suitability of the developed instrument according to grade level and gender differences and further explore potential developmental differences in students' attitudes toward assessment according to grade level and gender (Subramaniam & Silverman, 2000). The development of a new measurement to assess students' attitudes toward assessment in PE could provide a valuable methodological contribution to further studies (Jansson et al., 2019).

Methodology

Instrument Development

The first step in developing a tool for assessing students' perceptions of assessment in PE was to conduct an extensive literature review. In this manner, different assessment procedures in PE were identified, and the methods and instruments used in previous studies, as well as aspects of the assessment process in need of exploration, were detected (James et al., 2005; MacPhail & Halbert, 2010; Redelius & Hay, 2009; Phillips & Silverman, 2012; Subramaniam & Silverman, 2000). Then, sentences were formed about assessment concerning the pedagogical process of assessment and curriculum. Critical aspects considered were the teacher's role, the importance of grading, and fitness tests. An eight-item instrument emerged called "Students' attitudes toward assessment in PE (SATA-PE)"; it concerned the following themes: (a) curriculum, (b) teachers, (c) curriculum grading, (d) teacher grading, and (e) fitness testing (Table 3).

To examine the instrument's content validity, a panel of three research experts with more than 20 years of experience in behavior change, attitudes, and motivation who have published articles in peer-reviewed journals on questionnaire development and psychometrics reviewed the final items. It resulted that the scale's items referred to students' attitudes toward assessment in PE and were appropriate for both elementary and middle school. A 5-point Likert scale was chosen, ranging from 5 (strongly agree) to 1 (strongly disagree).

The SATA-PE scale was pilot tested on a convenience sample of 75 students from the 5th and 6th grades. This grade level group was chosen because more clarifications would be needed, more questions would arise, and the completion time would be longer than with the other grade levels. The purpose of this pilot study was to check any ambiguous or non-discriminant items, assess the clarity of the completion instructions, and estimate the required completion time. The pilot study sample was excluded from the main study as only the SATA-PE questionnaire was tested, and not all the necessary data were according to the original research design.

Reliability and Validity Study

In order to determine reliability and validity, the constructed scale was administered to students in the 5th, 6th, 7th, and 10th grades. The study was conducted in two waves to ensure a representative sample size. The initial sample comprised 638 students; after a year, a second wave followed with a sample of 765 students.

Participants

Twenty-two schools were selected from different municipal districts in Athens, the capital city of Greece, representing 80 classes, with a total of 1,403 students (730 boys and 684 girls) participating. The students were attending 5th or 6th grades ($n = 256$), the 7th ($n = 437$) and 10th ($n = 721$) grades. They were aged 10, 11, 12, or 15 years old ($M = 13.29$, $SD = 1.85$). Twenty-two schools were selected from different municipal districts in Athens, the capital city of Greece, representing 80 classes. The first author distributed the questionnaires to the students and informed them about the purpose of the study. The following instructions were provided: "In the following sentences, circle what best matches what you think of..." The response alternatives were explained. The students were further informed that there were no right or wrong answers, and that they were free to ask questions.

Ethical Clearance

The research received approval from the Institute for Educational Policy of Greece, and data collection was conducted after receiving approval from the University of Thessaly Institutional Research Ethics Committee. Participants were fully informed of the nature of the study, and their participation was voluntary; written consent was obtained from all participants and their parents/guardians.

Data Analysis

To determine the instrument's reliability and validity, the Statistical Package for Social Sciences (SPSS v.26) and AMOS v.18.0 were used in the following steps: (a) principal components analysis, which functions as an initial step in factor analysis as it reveals much about the number and nature of factors (Tabachnick & Fidell, 2001); (b) confirmatory factor analysis to confirm the factorial validity; and (c) Cronbach's alpha, inter-item correlation, and corrected item-total correlation to calculate the internal reliability consistency of items. Furthermore, the Pearson correlation coefficient was calculated to examine concurrent validity. Beyond that, a two-way analysis of variance (two-way ANOVA) was conducted to reveal significant differences between gender, grade level, and interaction

between gender and grade level. Finally, descriptive statistics were used to investigate students' answers and their perspectives on assessment in PE.

Results

Principal Components Analysis

Principal components analysis (PCA) was performed on the eight items of the SATA-PE tool to test conceptual variables. Principal components analysis is a reliable method for developing objective tests and reveals a factor solution (Tabachnick & Fidell, 2001). The results showed an eigenvalue factor greater than 1, which accounted for 47% of the total variance. That factor had eight items with high loads that indicate attitude toward assessment in the PE. This factor was called "Students' attitudes toward assessment in PE (SATA-PE)." Table 1 presents the item loadings and the communality values.

Confirmatory Factor Analysis

Confirmatory factor analysis was conducted on the eight-item scale to cross-validate PCA, confirming a uni-dimensional model. The following eight-item model yielded satisfactory indices ($\chi^2_{20} = 251.753, p < .001, TLI = .907, CFI = .934, RMSEA = .091, RMSEA\ 90\% \text{ CI} = .081-.101$). Figure 1 presents the item standardized regression weights.

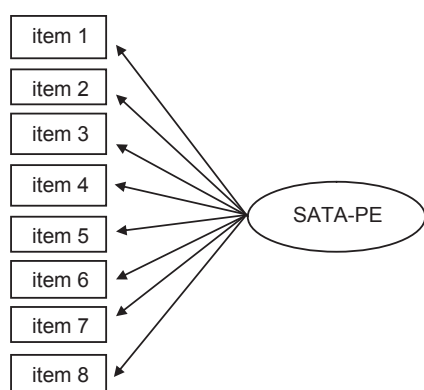


Figure 1. Confirmatory factor analysis (CFA) of SATA-PE, standardized regression weights

able). All adjectives were rated on five-point semantic differential scales and achieved satisfactory internal reliability ($\alpha = 0.80$). Pearson product correlation was then computed and revealed that there was a significant relationship between the two scales ($r = .609, p < .01$), with a large effect size ($r^2 = .37$), which explained 37% of the variance.

Gender and Grade Level Differences

Two-way ANOVA was conducted to note gender and grade level differences in students' attitudes toward PE. The results indicated no significant interaction between gender and grade level effects on students' attitudes toward assessment in PE. No significant gender differences were noted, either. Significant differences were noted according to grade level with a small effect size $F(2,1397) = 4.26, p = .014, \text{partial } \eta^2 = .006$ (Table 2). The assumption of independent observations, homogeneity of variances, and normal distributions of the dependent variable for each group were checked and met. The post-hoc tests showed a significant difference between the 7th and 10th grades. There was no significant difference between elementary and high school. Table 3 provides the means and standard deviations for grade level by gender.

Students' Perspectives on Assessment in PE

From the percentages of students' answers (Table 4), it is concluded that the students generally had a positive attitude toward PE assessment since all of their answers agreed with a high rate. More specifically, concerning the curriculum, the students agreed (strongly agreed, 24.5%, or agreed, 31%) that the assessment process helped them

Reliability

Cronbach's alpha was computed to assess whether the data from the eight items of the SATA-PE scale formed a reliable scale. The alpha of the eight items was .84, indicating that the items form a scale with good internal consistency and reliability. Eight of the 10 items that make up the tool contribute positively and, if removed, reduce its degree of reliability. The reliability analysis results are presented in Table 1, with the questionnaire listed in Table 3.

Concurrent Validity

Concurrent validity was examined using a semantic differential scale for the first wave of the sample ($n = 638$). The scale used the question, "Generally, assessing our performance in a PE lesson is..." and responses were measured using a semantic differential format (Osgood et al., 1967) on five bipolar adjectives (good-bad, fair-unfair, useful-useless, harmful-beneficial, enjoyable-unenjoyable).

Table 1. Item loadings and reliability of the SATA-PE

Items	Factor Loading	Communality	Cronbach's α
	SATA-PE		
1	.74	.55	.84
2	.66	.44	
3	.78	.61	
4	.80	.64	
5	.53	.28	
6	.67	.45	
7	.67	.44	
8	.60	.36	
Eigenvalue	3.76		
% of variance	46.99		

Table 2. Two-way analysis of variance for students' attitudes toward assessment in PE as functions of grade level and gender

Variable	df	MS	F	p	η^2
Grade level	2	2.53	4.26	.014	.006
Gender	1	1.90	3.20	.074	.002
Grade level*Gender	2	.336	.567	.568	.001
Error	1397	.594			

Table 3. Means and standard deviations of the grade level separately by gender

Grade level	n	Boys			Girls		
		M	SD	n	M	SD	
5 th -6 th	130	3.66	.65	126	3.64	.71	
7 th	219	3.77	.81	218	3.63	.81	
10 th	377	3.61	.78	333	3.53	.77	

improve in PE lessons (skills, knowledge, behavior) and believed that the process of assessment in PE was important for learning (strongly agreed, 19.6%, or agreed, 31.5%). As far as the PE teacher was concerned, students felt that the PE teacher helped them improve through the assessment process (strongly agreed, 23.4%, or agreed, 35.6%); they were assessed according to whether they had learned what had been taught (strongly agreed, 16.7%, or agreed, 37.1%) and graded according to whether they had achieved their goals (strongly agreed, 25.7%, or agreed, 39.4%). Moreover, the students agreed with the highest rate that having a good grade in the PE lesson was important (strongly agreed, 36.2%, or agreed, 33.1%) and that being informed about the grading method in the lesson was helpful (strongly agreed, 22.7%, or agreed, 34.6%). Similarly, they agreed that they liked to test their abilities through fitness tests (strongly agreed, 34.2%, or agreed, 30.5%).

Table 4. Topics and items of the examined instrument, descriptive statistics (frequencies, percentages) of students' responses

Topics	Items	5	4	3	2	1
		n (%)	n (%)	n (%)	n (%)	n (%)
Curriculum	1. The assessment process helps me improve in PE (skills, knowledge, behavior).	344 (24.5)	435 (31)	380 (27.1)	137 (9.8)	107 (7.6)
Teacher	2. The PE teacher assesses whether I have learned what has been taught.	235 (16.7)	520 (37.1)	368 (26.2)	197 (14)	83 (5.9)
Curriculum	3. The process of assessment in PE is essential for learning.	275 (19.6)	442 (31.5)	402 (28.7)	184 (13.1)	100 (7.1)
Teacher	4. I feel that the PE teacher helps me improve through the assessment process.	328 (23.4)	500 (35.6)	283 (20.2)	201 (14.3)	91 (6.5)
Grading – curriculum	5. Having a good grade in PE is important.	508 (36.2)	465 (33.1)	280 (20)	94 (6.7)	55 (3.9)
Grading – curriculum	6. It is helpful to be informed about the manner of grading in PE.	318 (22.7)	486 (34.6)	382 (27.2)	148 (10.5)	69 (4.9)
Grading – teacher	7. The PE teacher grades me fairly on whether I have achieved my goals.	360 (25.7)	553 (39.4)	323 (23)	105 (7.5)	62 (4.4)
Fitness tests	8. I like testing my abilities through fitness tests.	480 (34.2)	428 (30.5)	291 (20.7)	117 (8.3)	87 (6.2)

Notes. Strongly agree = 5; Agree = 4; Not sure = 3; Disagree = 2; Strongly disagree = 1.

Discussion

This study's purpose was to assess students' attitudes toward assessment in PE through quantitative methods. Developing and validating a quantitative instrument assessing students' attitudes toward PE is one way to gain a quantitative measurement. According to Chan et al. (2011, p. 4), "work in this area is still relatively limited, and our knowledge in this area is still weakly conceptualized." This instrument was constructed to provide the whole picture of students' attitudes toward assessment procedures as it integrates crucial domains of pedagogy such as curriculum, grading, teachers, and fitness testing. The research concerned boys and girls of a broad age group consisting of elementary, middle, and high school grade levels. The scale's development and testing were guided through research consistent with attitude theory and psychometry, integrating the literature and empirical knowledge concerning students' attitudes toward PE assessment. The conceptual and methodological procedures appropriate for quantitative approaches were also used. Additionally, a suitable method design was chosen to develop an instrument that could address a wide age range of students who do not all necessarily have the same ability to express their feelings.

A psychometric assessment of the scale resulted in a short, easy-to-complete instrument. Since completion time is a consideration for researchers, teachers, and school administrators, this short, easy-to-complete instrument could be beneficial for them as it is not time-consuming (Mercier & Silverman, 2014). Moreover, the good internal consistency it exhibits may increase the accuracy of students' answers and enable regular use by teachers, resulting in a better understanding of what students think and feel about assessment methods and procedures in PE. This tool may help educators and researchers explore students' perceptions of PE assessment. A simple analysis of students' answers, as shown in Table 3, provides the feedback needed to highlight the points of the assessment process that students consider important, those that need better explanation or modification, to connect teaching with assessment.

It was observed that students in the 7th grade had a more positive attitude toward assessment procedures than students in other grades. Moreover, there were no statistically significant differences for students in the 5th and 6th or 10th grades, while their attitude toward assessment was not as positive as that of the 7th-grade students. This result

may depend on the summative function of assessment, the role of grades, and different assessment practices used by teachers (Borghouts et al., 2017). Furthermore, while students' attitudes became more positive from the 5th and 6th grades to the 7th grade, these attitudes seemed to decline sharply in the 10th grade. This decline may result from the decline in attitude toward PE lessons that occurs as the school level increases (Evangelou & Digelidis, 2018).

Concerning students' perceptions of assessment, this research reveals that the students considered the assessment process to be significant in their learning and helped them improve in PE lessons (skills, knowledge, behavior). Furthermore, students felt that the PE teacher assessed what had been taught, graded them according to whether they had achieved their goals, and helped them improve. Moreover, students thought that having a good grade in the PE lesson was crucial, while being informed about the grading criteria for the lesson was helpful. Finally, they appreciated having the opportunity to test their abilities through fitness tests.

A better balance between the curriculum and the assessment procedures, accurate grading decisions, and an understanding of student assessment consequences will strengthen the construct validity of the assessment processes (Redelius & Hay, 2009). Teachers should align grades with official syllabus expectations through task-specific criteria and clearly defined student implications (Redelius & Hay, 2009). According to the research, students who thought the teacher graded fairly were more assessment literate, as they were the ones to identify the elements that would reward them with better grades (Leirhaug, 2016).

As for gender, there were no significant differences between boys and girls, and gender did not influence students' attitudes toward assessment in PE. Consequently, the scale is not influenced by gender, and both genders can use it equally (Robbins et al., 2008). In other research, gender had minor statistical importance in predicting students' attitudes toward assessment (Leirhaug, 2016).

Regarding the strengths and limitations of the study, the scale was consistent with the theory of planned behavior, with a single factor to account for much of the variance in attitudinal responses (Ajzen, 2005). Furthermore, concurrent validity was examined through a question that was answered using a semantic differential format (Osgood et al., 1967) on five bipolar adjectives, which achieved satisfactory internal reliability and a significant relationship between the two scales, with a large effect size ($r^2 = .37$). Furthermore, using a sample from several municipal districts with different social and economic characteristics strengthens the generalization of the findings. In addition, the sample was large, with an equal number of male and female participants.

However, the total number of elementary students was smaller than the number of students in other grades, and the conduct of an elicitation study could emerge or confirm the items. Additionally, we cannot know whether the anonymity of the questionnaire ensured the truthfulness of the participants' responses.

As assessment is one crucial aspect of teaching and learning procedures, students' attitudes toward assessment form another critical aspect when considering students as essential factors in the educational process. For this reason, students' perspectives should be considered for any assessment procedure (Tolgfors, 2018). To make PE a meaningful and enjoyable experience, PE teachers should mobilize all the means provided.

Conclusion

This research contributes insight into students' attitudes toward assessment procedures in PE while investigating grade and gender differences. Furthermore, it provides educators and researchers with a reliable, valid, easy-to-use quantitative instrument to assess students' attitudes toward assessment in PE. Using this instrument, they can better understand what students think and feel about assessment procedures. With this understanding, teachers can modify their teaching and curriculum to make assessment a meaningful experience that enhances students' learning and enjoyment of the lesson. Additional research can further confirm the validation and reliability of the scale. Finally, the SATA-PE scale can be used in other science disciplines to collect information about students' attitudes toward assessment procedures by replacing the word "Physical Education (PE)" in the items presented.

Ethics approval and informed consent

The research received approval from the Institute for Educational Policy of Greece. Participants were fully informed of the study's nature, and their participation was voluntary, with written consent being obtained from all participants and their parents.

Competing interests

The authors of a paper have no competing interest or any commercial associations or financial interests to declare.

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Effect of Educational Intervention on Sports Law Concepts on the Attitude, Knowledge, and Behavior of Coaches

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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Abstract

The aim of this study was to measure the effects of educational intervention on sports law concepts on coaches' attitude, knowledge, and behavior. The method of the study was quasi-experimental, including two groups, pretest and posttest stages, and a follow-up study. A total of 50 coaches from Eghlid in Fars Province, Iran, were selected using the convenience sampling method. They were then randomly divided into an experimental group and a control group. A researcher-made educational protocol was used for educating coaches who participated in the experimental group on the concepts of sports law. Then, in order to measure the efficiency of the educational protocol, three questionnaires were employed to measure the coaches' attitudes and their knowledge about the concepts and regulations of sports law, as well as their behavior related to the principles and regulations of sports law at sports clubs. The covariance analyzing test and ANOVA with repeated measures were employed to analyze the data provided by the study's instruments. The results indicated that the educational intervention of this study positively changed the attitude of the coaches in the experimental group towards the concept of sports law. In addition, the educational intervention of this study significantly improved the knowledge of coaches in the experimental group about the rules and regulations of sports law. Furthermore, the behavior of the coaches in the experimental group changed in that they began properly implementing the principles and regulations of sports law after participating in eight educational sessions. Moreover, the effects of the educational intervention in this study remained for three months following the completion of the intervention.

Keywords: Breaches of duties, fault, injury, legal duties, legal liability

Introduction

The importance of engaging in and reaping the benefits of sports has made the phenomenon of sports an unrivaled industry in which many people have specific duties leading to different responsibilities (Païement, 2011, p. 36; Hensch, 2006, p. 14; Castro, 2010, p. 51). Preventing the negative consequences of individuals' legal responsibilities requires managing their awareness of sports rights (Qiang, 2019, p. 8). Given that sports accidents are an integral part of sports activities, awareness of the duties of people involved in sports is essential to preventing and reducing legal harm in sports for planners in the sports industry (Cavico et al., 2015, p. 18). From a legal point of

view, coaches have the closest relationship with athletes. Due to the nature of this relationship, which is based on the superior power of the coach over the athlete, it can lead to coaches having high legal liability when athletes under their control are injured (Mohammadinejad & Mirsafian, 2015, p. 560). Therefore, it is important to discuss the legal duties of coaches towards athletes. In general, sports coaches have a role that is defined and approved in the field of sports legal liability in the form of sports law regulations (Carpenter, 2000, p. 89). According to sports law specialists, the legal duties of coaches in the field of sports and towards the athletes under their control can be classified into seven areas including supervision (public and special), training, facilities and equipment, risk awareness, medical assistance, coordination between athletes, and being informed of the situation of athletes (Mohammadinejad & Mirsafian, 2015, p. 558). In fact, the coach's liability to athletes can be due to a lack of care. When the court of law investigates the case, it usually considers the coach's permissibility, kind of activity, and ability to prevent injury (Albrecht, 2008, p. 66). In other words, what makes coaches legally responsible is not the abnormal results of sports activities, but their failure to perform the relevant tasks (Aghaie-Nia, 2002, p. 61). In all countries, any failure of coaches to perform their legal duties causes irreparable financial and human losses. Therefore, most countries try to train professional coaches to be aware of their legal duties, their authority, and their responsibilities towards athletes. This in turn can lead to the reduction of sports accident risks caused by coach failure (Bin & Lanjuan, 2019, p. 468).

The results of various studies in countries such as the United Kingdom (Partington, 2014, p. 540; Mitten, 2013, p. 228) and the United States (Herbert, 2019, p. 34) have shown that the weak performance of coaches in different sports is the result of their lack of awareness of their legal duties towards the athletes under their control, as well as the consequences of violating their duties in the case athlete injury, which can lead to irreparable consequences for both coaches and athletes (Mirsafian, 2016, p. 11). In Iran, this issue can also be widely observed, which is why the Iranian sports community is constantly facing various legal cases.¹

Upon reviewing the training conditions of coaches in different countries, it seems that the training programs for sports coaches in relation to sports law issues in general, as well as the legal duties of coaches in relation to the athletes under their control in particular and the consequences of the nonimplementation of legal duties, are not fully designed or performed by coaches in the case of injury (Mirsafian, 2017a, p. 110). This may be why sports coaches in Iran do not have the correct attitude towards sports rights. Additionally, neither the knowledge of sports coaches nor their behavior related to the performance of their legal duties in the sports environment is appropriate (Mirsafian, 2016, p. 11). According to the concepts related to the theory of planned behavior, the origin of human behavior is the type of attitude towards the subject and also the benefit of the appropriate motivation to perform that behavior. Behavioral change first requires a change in attitude towards the importance and value of the relevant subject; an improvement in the knowledge of the individual is then necessary to increase the motivation to perform the desired behavior (Ajzen, 1991, p. 203). In other words, attitude is the root of motivation and motivation is the root of behavior; increasing one's knowledge of a particular subject can be effective in changing one's attitude and motivation to either engage or not engage in that behavior (Ajzen, 1991, p. 204). Therefore, the present study aims to design an appropriate training program and to study its educational effect on changing the attitude of coaches in order to increase the importance of sports law in the coaching profession and also increase their knowledge of issues related to sports law, their legal duties towards athletes, consequences of nonperformance of their legal duties in the sports environment, legal liability, and other related issues. The study also aims to examine the extent of the change in the coaches' behavior to better perform their legal duties towards the controlled athletes following the implementation of the designed training protocol.

Training conditions for coaches in Iran in relation to the concepts of sports law

In Iran, only people who have a coaching certificate for the sport in question can work as coaches at different levels. Sports federations are the only legal authority in this country for training coaches in various sports. In fact, individuals can succeed in obtaining this valid certificate only by participating in a few days of coaching courses and passing the relevant exams. The degrees of coaches in Iran have three parts: the lowest grade (Grade 3) is

¹ Such as the incident that occurred in a climbing competition in one of the stadiums in Isfahan: an eight-year-old boy fell during a rock-climbing competition and went into a coma. The cause of the injury was determined by the court to be the lack of a suitable mattress (Young Reporters Club). In another incident, two young Iranian soccer players made an appointment for a sports tour in Georgia. The reason for this incident was the irresponsible behavior of the club manager, the club president, and the sports tour manager. Both of these incidents occurred because of the lack of awareness of the coaches and authorities about their legal duties and their lack of responsibility towards the athletes under their control (Moj News Agency).

awarded to inexperienced coaches, while Grade 2 and Grade 1 are awarded to more experienced coaches. Since the only way for coaches in Iran to improve their knowledge is for them to attend the coaching courses of sports federations, the topics and educational concepts of these courses are highly important. Unfortunately, the topics of these training courses for coaches at all of the above-mentioned levels have many drawbacks and problems. For example, the concepts of sports law in general and the legal duties and responsibilities of coaches towards the athletes under their control in particular, as well as the conditions created in the case of coaches' noncompliance with their legal duties and the conditions of imposing legal liability on coaches, are not represented in the main syllabi at all. This in and of itself can be the cause of many sports injuries for athletes and the imposition of legal liability on coaches (Mirsafian, 2017b).

Method

The present study was a quasi-experimental study with a pretest-posttest design as well as a two-group follow-up study that was conducted in the winter of 2019 in Eghlid, a city in Iran. Fifty coaches from sports clubs in the city were selected to participate in this research using the available sampling method and were randomly divided into an experimental group and a control group (25 people in each group). The main criteria for the sports coaches to participate in this study were the possession of an official coaching degree in one of the sports disciplines, no previous history of participating in a class or workshop, justification related to the research topic, and a continuous presence in the educational categories of this research. Prior to the initiation of this project, the participants were assured that the information and results obtained from the study would be confidential and the information would not be used as a tool. Their confidence in maintaining all human affairs as the main principle of ethics in the research was also obtained. Furthermore, before the project was initiated, all of the instructors promised to be present in the classes until the end of the course. The measurement tools used in the study included four questionnaires. In order to assess the attitude of coaches towards sports law and evaluate its importance in coaching, a researcher-made questionnaire with 12 items and a 5-point scale method (from strongly disagree to strongly agree) was used. In order to assess the level of the coaches' legal knowledge about their sports rights and legal duties towards the athletes under their control, Mirsafian's Questionnaire (2017b) was used. The variables of supervision, instruction and training, warning of risk, facility and equipment, medical care, knowledge about athletes, and matching athletes were assessed using a 40-item, 5-point scale (from strongly disagree to strongly agree). A checklist was used to measure the behavior of coaches in relation to the performance of their legal duties towards the athletes under their control. The checklist was prepared by a researcher. This checklist was compiled based on the weekly tasks of the coaches and athletes in training and competition, as well as information about the physical conditions of the athletes, and was evaluated using 36 items with a 2-point value (yes-no).

In this study, the content validity of all the questionnaires was confirmed before use by relevant experts (sports management experts, sports law experts, and sports experts, including five people in each group), while their reliability was confirmed using Cronbach's alpha test coefficients of 0.80 for the legal attitude questionnaire. The instructors received 0.79 for the instructors' legal knowledge questionnaire and a coefficient of 0.81 for the instructors' behavior assessment questionnaire. The trainers' attitude and knowledge questionnaire was completed in three stages by the participants in the experimental and control groups. The first stage was performed before the beginning of the educational protocol, the second stage was performed after the completion of the educational protocol, and the third stage was performed 12 weeks after the end of the educational intervention (in order to measure the persistence of the changes). In the first stage of completing the questionnaires, before implementing the training protocol, the necessary information for completing the questionnaires was provided to the participants in both the experimental and control groups in the same way at the training site. The participants of both groups were then asked to complete both questionnaires accurately. In the second stage of the project and after the educational intervention, which consisted of eight sessions given over eight weeks (Thursday mornings), posttest questionnaires were completed by the participants in both the experimental and control groups at the test site. The third stage of completing the questionnaires was completed by both the experimental and control groups 12 weeks after the completion of the training course at the pretest and posttest site. The measurement of the behavior of the coaches was conducted in three stages: first, before the implementation of the training protocol; second, after the completion of the training protocol; and third, 12 weeks after the completion of the training protocol. The researchers then discreetly reviewed the behavior and actions of the coaches in the sports classes.

The educational protocol used in this study is based on theoretical foundations and research conducted in relation to sports law, specifically to promote the legal awareness of sports coaches regarding the importance and value of sports rights, the intrinsic and nonintrinsic risks of sports, the legal duties and responsibilities of coaches, and the consequences of coaches' noncompliance with their legal duties towards athletes. In general, lesson plans and course titles, as well as their desirability and efficiency in relation to each of the seven areas of the legal duties of coaches, were approved by five sports management and three sports law specialists. The items implemented in this training protocol included lectures, the presentation of brochures, group discussions, review of related legal cases, and questions and answers for all instructors in the experimental group. The research training protocol for each session included the items and topics presented below.

Session 1: In the first session, the coaches participating in the research experiment became familiar with the concept of sports law, the concept and importance of supervision in the sports environment (before, during, and after sports activities), and the importance, necessity, and value of training and applying legal knowledge about sports legal liability and duties. The coaches also became familiar with their area of authority at work and its effects on their professional life. Additionally, they familiarized themselves with legal cases related to breaches of duty and supervision strategies to prevent legal liability from being imposed on them. For example, they learned how to manage time when attending and holding or terminating sports activities, how to monitor the activities of young athletes and monitor the locker room and toilet, and how to maintain a continuous and conscious presence during sports activities involving training or competition. They were also taught about sports supervision in relation to the complexity of the sports field by watching video clips and reviewing samples of legal cases to learn about engaging in appropriate supervision in accordance with their environmental conditions and setting up their training class safely. This training session ended after a question and answer session. The duration of this meeting was 75 minutes.

Session 2: This session was held to acquaint the members of the experimental group with the field of education as the second skill in the educational protocol. In this session, the participants of the experimental group were introduced to the theoretical concepts and basics of sports training techniques and tactics for training a novice athlete to gain scientific and practical professional knowledge. To train independently of legal liability, sports coaches must ensure the correct use of sports facilities and equipment and design their training activities in such a way that novice athletes reach the professional level in a healthy manner without encountering any issues. If necessary, they can correct incorrect sports techniques and tactics and inform the athlete of possible intrinsic and nonintrinsic events during sports activities. The instructors also learned about legal cases arising from breaches of duty in education and strategies for avoiding legal liability. The session ended with time for questions and answers lasting 50 minutes.

Session 3: The educational topic of this session was familiarity with sports equipment and training facilities from a legal perspective, as well as its effect on the responsibility of coaches. In this session, the instructors were trained on how to review and prepare standard sports equipment and facilities and how to control their safety. The trainers were also made familiar with the importance of checking the safety of sports equipment (before, during, and after sports activities), correcting defects before starting activities, coach monitoring, and observing the standard distances between equipment such as a press table and treadmill. The importance of checking the safety of equipment and the personal tools of athletes (before and during sports activities) and checking the light and temperature in accordance with the sports activities (both before and during the activities) was also taken into consideration in this session. The trainers were supposed to be familiar with the necessary conditions for outdoor activities as well as the possible dangers (weather conditions, dangerous animals, etc.) that could play a role in their process of deciding whether to complete the tasks or not. The trainers then became acquainted with legal cases resulting from the violation of this duty and strategies for avoiding civil liability. The session ended after 83 minutes of questions and answers and clearing up the ambiguities of the participants.

Session 4: The purpose of this training session was to acquaint the coaches with the concept of keeping athletes informed and aware, as well as the importance of the information transferred from the coach to the athletes from a legal perspective. The coaches thus learned how to inform athletes and their parents about the intrinsic and nonintrinsic dangers of sports activities. The instructors were made aware of the importance of informing athletes about the dangers during or after using techniques, the potential dangers they face during training and competitions, and the potential dangers of training indoors and outdoors. Athletes must also be informed about possible dangers of using damaged or nonstandard equipment. Thanks to the knowledge imparted during this session, the coaches can reduce the risk of sports accidents to a minimum. The trainers then became acquainted with legal cases resulting from the violation of this duty and solutions for avoiding legal liability. The session ended after 53 minutes of questions and answers.

Session 5: The main aim of the fifth session was to inform the trainers about medical issues and first aid for injured athletes as well as related legal issues. One of the essential topics in sports that coaches should be aware of is how to manage athletes' injuries and provide them with first aid, as well as how to manage an injured athlete in their return to sports activities. In this session, the participants of the experimental group discussed the importance of having a first-aid kit in the club, checking the first-aid kit and medical equipment needed at the training site before training, taking initial measurements in case an athlete injures themselves, taking the necessary measures to send injured athletes to medical centers, and replacing the used materials in the first-aid kit for emergencies in the shortest time possible. The trainers were also introduced to legal cases resulting from the violation of this duty and strategies for avoiding civil liability. The session ended after 79 minutes and after the participants' questions were answered and any ambiguities were made clear.

Session 6: In this session, topics related to the importance of coordination between athletes and the sports activities they participate in during training and competitions, as well as its impact on the optimal and effective performance of athletes, were presented to the coaches in the experimental group. In this meeting, the coaches also talked about observing the level of physical and mental skills of athletes in training and competitions, as well as the extent of athletes' injuries. They were finally presented with the importance of coordination between athletes and factors such as age, gender, and physical condition. The athletes also became acquainted with all the materials mentioned above. The trainers were then informed about legal cases resulting from the violation of duties and solutions for avoiding legal liability. This session ended after 69 minutes following questions and answers.

Session 7: The seventh session of the educational protocol of the present study was related to the importance of trainers' awareness of athletes' health in various physical and mental dimensions in order to manage their performance. In this meeting, the participants in the experimental group learned about athletes' preparations, making a medical profile for each of the athletes, obtaining information about their physical condition by observing their appearance or medical profile, and finally considering the appropriateness of the sports activities for their physical condition. Some key points were also presented about preparing the athletes before and during exercises. The trainers then became acquainted with legal cases resulting from the violation of this duty and strategies for avoiding legal liability. This session ended after 73 minutes, and the participants' questions were answered to clear up any ambiguities.

Session 8: This session was held as the last session in the study's training protocol, with the aim of summarizing and reviewing the materials presented in the previous training sessions and resolving any areas of uncertainty for the instructors. In this meeting, legal cases resulting from coaches' breaches of duty were presented, as were the consequences of legal liability being imposed on them. Solutions for preventing the imposition of these responsibilities on the coaches were also presented. This session ended after 65 minutes of questions and answers, and the general conclusion resulted from the protocol of the previous training sessions. In carrying out this research, the researchers were also confronted with limitations such as a lack of full cooperation from some sports clubs in Eghlid.

In order to analyze the data obtained in the pretest, posttest, and follow-up stages, descriptive and inferential statistical methods (analysis of covariance, multivariate analysis of variance, and analysis of variance with repeated measures) were employed using SPSS software version 23.

Results

The demographic characteristics of the participants in the experimental and control groups of the study are presented in Table 1. The results indicate that most of the participants in the experimental and control groups were male. The average age of the groups was similar – 35.3 ± 6.3 for the experimental and 34.7 ± 2.9 for the control group. As for coaching experience in the experimental and control group, it amounted to 8.4 ± 4.4 and 9.1 ± 3.9 respectively.

The results presented in Table 2 indicate that there is a relative equality between the mean of the pretest scores of the attitude, knowledge, and behavior of the coaches in the experimental and control groups, while the mean of the posttest scores of the mentioned variables in the experimental group increased following the educational intervention. This change was not observed in the means of the control group.

The results of multivariate analysis of variance presented in Table 3 show that the statistics of Pillai's effect test, Wilks lambda test, Hotelling's effect, and Roy's largest root are significant at a 95% confidence level. This means that the linear combination of the three variables of the attitude, knowledge, and behavior of the trainers in the study following the adjustment of the differences of the three scattering variables (pretests of these variables) is affected by the independent variable (educational intervention on sports law concepts).

Table 1. Demographic characteristics of the participants

Variable/Group	Experimental		Control	
	N	%	N	%
Gender				
Male	19	76.0	18	72.0
Female	6	24.0	7	28.0
Age				
20–30 years	8	32.0	7	28.0
31–40 years	10	40.0	11	44.0
41 years and older	7	28.0	6	24.0
Educational level				
Bachelor's degree	19	76.0	17	68.0
Master and higher	6	24.0	8	32.0
Coaching experience				
Under 5 years	8	32.0	8	32.0
6 to 10 years	13	52.0	14	56.0
11 years and more	4	16.0	3	12.0
Total	25	100	25	100.0

Table 2. Mean and standard deviation of the pretest and posttest scores of the attitude, knowledge, and behavior of the experimental and control groups

Variable	Group	Pretest		Posttest	
		Mean	SD	Mean	SD
Attitude	Experimental	37.8	2.66	40.72	2.47
	Control	38.16	3.46	38.1	3.53
Knowledge	Experimental	104.6	10.8	127.4	9.15
	Control	98.1	13.63	95.6	14.1
Behavior	Experimental	90.12	8.84	114.56	8.3
	Control	91.48	14.3	88.72	14.9

Table 3. The effect of the independent variable (educational intervention) on dependent variables (attitude, knowledge, and behavior of the experimental group)

Variable	Test	F	df	Sig	Eta	Power
Attitude	Pillai's Trace	50.67	1	0.001	0.68	1
Knowledge	Pillai's Trace	403.04	1	0.001	0.95	1
Behavior	Pillai's Trace	322.412	1	0.001	0.932	1

Table 4. The effect of educational intervention on sports law concepts on the attitude, knowledge, and behavior of the sports coaches following the intervention

	Source of variation	Sum of square	df	Mean of square	F	Sig	Eta	Power
Attitude	Pre test	395.45	1	Pre-test	361.39	0.001	0.89	1
	Group	110.22	1	110.22	100.73	0.001	0.68	1
Knowledge	Pre test	6289.84	1	6289.84	613.74	0.001	0.93	1
	Group	7665.13	1	7665.13	747.93	0.001	0.94	1
Behavior	Pre test	6307.41	1	6307.41	441.28	0.001	0.90	1
	Group	9183.24	1	9183.24	642.48	0.001	0.93	1

Table 5. Comparison of the attitude, knowledge, and behavior scores of sports coaches in three stages: pretest, posttest, and follow-up

Variation	Source of variation	Sum of square	df	Mean of square	F	Sig	Eta	Power
Attitude	Group and time interaction	86.33	2	43.17	87.95	0.001	0.67	1
Knowledge	Group and time interaction	5844.0	2	2922.0	493.79	0.001	0.91	1
Behavior	Group and time interaction	8643.52	2	3421.76	654.67	0.001	0.93	1

The results of analysis of covariance presented in Table 4 indicate that the F observed at the level of 0.05 shows a significant difference between the mean of the posttest scores of the attitude, knowledge, and behavior of the trainers in the experimental and control groups. Accordingly, the educational intervention on the concepts of sports law had a significant effect on the promotion of the mentioned variables. The effect size of the test for the variables of the attitude, knowledge, and behavior of the coaches shows the explanation of 68% of the posttest scores of the attitude variable, 94% of the posttest scores of the knowledge variable, and 93% of the posttest scores of the behavior variable due to the educational intervention. The statistical power of 1 in the mentioned variables also shows the adequacy of the sample size for these tests.

The results of analysis of variance with repeated measures presented in Table 5 indicate a significant difference between the mean scores of the variables of the attitude, knowledge, and behavior of the trainers in the research group in the pretest, posttest, and follow-up test stages, which indicates the persistence of the results. The effect of teaching the concepts of sports law on the promotion of the mentioned variables was stable 12 weeks following the completion of the educational intervention. These results are presented in another manner in Figure 1.

Conclusion

The aim of this study was to investigate the effects of educational intervention on the concepts of sports law on the knowledge, attitude, and behavior of coaches in sports clubs. The results of the study showed that the participation of coaches in the training protocol of sports law had a significant effect on their attitude, leading to changes in their sports law attitude and raising the value of observing sports law regulations in order to perform their legal duties towards the athletes under their control. The results also showed that the intervention in the study had lasting effects. In other words, attending classes on the concepts of sports law and becoming familiar with the importance of implementing legal rules and regulations in sports had a meaningful effect on the attitude of the coaches. Furthermore, becoming familiar with their duties towards athletes and gaining awareness of the consequences of violating these laws or failing to observe their legal duties also affected the coaches' attitudes. This effect remained stable for 12 weeks following the completion of the training intervention sessions. The importance of changing the attitudes

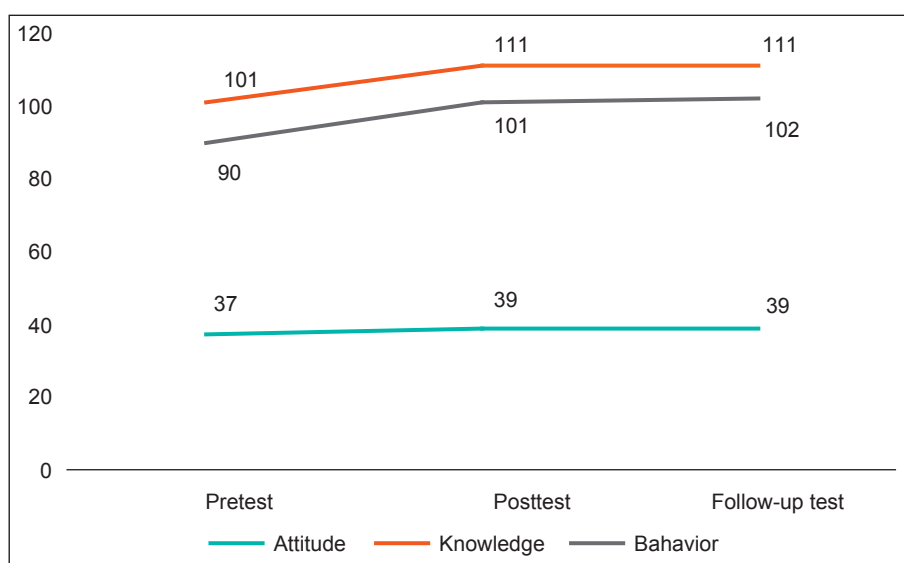


Figure 1. Changes in the attitude, knowledge and behavior of the experimental group in three stages: pretest, posttest, and follow-up test

of individuals in general and those of the coaches participating in the study's experimental group in particular can be examined from different perspectives. Based on the theory of planned behavior (Ajzen, 1991), attitude is one of the factors affecting human thought and action. This means that even the way a person thinks about things can be affected by how they look at things (Ajzen, 1991). On the other hand, the tendency to engage in or attempt to engage in a specific behavior is influenced by the individual's attitude to the issue (Ajzen, 1991). Considering the results of the present study, the educational protocol can make a lasting change in the attitude and behavior of coaches regarding sports law regulation issues. The improvement in the attitude of the coaches who participated in the experimental group shows that this issue can be a precondition for the coaches to be more willing to improve their knowledge of the concepts of sports law related to the coaching profession, as well as the knowledge of their legal duties, leading to optimal performance. These results can be considered in some respects alongside the research of Côté (2006), Mirsoleimani et al. (2015), and Mirsafian (2016).

The results showed that the educational protocol of the present study had an acceptable and lasting effect on improving the knowledge of the educators who participated in the experimental group compared with the status they had before participating in the educational intervention. These effects were also shown in the posttest results of the research control group. This means that participation in the training protocol of the present study significantly affected the coaches' knowledge about their legal duties towards the athletes under their control, conditions of violation or nonfulfillment of their duties, conditions for imposing responsibilities on coaches, and strategies for preventing this imposition of responsibilities. This effect remained significant for 12 weeks after the completion of the mentioned trainings. These results can be considered in some way in accordance with the research of Mostafa Pour Anzali and Kashif (2016), Nelson et al. (2006), and Mirsafian (2017b). Based on the results obtained from the study, participation in the training program of the study significantly changed the behavior of the trainers in the experimental group, enabling them to optimally perform their legal duties towards athletes compared with the same trainers before participation in the training intervention and also in comparison with the posttest results of the control group. The results proved the effectiveness of the educational protocol as well as its stability. In other words, the trainers in the experimental group performed their legal duties better after completing the research training protocol and executed most of their actions and omissions in sports and training classes exactly in accordance with the legal duties taught in the training sessions. In general, most learning theories are aimed at identifying and explaining new and innovative strategies to help people learn more (Kop & Hill, 2008). In this regard, educators in the field of education consider changes in individuals' behavior as the emergence and existence of a learning experience, the level of which depends on the rate of behavioral change (Kop & Hill, 2008). According to the observed changes in the behavior of instructors in the experimental group, the learning process was conducted in an acceptable manner, which shows the appropriate efficiency and effectiveness of the educational protocol designed in this study. Despite the existence of research in line with this study, the mentioned results can be considered to be in accordance with

the results reported by Singh and Surujlal (2010), Mostafa Pour Anzali and Kashif (2016), and Mirsafian (2017b). In general, as stated earlier and based on the theory of planned behavior, the origin of human behavior is actually attitude, and attitude is the main source of new behavior in a person. In fact, human behavior is guided by three factors: first, belief in the consequences of behavior (behavioral beliefs) and evaluation of the consequences; second, belief about the normative expectations of others and the motivation to fulfill these expectations; and finally, belief in the existence of factors that facilitate or hinder the performance. Behavioral beliefs create a favorable or unfavorable attitude towards behavior. The result of normative beliefs is reflected in the mental norm, and the result of control beliefs is also determined by behavioral control. In general, the attitude about the behavior, the mental norm, and behavioral control lead to the formation of the intention to engage in a behavior. As a general rule, the more favorable the mental attitude and the greater the perception of behavioral control, the stronger the person's intention will be to engage in the behavior in a practical way. Finally, the intention reaches the stage of action and the actual behavior is performed. Therefore, and based on the results of the research, it is necessary to change the behavior of the coaches in order for them to implement their legal duties, as well as to improve their knowledge of their breaches of duties towards student athletes. The results of the research also show that this change in behavior is the result of a change in attitude that finally leads to a change in the coaches' attitude towards their rights and students in the school, their legal duties, and, more generally, the sports law system prevailing in Iran. Unfortunately, the issue of sports law and the training of physical education teachers and sports coaches was not taken into consideration, neither at the macro level of sports organizations in Iran (Iran Ministry of Sports and Youth and Student Sports Federation) nor at the micro level (Sports Coaches Training System and the Physical Education Training System for coaches who are going to be recruited by schools). These problems occur in Iran not only at the micro level, relating to the legal problems of coaches, but also at the macro level of sports, such as coaches' lack of proper knowledge of sports law in the international dimension, which can cause heavy financial damage to Iran. For example, the Iranian Football Federation was required by the Court of Arbitration for Sport (CAS) to pay huge sums of money to a foreign football coach – Marc Wilmots (Imna News, 2022). In any case, the problems and shortcomings related to the coaches' lack of complete knowledge regarding the principles and concepts of sports law are not limited to Iran. These problems have existed in other countries in different ways as well. As an example, Stewart and Sweet (1992) studied the situation of some high school sports coaches in the state of Montana in the United States who did not possess an academic degree in physical education or the necessary skills related to the concepts of sports law and knowledge of the legal duties of coaches towards athletes. The result was an increase in lawsuits between coaches and athletes on the one hand and financial lawsuits between coaches and high school administrators on the other. Similar problems have been reported in Brazil, as the production of coaching science and the development of the legal knowledge of coaches in Brazil has not progressed along with the professionalization of sports in the country (Galatti et al., 2016). In another study, Hedlund, Fletcher, Pack, and Dahlin (2018) emphasized the need to increase the legal awareness of coaches and coaches' knowledge of their duties towards their athletes, considering the importance of the comprehensive training of sports coaches at all coaching levels. In a similar study, the importance and necessity of training coaches in Romania in relation to all legal concepts in general, as well as the legal duties and responsibilities of coaches towards athletes and other people involved in particular, was reported (Voicu, Stănescu, & Voicu, 2022). Meanwhile, Partington (2014) suggested amending inappropriate laws in England that increase the possibility of the real responsibilities of coaches on the one hand and create support organizations for coaches to reduce their civil liability on the other. According to the results obtained from this research, the Ministry of Sports and Youth and sports federations are recommended to use the protocol in this study to change the attitude and promote the knowledge of coaches in relation to sports law and to raise their awareness of their legal duties, leading to fewer injuries for athletes and the avoidance of legal liability. At present, sports federations are the only training authority for sports coaches in various fields that can grant a coaching certificate. Typically, the applicants in coaching courses attend very short-term, intensive courses that are not considered to be of high quality due to the high number of applicants accepted in each course period. Unfortunately, the amount of time allocated to sports law materials in these training courses is less than two hours, and this short period of study often focuses on sports safety concepts that do not have anything to do with sports law regulations. The deficiencies in sports coach training programs held under the supervision of sports federations in Iran, especially the parts related to the training of sports law concepts, show that sports federations have avoided changing the programs and syllabi over the past several years. An investigation into the causes of these deficiencies can thus be considered a giant step towards changing the aforementioned programs. Additionally, as the training and knowledge enhancement of teachers in different fields is mentioned in different parts of the Iran Basic Education Evolution Document (2011), it is suggested that the Ministry of Education in Iran improve the knowledge of teachers and coaches on sports law

concepts, which would lead to a reduction of various risks for student athletes in sports environments and consequently promote the quality of sports training in schools and sport clubs.

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Are Esports Players Inactive? A Systematic Review

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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Abstract

As esports grow, public authorities have many concerns about the potential negative health effects of this “sedentary” practice. This work proposes a systematic review on the links between esports and physical activity (PA). The research questions guiding this review are as follows: (1) What is the PA level of esports players? (2) Do data exist regarding the influence of participation in esports on players' PA? (3) Based on these findings, what future research questions should be asked and what studies should be conducted? Eighteen studies met the inclusion criteria. The analysis revealed that esports players appeared to be active, exceeding World Health Organization recommendations, in 13 studies and inactive or low-active in four studies. The different populations of players do not appear to have the same degree of PA. High-level, professional, and/or supervised players appear to be more physically active. However, some data are inconsistent, and our review highlights several biases and methodological limitations. Additionally, while we have found no studies providing data on the influence of esports on PA, five studies highlight several factors that could push players to engage in PA. Finally, further research is needed using objective measurement tools and characterizing and accurately distinguishing between players' levels of expertise and the type of game played. The nature and modalities of the PA also need to be clarified. We encourage supplementing these quantitative data with qualitative data obtained through interviews to provide a description and understanding of the influence of esports on PA engagement, re-engagement, retention, and withdrawal.

Keywords: Physical activity, inactivity, electronic sports, video games, influence

Introduction

Context

The competitive practice of video games, also known as esports (i.e., electronic sports), refers to “organised video game competitions” (Jenny et al., 2017). It is therefore distinct from the recreational practice of video games (without ranking or competition). This specific manner of practicing competitive gaming includes different video games (e.g., Call of Duty, Counter Strike, Dota 2, Hearthstone, FIFA, League of Legends, etc.) whose leagues and tournaments have neither the same degree of professionalization nor visibility and which have their own characteristics. The popularity and growth of esports, which is attracting an increasing number of players and spectators, has

been highlighted by numerous academic studies (Anh et al., 2020). Newzoo (2022) estimates that the global esports market would have generated \$1.1365 billion in 2021. According to a broader definition of the esports industry, this amount could even be estimated at \$24.9 billion in 2019 (Anh et al., 2020). Despite being showcased on the sidelines of the 2018 and 2020 Olympic Games and at the 2022 Asian Games, the practice of esports raises questions. While most esports involve the body and very fine motor skills (Besombes, 2018; Hilvoorde & Pot, 2016; Pluss et al., 2020), as players are required to press the correct keys on the control device (console controller, joystick, keyboard, mouse, etc.) at the right time within precise time frames, players most often play while seated (Besombes & Maillot, 2018) in front of a screen for hours at a time.

The consequences of a sedentary lifestyle and inactivity are current public health problems (Illivi & Honta, 2020). Sedentary behavior is typified by low energy expenditure (less than or equal to 1.5 metabolic equivalents of task [METs] in a seated or prone position [excluding sleep]; Tremblay et al., 2010). Inactivity is characterized by insufficient duration, frequency, and level of physical activity (PA), i.e., below a certain threshold. This threshold determines how much PA is considered enough, and therefore whether an individual is active or inactive. For adults aged 18 to 65 years, the threshold recommended by the World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), and the American College of Sports Medicine (ACSM) is 150 minutes of moderate-intensity PA (e.g., 30 minutes per day, five days per week) or 75 minutes of vigorous-intensity exercise per week. Several studies show that many people fail to meet these recommendations (Kohl et al., 2012). In 2016, the global prevalence of insufficient PA was 27%, while for adolescents it was 81% (Guthold et al., 2018, 2020). These shortfalls are associated with adverse health effects, as physical inactivity is considered the fourth most important risk factor for mortality worldwide (Kohl et al., 2012). In addition to its negative effects on mental health and quality of life, physical inactivity is a factor in cardiovascular disease, type 2 diabetes, breast and colon cancer, and reduced life expectancy (Lee et al., 2012).

In this context, public authorities have many concerns about the potential negative effects of esports on the health of players (Wattanapisit et al., 2020). Although many studies exist on the physiological effects of video gaming on health, only a few have focused on competitive practice, which seems to have its own specificities. Several scientific studies criticize the lack of data on the PA of esports players, as well as on other factors linked to lifestyle (Kelly & Leung, 2021; Yin et al., 2020). This scarcity limits our knowledge of how to promote health. Data also seem to be lacking on specific esports practices, linked in particular to the level of expertise (amateur, professional, etc.) and/or to the types of games played.

However, researchers suggest that esports may lead individuals to adopt a healthier lifestyle themselves or act as a lever for authorities to promote this healthy lifestyle (Chan et al., 2022; Ketelhut et al., 2021; Micallef et al., 2022; Polman et al., 2018; Schary et al., 2022). For example, some hypothesize that participation in certain esports (e.g., sports simulations) could motivate players to engage in real PA (Adachy & Willoughby, 2015; Jenny & Schary, 2014). On the other hand, several studies have recently highlighted the positive effect of PA on in-game performance (De Las Heras et al., 2020; Toth et al., 2020). Following this state of research on the topic, several questions remain: Are esports players inactive? Does engaging in this sedentary competitive practice push players to abandon PA or to also engage in physical exercise?

When this work was initiated, only one systematic review on this subject had been published (Lam et al., 2020). The review was published in 2020 and included six studies. We were aware that new studies had appeared shortly afterwards that provided a better understanding of the phenomenon. During the course of our work, another systematic review was published, focusing on the impact of esports and online video games on the lifestyle behaviors (including PA) of young people (Chan et al., 2022). However, although the title refers to “the impact of esports,” only three of the 36 studies included in the review actually refer to esports. Finally, a scoping review aiming to identify the influences of PA and dietary behaviors in emerging adults was also published during this time (Micallef et al., 2021). Of the 112 articles identified in this review, seven refer to the influence of online video games on PA. However, none of these seven articles concerns the specific practice of esports. Thus, these other reviews confirm the relevance of our own research work. Micallef et al. (2022) conducted another scoping review, identifying 23 health behavior influences in online gaming among emerging adults. These influences included family, virtual peers, characters, guild, console manufacturer or brands, esports events, esports organizations, and esports athletes. However, the impact, positive or negative, of these influences has not yet been studied.

Objectives

This systematic review of the literature on the links between esports and PA aims to identify the main findings to date, the questions that remain open, and the studies that need to be conducted in the near future to fill the knowledge gaps on the subject. The three main questions guiding this review were: (1) What are the PA levels of

esports players? (2) Do data exist on the influence of participation in esports on players' PA? (3) What future research questions can be derived from these results, and what studies should be conducted in the near future to fill the knowledge gap on this topic?

Method

Design and Protocol

The systematic review method provides a review of the existing literature that minimizes bias. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, which allow for the reproducibility of work and help authors transparently report their findings (Page, McKenzie, et al., 2021; Page, Moher, et al., 2021).

Eligibility Criteria

To clearly delineate our scope and answer our research questions, studies had to meet the predetermined selection criteria of Population, Intervention, Comparison, Outcome, and Study Design (PICOS) to be included:

- Population: The studies had to contain samples of healthy individuals over the age of 12 years.
- Intervention: Participants in the studies had to be competitive video game players participating in ranked games and/or online or offline competitions at different levels of engagement in the esports practice (e.g., recreational, amateur, or professional). Studies involving exergames were excluded because exergames induce higher energy expenditure, are not sedentary games, and are very rarely played competitively. Studies involving video games played recreationally, outside of a competitive setting, were also excluded.
- A comparison group was not required.
- Outcome: Studies had to report data on PA levels and/or influences on PA.
- Study Design: Studies had to be published (and peer-reviewed) in English and provide empirical data using quantitative, qualitative, or mixed methodologies.

Information Sources and Searches

To find all studies in the scientific literature related to the competitive practice of video games and PA that met our eligibility criteria, the PubMed database and three additional databases (Google Scholar, ResearchGate, and ScienceDirect) were searched, with no publication date restriction. Given the plurality of terms used to refer to esports in the literature, the search included several keywords: (electronic video game* OR competitive video game* OR pro game* OR professional video game* OR online game* OR sport video game* OR esports*) AND (sedentary OR physical activity OR physical inactivity OR inactivity) NOT (esporte OR deportiva OR sportivo). The exclusion of the term “esporte” avoided a profusion of studies written in Spanish referring to sport. This search strategy was developed in PubMed and then adapted to Google Scholar, ResearchGate, and ScienceDirect. Furthermore, the search comprised reference list searching, citation searching, and hand searching. Although the initial search started on May 15, 2021, data collection was extended to August 1, 2022. Until this date, we maintained a scientific watch through manual searches and searches of the studies' citation lists. The last study included was dated February 16, 2022, and unless we are mistaken, this work includes all eligible studies published before August 1, 2022.

Data Extraction Process

The procedure was performed using only free tools: the bibliography management software Zotero (5.0.84) and Microsoft® Excel (Mateo, 2020). Following the identification and deletion of duplicates, the articles were selected based on their title and abstract. Five exclusion criteria were retained and scored from 1 to 5:

- Criterion 1: It is not esports.
- Criterion 2: It is not about PA.
- Criterion 3: There is no empirical data input.
- Criterion 4: The population is not healthy or is under 12 years of age.
- Criterion 5: The study is unpublished.

Articles that appeared to meet the inclusion criteria, or for which there was doubt due to a lack of information, were exported for an eligibility check. Eligible articles were then read in their entirety for inclusion in the review or excluded based on the criteria. This method achieved our objective while minimizing the risk of error.

Risk of Bias

To assess the methodological quality of quantitative studies, we used the adaptation of the Newcastle-Ottawa Scale (NOS) adapted for cross-sectional studies (Herzog et al., 2013), which is described in the supplementary material. Studies are scored out of 10. For qualitative studies, the methodological checklist “Critical Appraisal Skills Program (CASP): Qualitative Research,” which provides key criteria relevant to qualitative research studies, was used. A score out of 10 was also obtained.

Synthesis of Results

To answer our research questions and clearly present the different results, we first described the geographical locations of the studies, the sociodemographic characteristics of the participants (gender and age), and the types of esports (games played and expertise levels). This allowed us to later examine whether these variables affected players' PA levels. We also documented the purpose of the studies, the methodologies and tools used to measure PA levels (and/or the influence of esports participation on PA), and the quality of the evidence. Results and data on PA levels and on the influence of esports participation on PA were summarized. When possible, we used the WHO recommendations of 150 minutes of activity per week as the standard to determine whether the majority (or average) of esports athletes in the studies appeared to be active or inactive. We presented the results for the full sample of included studies. We also presented the results for each level of expertise/esports player population, as well as for each game/game type and geographic region, when possible. Given the relative heterogeneity of the studies, no meta-analysis was undertaken.

Results

Study Selection

Searches on the PubMed, ScienceDirect, Google Scholar, and ResearchGate databases using key words identified 1,850 studies. Following the removal of duplicates, 1,785 studies remained. After reading the titles and abstracts, 1,755 studies were excluded. Thirty articles were then read in their entirety to assess eligibility. Eighteen of these 30 articles were excluded: three were not esports related, two were not PA related, 11 did not provide empirical evidence, and two were not published. Six additional studies were identified by checking the citation lists of the included articles. In the end, 18 studies were included in the review, with data from 7,442 participants. The process of selecting the studies is summarized in Figure 1.

Study Characteristics

These 18 studies were published between 2016 and 2022. Eight of the studies (2, 4–5, 8, 10, 13, 16, 18) had relatively small sample sizes (i.e., $n < 70$), and six studies (1, 11–12, 14–15, 17) had large sample sizes (i.e., $n > 720$).

Thirteen studies targeted a population of esports players from a specific country, such as Saudi Arabia (1), the United States (2, 4–5, 13, 18), Denmark (9), Indonesia (10), Portugal (11–12), Germany (14–15), or Malaysia (16). One ($n = 1$) study targeted and compared athletes from three different countries: South Korea, the United States, and Turkey (3). Four ($n = 4$) studies did not target any specific geographical area and included participants from 65 different countries in Latin America and Europe (17), or from mainly Europe and North America (6–8).

Most studies ($n = 11$) surveyed high-level athletes and/or athletes supervised by professionals within a structure (club, college, etc.). Five ($n = 5$) studies targeted college players (2, 4–5, 13, 18). Three ($n = 3$) studies focused on professional and/or high-level athletes (6–8). One ($n = 1$) reported data from club members who represented their country in international competitions (3). One ($n = 1$) targeted the top 50 players of a national competition (10).

Finally, the remaining seven ($n = 7$) studies targeted or distinguished between different levels of practice within their samples. Two ($n = 2$) focused on players of different levels participating in Portuguese Football Federation competitions (11–12). One ($n = 1$) focused on all esports players in Malaysia who participated in ranked games, national competitions, or international competitions (16). One ($n = 1$) distinguished between recreational players and players under contract participating in competitions (1). Another ($n = 1$) differentiated players according to their rank in their preferred games (17). The last two distinguished between occasional, regular, amateur, and professional players (14–15). These last four ($n = 4$) studies separated players of different levels into different outcome groups, while the first three ($n = 3$) did not distinguish between different levels of practice.

Only three ($n = 3$) studies specifically targeted players of a single game or type of game. Two of these targeted virtual football players (11–12), and one ($n = 1$) targeted players of a multiplayer online battle arena (MOBA) game

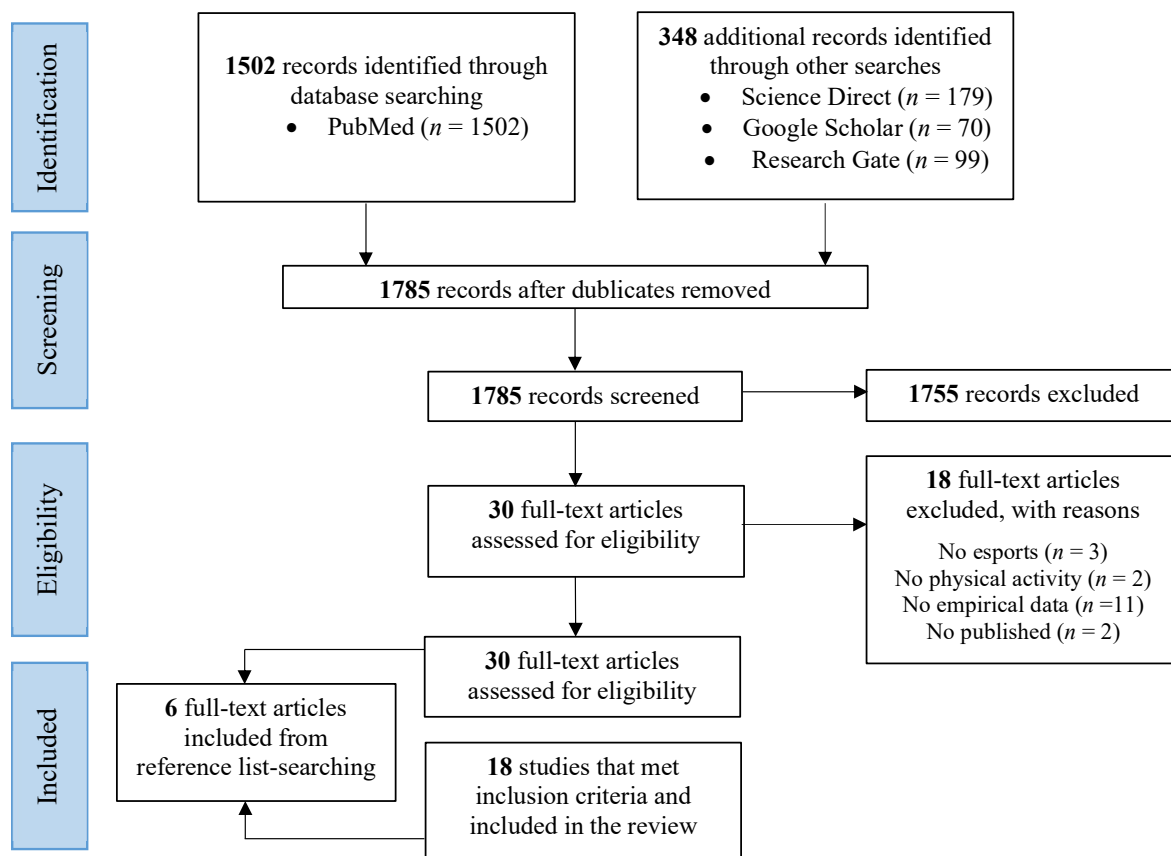


Figure 1. PRISMA flowchart for the study selection process

(10). One ($n = 1$) study differentiated the results according to the individual or collective nature of the game (player vs player or team vs team; 7). Eight ($n = 8$) studies recorded the games played, but did not differentiate the results according to the game played (5–9, 14–15, 17). Finally, six ($n = 6$) studies provided no information on the types of games played (1, 3–4, 13, 16, 18).

Male subjects were overwhelmingly represented in all studies. In eight ($n = 8$) studies, 100% of the subjects were male (2–6, 8, 10, 13). In only three studies were more than 10% of the subjects female (1, 16–17). Most participants in the studies were young adults aged between 18 and 25 years.

Finally, 17 ($n = 17$) studies aimed, among other things, to assess the PA levels of athletes (1, 3–18). Some had other objectives, such as implementing a health management model or assessing body composition, sedentary behavior, training habits, health-related lifestyle habits, common health issues, prevalence of MSK pain, the influence of player rank on health behaviors, the relationship between playing time and health behaviors, or the relationship between esports athletes' PA and other variables. The last study (2) aimed to describe the physiological and perceptual responses in a live esports tournament, but also measured PA to characterize the participants.

Methods of Included Studies

The studies used different methodologies to measure the athletes' PA. The study by Kari et al. (2019) was qualitative and used interviews. The study by DiFrancisco-Donoghue et al. (2020) was a cohort study. Sixteen ($n=16$) studies were cross-sectional and provided quantitative data. Only Bayrakdar et al. (2020) and DiFrancisco-Donoghue et al. (2020) used objective data (number of steps) to quantify PA. Bayrakdar et al. (2020) used self-reporting to obtain step count data and evaluated the athletes' PA (or inactivity) based on the graded step index introduced by Tudor-Locke et al. (2011). DiFrancisco-Donoghue et al. (2020) used a Fitbit activity tracker worn on the wrist to measure steps and compared the activity of athletes with age-matched non-athletic controls. These two studies also included data self-reported via questionnaires, as did all of the other 15 ($n = 15$) quantitative studies. In 14 studies ($n = 14$), the questionnaires were online. Eight ($n=8$) of these studies (1, 6, 9–13, 16) used the International

Physical Activity Questionnaire (IPAQ), a validated measurement tool, to classify participants into three different groups according to their PA (i.e., high, moderate, or low). The PA questionnaires of the other nine ($n=9$) studies were constructed by their authors. The studies of Pereira et al. (2019, 2021) were inspired by and used the Kari and Karhulahti (2016) questionnaire in their own questionnaires. Thus, in addition to references to the step scale and the IPAQ, the authors referred mainly to the WHO adult recommendations of 150 min/week.

Risk of Bias

The overall quality ratings for each study range from 1 to 7, with a mean of $M = 4.77$. Except for four ($n = 4$) studies (2, 4, 16, 18), all of the works provided satisfactory levels of evidence according to this scale. Most studies lost points due to the use of self-reporting measurement tools. Other biases and limitations, which may not be apparent from these scales, are highlighted below.

Physical Activity Level

In three ($n = 3$) studies, the majority (4, 17) or average (5) of esports players did not reach the WHO recommendations and appeared to be inactive. In another ($n = 1; 3$), they appeared on average as “low-active” according to the graduated step index of Tudor-Locke et al. (2011). On the contrary, in 13 ($n = 13$) studies, the majority (1, 6–8, 11–16) or average (2, 9–10) of esports players exceeded the WHO recommendations and appeared to be active.

Bayrakdar et al. (2020) and DiFrancisco-Donoghue et al. (2020) reported the average step counts of $6,646 \pm 3,400$ and $6,040.2 \pm 3,028.6$, which classified the players as “low active.” According to DiFrancisco-Donoghue et al. (2020), esports players were significantly less active than non-athletes ($p = 0.04$). The other study by DiFrancisco-Donoghue et al. (2019) reported that 40% did not participate in any form of PA. Finally, Trotter et al. (2020) showed that as a group, 80.3% of the esports players in the sample did not meet the WHO guidelines.

Still, the majority or average of esports players appeared active in 13 ($n = 13$) studies. Kari and Karhulahti (2016) reported that 88.7% of the professional and elite esports athletes in their sample engaged in PA, and that those over 18 years of age engaged in three times the WHO daily PA recommendations. The eight ($n = 8$) studies using the IPAQ showed that the majority or average of players were included in the high (6, 9–13, 16) or moderate (1) PA level category. According to the studies by Rudolf et al. (2019, 2022), 66.9% and 80.5% of the samples exceeded the health guidelines. Details of the results are available in Table 1.

The players in the studies on Saudi Arabia (1), Denmark (9), Indonesia (10), Portugal (11–12), Germany (14–15), and Malaysia (16) appeared to be active. Kari and Karhulahti (2016), on the other hand, reported no difference in the PA scores of high-level athletes in North America and Europe ($p > 0.05$). However, the study by Bayrakdar et al. (2020) that differentiates esports athletes from three countries reported that American players appeared less active than Turkish and Korean players ($p < 0.05$). The two studies by DiFrancisco-Donoghue et al. (2019, 2020) that surveyed college gamers in the United States also found that esports players were inactive. However, the American (high-level) subjects in the studies by Roncone et al. (2020) and Kari and Karhulahti (2016) appeared to be active.

The virtual football players in the Portuguese Football Federation (FPF) appeared to be very active (Pereira et al., 2019, 2021), as did the MOBA players in Indonesia (Paramitha et al., 2021).

The levels of PA were not always the same depending on the participants' level of expertise in esports. Trotter et al. (2020) showed that the top 10% of athletes were significantly more active than the other 90% ($p < 0.05$), and that the players' in-game rank was positively associated with the number of days they were physically active per week ($p < 0.01$). The studies by Kari and Karhulahti (2016), Kari et al. (2019), Giakoni-Ramírez et al. (2022), and Paramitha et al. (2021) targeting high-level and/or professional players reported that these players were very active. On the other hand, players who represented their countries in international competitions (3) and collegiate athletes (4–5), who are assumed to have a high level of expertise, did not appear to be very active, bringing into question the idea that high-level esports players are more active.

AlMarzooqi et al. (2022) and Rudolf et al. (2019, 2022) also found no significant difference in PA levels between paid competitive esports players and recreational players ($p = 0.898$), or according to the players' level of expertise ($p > 0.05$). All the players in their samples were active.

Sixteen ($n = 14$) studies did not provide data on the nature of the PA practiced (1–6, 9–10, 13, 15–18). In three ($n = 3$) studies, information was provided on the supervision and planning of PA (7, 11–12). According to these studies, 70.4%, 51%, or 60% of players would plan their own exercise. For 4.4%, 16%, or 18.84%, planning was done by an e-sports coach, while for 5.2% or 13.49%, it was done by a personal trainer (7, 11–12). Through their interviews, Kari et al. (2019) reported that some players jogged, played football in a club, or did weight training at home or in a gym. Rudolf et al. (2019) showed that 36% of their sample practiced fitness, 28.4% cycling, 28.3%

Table 1. Summary of included articles

Study	Location; year	Study aims	Sample size (% males)	Age; location of participants; mean (SD)	Level and esports practiced	Study design; method overview	Results; mean (SD)	Inactive?; findings	NOS or CASP
(1) AlMarzooq et al., 2022	Saudi Arabia; 2021	To determine the prevalence and relationship between symptoms of nomophobia, psychological aspects, insomnia, and PA of esports players in Saudi Arabia	893 (76.6%)	Age (years) = 18-25 (n=501), 26-30 (n=207), ≥31 (n=185)	Esports players (competition, with work contract or salary; n=216); recreational gamers (n=677); nr	Cross-sectional; self-reported electronic questionnaire; IPAQ	Low PA (n=25), moderate PA (n=63), high PA (n=235); both groups had a similar percentage of participants with vigorous/moderate/low PA	Active; 26.3% were included in the high PA level category, 70.9% moderate level, 2.8% low level; no significant difference in PA levels between paid competitive esports players and recreational players ($p=0.898$)	4
(2) Andre et al., 2020	USA; 2018	To describe the physiological and perceptual responses in a live collegiate esports tournament	14 (100%)	Age (years) = 19.8 (1.0)	University of Mississippi Esports team; Overwatch (n=4), Super Smash Bros (n=3), RL (n=2), CS (n=2), CoD (n=3)	Cross-sectional; self-reported questionnaire	PA (h/week) = 3.9 (2.4); PA (days/week) = 3.5 (2.2)	Active	3
(3) Bayraktar et al., 2020	Turkey, South Korea, USA; nr	To determine the effect of esports on PA level and body composition	137 (100%)	Age (years) = 19.92 (2.21); Turkey (n=27), USA (n=63), South Korea (n=47)	Licensed in a club and representing their country in international competitions; nr	Cross-sectional; self-reported data received by email from esports clubs	PA steps = 6,646 (3,400); Turkey PA steps = 7,909 (2,982), South Korea PA steps = 7,785 (3,018), USA PA steps = 5,255 (3,350)	"Low-active"; there were no significant relationships between playing time and BMI and the number of PA steps ($p>0.05$). However, as playing time increased, BMI increased and the number of PA steps decreased	5
(4) DiFrancisco-Donoghue et al., 2019	USA, Canada; nr	To determine the lifestyle/health habits of college athletes; report on common health issues that arise in competitive gaming and present a health care model for institutions to help them create protocols to prevent and treat common health issues in esports athletes	65 (100%)	Age (years) = 18-22; eight different universities in the USA	Collegiate esports players; nr	Cross-sectional; self-reported electronic questionnaire	40% did not participate in any form of PA	Inactive	1
(5) DiFrancisco-Donoghue et al., 2020	USA; nr	To examine the activity levels, BMI, and body composition of college esports players compared with age-matched controls	24 (100%); esports players (n=13) & controls (n=11)	Age (years) = 20.2 (1.7); esports), 19.2 (1.3; controls)	Collegiate esports players who were members of the American Collegiate East Coast Esports League; MOBA and FPS. High platinum/low diamond ranked team in Overwatch and Platinum I/Diamond4 for MOBAs	Cohort; Fitbit Charge activity tracker worn 24 h/day for 14 days; self-reported questionnaire	Step count 6,040.2 (3,028.6) vs 12,843.8 (5,661.1); PA (days/week) 1.7 (1.9) vs 4.8 (1.2); Exercise (min/session) 39.5 (40.4) vs 56.7 (26.8)	Inactive or "low-active"; collegiate esports players were significantly less active than non-esports players ($p=0.04$)	6

Study	Location; year	Study aims	Sample size (% males)	Age; location of participants; mean (SD)	Level and esports practiced	Study design; method overview	Results; mean (SD)	Inactive?; findings	NOS or CASP
(6) Giakoni-Ramirez et al., 2022	European and Latin American countries; 2021	To analyze the relationship between PA levels and motivational orientations in an international sample of professional esports players	260 (100%)	Age (years) = 21.30; Spain (n=56), Germany (n=43), Sweden (n=44), Chile (n=23), Argentina (n=26), Brazil (n=42), Mexico (n=26)	Professional players; LoL (n=116), CS (n=86), Hearthstone (n=6), CoD (n=18), FIFA (n=7), Clash Royale (n=22), RL (n=5)	Cross-sectional; self-reported electronic questionnaire; IPAQ	Europe PA (METs) = 2,533.23 (2,017.71), Latin American PA (METs) = 2,428.55 (1,437.69)	Active; 48.5% were included in the high PA level category, 44.2% moderate level, 7.3% low level; extrinsic and intrinsic motivation were inversely correlated with energy expenditure ($r=-0.158$; $r=-0.174$)	5
(7) Kari & Karhulahti, 2016	Europe, North America, and others; 2015-2016	To study the training habits of elite e-athletes, with a particular focus on exercise habits	115 (97.39%)	Age (years) = -19 (n=50), 20-24 (n=49), 25-29 (n=12), 30- (n=4); Europe (n=63), North America (n=35), other (n=11)	Professional players (n=31), high-level players (n=84) ranked in the best of their games; Pvp games (n=31), team games (n=78), N/A (n=6); CS (n=51), SC2 (n=15), DOTA2 (n=14), LoL (n=12), other (n=23)	Cross-sectional; self-reported electronic questionnaire	PA (h/day) = 1.08 (0.83); 88.7% of professional and elite e-athletes practiced PA; 81.7% reported having a PA program; 70.4% planned their own PA, 5.2% planned by personal coach, 4.4% by team coach; 18.3% had no training plan; main reason for physical training: physical health (47%), physical appearance (17.4%), to be more successful in esports (8.7%), physical capacity (7.0%), fun or enjoyment (5.2%)	Active; elite e-athletes aged 18 and older engaged in more than three times the WHO daily activity recommendation	7
(8) Kari et al., 2019	USA, Europe; 2017-2018	Extensively revise the authors' previous study (2016) on the training routines of professional and high-level esports players, with an additional focus on their PA	7 (100%)	Age (years) = 18-25; North America (n=2), Europe (n=5)	North American TOP 200 LoL players studying at an American university on an esports scholarship (n=2), international competitors on Hearthstone (n=1), Tekken (n=1), and DOTA (n=2), challenger on LoL (n=1)	Qualitative interviews	Roughly an hour of PA per day; different types of PA: running, soccer, weight training, walking; they believed PA to be useful against injuries, but practiced mainly for health benefits (to boost concentration, mood, and energy), stretching against pain; no PA plan; coaches and their teams recommended 1-2h of PA per week; difference in training between Hearthstone players and others	Active; players believed in the benefits of exercise, but coaches and their teams sometimes thought it to be of little importance; there was a discrepancy between the players' attitudes towards exercise and the amount of exercise they did; PA seemed largely unstructured and unsystematic; the reasons for practicing PA were more related to an awareness of the benefits of a healthy lifestyle than to a desire to enhance esports performance	7

Study	Location; year	Study aims	Sample size (% males)	Age; location of participants; mean (SD)	Level and esports practiced	Study design; method overview	Results; mean (SD)	Inactive?; findings	NOS or CASP
(9) Lindberg et al., 2020	Denmark; 2019	To investigate (1) the prevalence of MSK pain, (2) the association between MSK pain and esports-related training volume, and (3) the association between MSK pain and PA levels	188 (97.9%)	Age (years) = 17.1 (2.3); Denmark	Structured esports athletes (training with coach) in an educational institution (n=146), community-based team (n=30), pro-team (n=4), or other (n=8); CS (n=109), LoL (n=51), other (n=28)	Cross-sectional; self-reported electronic questionnaire; IPAQ	MSK pain group PA (METs min/week) = 3,722.4 (3,667.3); no MSK pain group PA (METs min/week) = 3,641.3 (4,563.1)	Active; athletes were included in the high PA level category; there was no significant correlation between MSK pain and PA levels ($p=0.906$)	7
(10) Paramitha et al., 2021	Indonesia; 2019	To determine the PA level of Indonesian professional athletes, to gather preliminary data for recommendations to major esports organizations or sports policymakers in future esports development efforts	50 (100%)	Age (years) = 21.5 (1.01); Indonesia	Players qualified for the final round (top 50) of the national competition, the 2019 Esports Presidential Cup; MOBA	Cross-sectional; self-reported questionnaire; IPAQ	PA (METs min/week) = 3,120.2 (24.3)	Active; players were included in the high PA level category	6
(11) Pereira et al., 2019	Portugal; nr	To assess the PA and sedentary behavior levels of e-athletes participating in FFP esports competitions	721 (99%)	Age (years) = 24 (6); Portugal	Players participating in FFP esports competitions; Virtual Football	Cross-sectional; self-reported electronic questionnaire; IPAQ	PA (METs) = 4,332 (IQR=4,673); 51% planned their own physical training; 16% had PA planned by their esports team coach; main reason for physical training: health (32%), physical capacity (24%), esports performance (6%)	Active; 73% were included in the high PA level category; 15% moderate level, 12% low level	4
(12) Pereira et al., 2021	Portugal; 2018	To conduct a preliminary assessment of the PA levels, sedentary behavior, and physical training habits of adult virtual soccer players in Portugal	926 (98%)	Median age (years) = 22 (IQR=8); Portugal	Players participating in FFP esports competitions, from recreational to professional; Virtual Football	Cross-sectional; self-reported electronic questionnaire; IPAQ	Median PA (METs) = 5,625 (IQR=4,911); 60.0% planned their own PA, 18.84% planned by team coach, 13.49% by personal coach; main reason for physical training: physical health (66.7%), physical capacity (49.53%), fun or enjoyment (41.40), physical appearance (40.47%), to be more successful in esports (6.05%)	Active; 84.53% were included in the high PA level category; 87.07% met WHO recommendations	6
(13) Roncone et al., 2020	USA; nr	To analyze the relationship between the PA and mental toughness of esports athletes	34 (100%)	Age (years) = 20.02 (1.46); USA	Collegiate esports players from one large major NCAA Division I public university	Cross-sectional; self-reported questionnaire; IPAQ	PA (days/week) = 5.8; PA (min/day) = 69; n=33 (97%) engaged in vigorous PA for at least 2 days and up to 7 days per week	Active; 88% met WHO standards; moderate and vigorous PA seemed to be associated with higher levels of mental toughness	6

Study	Location; year	Study aims	Sample size (% males)	Age; location of participants; mean (SD)	Level and esports practiced	Study design; method overview	Results; mean (SD)	Inactive?; findings	NOS or CASP
(14) Rudolf et al., 2020	Germany; 2018	To assess the demographic characteristics and health behaviors of video game and esports players; possible associations between video game time and health behaviors were also examined	1,066 (91.9%)	Age (years) = 22.9 (5.9); Germany	Professional players (n=14), former professional players (n=33), amateurs (n=355), regular players (n=577), occasional players (n=87); CS (n=522), LoL (n=157), PUBG (n=51), Fortnite (n=50), FIFA (n=45), Dota 2 (n=43), Overwatch (n=24), R6 (n=21), RL (n=19), WoW (n=12), other (n=122)	Cross-sectional; self-reported electronic questionnaire	N=713 (66.9%) engaged in moderate to vigorous PA for more than 2.5 h/week; 57.5% of the players who participated in tournaments and official leagues engaged in structured training; they believed good physical condition had very positive (32.2%) or positive (48.1%) effects on in-game performance	Active; no statistically significant or relevant association found between video game time and sleep parameters, PA, and fruit and vegetable consumption (rho<0.10)	6
(15) Rudolf et al., 2022	Germany; 2019	To investigate the media usage, sleep behavior, stress, and well-being of video game and esports players and the association with health	1,038 (91.2%)	Age (years) = 23 (5.4); Germany	Professional players (n=26), former professional players (n=36), amateurs (n=282), regular players (n=545), occasional players (n=149), tactical shooters (n=581), MOBA (n=197), sport and racing simulations (n=90), battle royales (n=58)	Cross-sectional; self-reported electronic questionnaire	N=819 (80.5%) engaged in PA for more than 2.5 h/week; PA (h/week) = 8.8 (10.7); professional PA (h/week) = 7.3 (7.7); former professional PA (h/week) = 10.3 (13.2); amateur PA (h/week) = 8.7 (9.6); regular PA (h/week) = 9.0 (11.4); occasional PA (h/week) = 8.5 (9.9)	Active; esports players showed sufficient general health and had predominantly positive health behaviors; no statistically significant difference in PA levels between groups of players at different levels ($p>0.05$)	6
(16) Seng et al., 2021	Malaysia; nr	To study the common health issues among esports players	69 (86%)	Age (years) = 18-21 (n=9), >21 (n=60); Malaysia	Ladder/ranking players (n=37, 53.6%), national tournament players (n=26, 37.7%), world tournament players (n=6, 8.7%); nr	Cross-sectional; self-reported electronic questionnaire; IPAQ	nr	Active; 60.9% (n=42) were included in the high PA level category	3
(17) Trotter et al., 2020	65 countries; nr	To investigate the association between obesity, self-reported PA, smoking, alcohol consumption, and perceived health in esports players and the influence of player rank in the game	1,772 (87.2%)	65 countries; USA (n=290), Australia (n=180), Canada (n=75), Germany (n=41), UK (n=26)	Top 10% in-game rank (n=124), 80-89% top in-game rank (n=97), 70-79% top in-game rank (n=102), 0-69% top in-game rank (n=360); 5 esports	Cross-sectional; self-reported electronic questionnaire	Rank 0-69% PA (days/week) = 2.30 (1.98); rank 70-79% PA (days/week) = 2.72 (2.25); rank 80-89% PA (days/week) = 2.47 (2.23); top 10% PA (days/week) = 2.81 (2.09)	Inactive; 80.3% did not meet the WHO recommendations; players' in-game rank is positively associated with the number of days they were physically active per week ($p<0.01$); top 10% in-game rank were significantly more active than the remaining 90% of esports players ($p<0.05$)	5

Study	Location; year	Study aims	Sample size (% males)	Age; location of participants; mean (SD)	Level and esports practiced	Study design; method overview	Results; mean (SD)	Inactive?; findings	NOS or CASP
(18) Zwiibel et al., 2019	USA; nr	To understand the lifestyle behaviors, exercise habits, and common injuries of esports players in the collegiate setting	63 (94%)	Age (years): 18-22; eight different colleges and universities in the USA	Collegiate esports players; nr	Cross-sectional; self-reported electronic questionnaire	65% (n=41) PA ≥30 min/day, PA (days/week) = 3 (1.7); 24% (n=15) reported no PA; 64% (n=40) reported being conscientious about exercise	nr	1

nr: not reported; IQR: interval quartile range; IPAQ: International Physical Activity Questionnaire; NOS: Newcastle-Ottawa Scale adapted for cross-sectional studies; CASP: Critical Appraisal Skills Program Qualitative Research; CoD: Call of Duty; CS: Counter Strike; LoL: League of Legends; RL: Rocket League; WoW: World of Warcraft; “active” and “inactive” are defined according to the WHO standard; “low-active” is defined according to the graded step index introduced by Tudor-Locke et al. (2011).

running or walking, 17.6% football, 18.5% other ball sports, 11.6% swimming, 5.7% martial arts, 3.5% athletics, 1.9% yoga/Pilates, and only 16.5% did not practice sports. However, the study did not distinguish between the different activities practiced according to the participants’ level of expertise.

Bayrakdar et al. (2020) did not report statistically significant relationships between playing time and BMI and the number of PA steps ($p > 0.05$). However, they noted that as playing time increased, BMI increased and the number of PA steps decreased. Rudolf et al. (2019) found no statistically significant association between playing time and PA ($\rho < 0.10$). Finally, Trotter et al. (2020) found that play time was significantly associated with higher in-game rank ($p < 0.001$), levels of perceived PA ($p < 0.001$), and the number of days players were physically active per week ($p < 0.01$).

Influence of Esports on Physical Activity

None of the included studies provided data on the influence of esports practice on PA. However, five ($n = 5$) studies provided data on the reasons players may have had for engaging in PA (8–9, 11–12, 14). Rudolf et al. (2020) reported that 32.2% believed that physical fitness had very positive effects on in-game performance, and 48.1% believed it had a positive effect. In the studies by Kari and Karhulahti (2016) and Pereira et al. (2021), 55.6% and 38.66% of the subjects believed that incorporating exercise into their training programs had a positive effect on their esports performance. However, Pereira et al. (2021) also noted that for 45.11%, PA had no effect on in-game performance. Worse, for 4.77%, PA even had a negative effect on performance. Thus, Kari et al. (2019) reported that professional and elite esports players’ reasons for exercising so much were not due to their desire to improve their performance in competition, but rather to their awareness of the benefits of a healthy lifestyle. According to Kari and Karhulahti (2016), 47% of the subjects exercised primarily to maintain good health, and 8.7% thought the main purpose of exercising was to become more successful in esports. According to Pereira et al. (2021), 32% and 66.7% of the subjects also did physical training mainly to maintain or improve their physical health, and 6% and 6.1% of the subjects responded that they were active to be more successful in esports. Thus, they mainly perceived improved performance to be a desirable consequence, among many others, of good health. Moreover, the subjects interviewed by Kari et al. (2019) confirmed that, in their opinion, good physical health acquired through exercise improved concentration, mood, and energy levels, which helped them focus during daily training and tournaments.

Other main reasons for engaging in PA were given. According to these studies, 17.4% and 40.47% of the subjects exercised mainly to improve their physical appearance; 7%, 24%, and 49.53% to improve their physical capacities; and 5.2% and 41.40% for fun. In the latest study by Pereira et al. (2021), participants could give more than one answer to the question “What is your main reason for doing physical training?” Some may also have sought to improve their physical appearance to perform better, since 29.6% of the subjects in the study by Kari and Karhulahti (2016) believed that physical appearance could influence the competitive performance of others, and 18.3% reported having been personally intimidated by the physical appearance of an opponent.

On the other hand, according to Kari et al. (2019), the media coverage of professional players who engaged in physical training could also encourage amateurs to engage in PA, as they would mimic their idols. Finally, players

on some teams could be encouraged to engage in PA by their coach (or equivalent); for example, the coach from the study by Kari et al. (2019) recommended 1–2 hours of exercise per week. Despite this, according to the studies, only 4.4%, 16%, and 18.84% of esports players were engaging in PA planned by the team coach; 70.4%, 51%, and 60% planned their own exercise (7, 11–12). In addition, Kari et al. (2019) also noted a discrepancy between some players' positive attitudes towards PA and the exercise they practiced, which remained unstructured and unsystematic.

Discussion

Summary of Evidence

In 13 ($n = 13$) studies, the majority (1, 6–8, 11–16) or average (2, 9–10) of esports players exceeded the WHO guidelines and could be considered active, while in four studies ($n = 4$), they did not reach the WHO guidelines and were considered inactive (4–5, 17) or “low-active” (3).

Virtual footballers seemed more active than players of other esports (11–12). This is in accordance with previous studies that showed correlations between playing sports video games and PA (García & Murillo, 2020; Ng et al., 2022). Some authors, for example, have shown that participation in sports simulations (e.g., FIFA Soccer or Madden NFL) can increase engagement in real sports (Adachi & Willoughby, 2015; Jenny et al., 2017; Jenny & Schary, 2014), or have hypothesized that players who engage in virtual football simulations are first and foremost football fans, and only secondarily virtual football fans (Peter, 2007).

High-level esports athletes seemed more active than lower-level players. However, some data showed no correlation between the level of expertise in esports and the level of PA (AlMarzooqi et al., 2022; Rudolf et al., 2019, 2022). Some theoretically high-level players even appeared to be inactive (3–5), while some lower-level players seemed to be equally or even more active (14–15). These results may corroborate the idea that video games and sports are not opposed (Peter, 2007). Nevertheless, data is lacking on players of specific types of games and at different levels to more precisely determine the impact of these variables on players' PA.

Factors other than players' levels of expertise may influence differences in PA outcomes. While playing esports in a structured setting with coaches appears to be associated with higher levels of PA, not all clubs, teams, or universities place the same importance on PA. For example, the studies by DiFrancisco-Donoghue et al. (2019, 2020) and Roncone et al. (2020), which examined samples of college players in the United States, presented conflicting results. Beyond potential differences in the levels of college student athletes (Roncone et al., 2020), these differences were primarily due to the specificities of different institutions which, like professional structures, do not integrate exercise into training in the same way. Esports athletes do not receive the same level of professional support from one college to another in terms of PA (e.g., physical trainers, health staff, sports coaches, PA service, nutritional advice, etc.; DiFrancisco-Donoghue et al., 2019). Instead, some players/university teams may be more community oriented, while others focus more on the competitive aspect (Eckman, 2021).

Furthermore, the methodological tools used in the studies seem to influence their results. Indeed, the only two studies relying on objective measurements of the number of steps to measure esports players' PA concluded that they were “low-active” or inactive (Bayrakdar et al., 2020; DiFrancisco-Donoghue et al., 2020). In contrast, the eight ($n = 8$) studies using the self-reported IPAQ survey found that the players had mainly high or moderate PA levels (1, 6, 9–13, 16). The questionnaire used by Trotter et al. (2020) showed that participants were very inactive.

Different geographical areas could also explain the differences in results. Players from certain countries appeared to be more active (Saudi Arabia, Denmark, Indonesia, Portugal, Germany, and Malaysia), and those from other countries appeared to be less active (United States). However, some of the data were contradictory and were probably confounded by the influence of other variables on PA levels. Thus, data on populations of esports athletes in specific geographical regions are insufficient to reach a conclusion on this.

Beyond the levels of PA, it seems important to distinguish between the nature of PA and how it is practiced (modalities) according to the different types of players (e.g., level, game, etc.). Indeed, some players seemed to practice PA under the supervision of trainers or exercise professionals (e.g., weight training with a trainer or playing football with a trainer), while others engaged in PA autonomously, structuring their own training (e.g., weight training alone at home or running near their home). Differences can also be observed from one esports team to another: some schedule and supervise their players' exercise, while others do not cover these aspects of training. Thus, professional players would be more likely to be required to engage in PA in a supervised manner within their organization. Some players also engaged in PA in a formal and institutional manner (e.g., playing with a football club within a federation), or in an informal and self-organized manner (e.g., playing street football with friends). Thus, rather

than only being esports players, many of them could be first and foremost football players in their own right within a club. This also raises questions about their motivations to play these specific sports. Many players engage in PA for the intrinsic pleasure they get from it, independently of any esports practice. Others exercise for utilitarian purposes and as a complement to esports to improve their performance in the game. These players would not have the same physical commitment if they were not esports players. These motivations to practice are also questionable for the many players who claim to exercise to maintain and improve their health. Do they want to improve their health because they are aware that the sedentary practice of esports can have harmful effects, or would they also engage in sport to improve their well-being and health if they did not practice esports?

Methodological Limitations

Some of the methodological tools used may have limitations. First, self-reporting is the biggest methodological limitation. These questionnaires are often sent out on the social media of gaming communities (e.g., *Discord*, *Reddit*, or *Twitter*), which leads to self-selection of the subjects who volunteer to answer them. Thus, those who engage in PA might be more inclined to voluntarily respond to a questionnaire assessing their PA levels. The second problem with self-reporting is the definition of the level of esports expertise. Subjects may self-report playing at a high level and exaggerate their level. Finally, subjects may also be led to overestimate their results and their level of PA. It is well known, for example, that individuals under-report their weight and over-report their height and activity level (Sallis & Saelens, 2000) as the result of a social desirability bias (Adams, 2005; Furnham, 1986; Podsakoff et al., 2003). Recall (or memory) biases can also distort results. Respondents may have difficulties recalling all of the PA performed, especially when recall is required beyond 24 hours (Jacobs et al., 1993).

In addition, some of these questionnaires are not standardized and ask subjects about their PA in different ways, which may lead to different results. These questionnaires may also be biased, such as the one by Trotter et al. (2020), which measured PA using the questions “How many days per week do you participate in sport or PA for a total of 30 minutes or more per day?” and “How many days per week do you participate in sport or PA for a total of 60 minutes or more per day?” Only 19.7% of the subjects exceeded 30 min/day of PA five times a week, which led them to conclude that 80.3% did not meet the WHO recommendations. However, in addition to recommending 30 min/day five times a week, the WHO also recommends 150 min/week of moderate-intensity activity. Moreover, their questions do not ask for any details on the intensity of the exercise, despite the WHO considering 75 minutes per week enough to be considered active if the activity is of sustained intensity. Thus, an individual who performs an activity with sustained intensity twice a week for 45 minutes will appear inactive according to the questionnaire in this study, but active according to the WHO. The same applies to an individual who performs moderate-intensity activity for 1.5 hours twice a week.

The objective measurement of steps using a pedometer also has limitations, such as not measuring the intensity of PA and horizontal or upper body movements (Reiser & Schlenk, 2009). For example, the many players who participate in weight training may be able to achieve a significant amount of PA without a significant increase in their number of steps. Furthermore, if the measurement is accurate to 96% above a walking speed of 3 mph (Melanson et al., 2004), the pedometer algorithm, the position of the sensor on the body, or differences in the regularity of walking during different activities can all be sources of error (Mattfeld et al., 2021). We can also question the characteristics of the control group used by DiFrancisco-Donoghue et al. (2020) since the study provided little information about the 11 subjects in this group. According to the Tudor-Locke and Bassett graduated step index, their step counts classified them as “very active,” which suggests that these individuals may be very athletic.

Another limitation could be related to the representativeness of the subjects in relation to all esports players. Female subjects were absent in most studies, while 35% of individuals who play esports games (Interpret, 2019) and 5% of professional gamers are female (Hilbert, 2019). The same applies to age: most of the subjects in the studies were between 18 and 25 years old. However, many esports players are children and teenagers under the age of 18. Nevertheless, studying this age group seems to be the most important from a public health perspective, as the literature agrees that this period is decisive for the adoption of health-related behavioral habits later in life. Studying the influence of esports for this age group also seems more relevant because the PA of children and young adolescents is influenced mainly by parental choices (Gatouillat et al., 2020). Beyond that, while a large percentage of esports players are Asian, the studies included in this review mainly targeted European and North American audiences. Finally, some players of specific game genres did not appear to be taken into account (e.g., fighting games and sim racing). Thus, certain populations of players seemed to be absent from these studies.

These different populations of esports athletes of different levels and different games were not always differentiated and compared in the results. The impact of the different games on PA was not investigated. As for differences

according to the level of expertise in esports, only five ($n = 5$; 1, 7, 14–15, 17) of the seven ($n = 7$; 11–12) studies that surveyed players of different levels distinguished between them in the outcome groups. Furthermore, the levels of the participants in the studies were not always clear. For example, the group “club players who have represented their country in international competitions” can cover a wide range of levels, as can the group “players who participate in competitions and receive a salary.” Therefore, without additional information on these topics, the level of these players is unclear.

Finally, the cross-sectional nature of 16 ($n = 16$) of the 18 ($n = 18$) studies also represented a limitation. Because of the cross-sectional design, the direction of causality remains uncertain. Indeed, if playing time is correlated with a decrease in PA, are players inactive because they have a high playing time, or do the players have a high playing time because they are basically inactive? Thus, this cross-sectional observation criterion only allows us to know the PA levels of esports players at a given time, to establish correlations between esports practice (and the different specificities of expertise level and game) and PA. It is also not possible to identify the precise influence of esports on PA levels. Indeed, although esports players are inactive according to these studies, one can imagine that they were as or more inactive before starting to play esports, or that they would be as or more inactive if they did not play esports. Therefore, measuring the influence of playing esports on PA seems relevant.

Influence of Esports on Physical Activity

While some studies have investigated the influence of exergames (Chan et al., 2019; Li & Lwin, 2016; Navarro et al., 2020), augmented reality games such as Pokémon Go (Koivisto et al., 2019; Wong, 2017), or sports simulation games (Adachi & Willoughby, 2015) on PA, we found no studies providing data on the influence of esports on PA. However, several studies have suggested that playing esports can potentially lead to an increased awareness of the importance of PA or be a relevant medium for promoting PA among a young population (Chan et al., 2022; Ketelhut et al., 2021; Micallef et al., 2022; Polman et al., 2018; Schary et al., 2022). There are several reasons why a player might want to exercise: to improve in-game performance, to improve their physical appearance, to reduce or prevent injury and be healthy, or to improve mental toughness. Scientific literature on the effects of PA on esports performance is growing (Kosmina, 2020; Toth et al., 2020). However, according to Kari et al. (2019) and Pereira et al. (2021), esports players engaged in PA more to gain the benefits of a healthy lifestyle than to improve their in-game performance. Some studies on player training have also tempered this idea by showing that most players did not consider physical fitness as a determinant of their performance (Nagorsky & Wiemeyer, 2020; Pereira et al., 2021). Furthermore, awareness of the benefits of PA and a healthy lifestyle is not enough to actually engage in PA. Thus, there could be a gap between the discourse or attitude towards PA and the actual level of PA (Baumann et al., 2022; Kari et al., 2019). Beyond these potential motivations, some players would have no choice but to engage in PA when joining certain teams that place importance on physical exercise in their training. This could become even more pronounced in the future, as the professionalization and sportification of esports means that physical fitness and well-being will become the new norms in the training of esports teams (Pargman & Svensson, 2019). On the other hand, by seeing professionals train physically to perform, some amateurs could also be led to engage in PA to imitate their idols. Finally, PA and esports are far from being incompatible activities: a player motivated by competition may be led to engage in esports and in PA and sport with equal enthusiasm, regardless of their virtual or physical nature.

Measuring the influence of esports on PA requires methodological reflection. Numerous studies, mainly from the social sciences, have focused on the determinants of PA (Gatouillat et al., 2020) and can offer tools to study the influence of esports on physical practice. Some approaches focus on the levers of PA (ecological model [Bauman et al., 2012; Hu et al., 2021; Martins et al., 2015; Moulds et al., 2022; Spence & Lee, 2003] or leisure constraints model [Crane & Temple, 2015; Witt & Dangi, 2017]), while others are more interested in the description of PA paths over time (retrospective or longitudinal methods [Bentzen et al., 2021; Bidart, 2013; Forté, 2006; Lafabrière, 2020; Gardner et al., 2017; Joncheray et al., 2015]). Depending on the methodologies, these approaches make it possible to describe the phenomenon and/or explain and understand it. Thus, they could allow researchers to describe the influence that esports can have on PA, as well as explain and understand the underlying reasons players engage in, continue, resume, or abandon PA. Based on these different approaches, different quantitative and qualitative methodologies appear to be complementary. Following the example of Schary et al. (2022), we encourage the implementation of longitudinal cohort studies, such as the recent study by Giakoni-Ramírez et al. (2021), which undertakes a one-year follow-up with 53 professional esports players to observe the influence of esports on body composition. Finally, semi-structured interviews appear to be essential for understanding the influence of esports on PA.

Limitations with this Review

The results of this review must be interpreted with caution due to the limitations of our study. The biggest limitation is that the data extraction procedure was not performed by several people independently due to a lack of resources. The same applies to the evaluation of the evidence. Another limitation that can be noted is related to the databases explored. It might have been appropriate to explore databases other than PubMed, Google Scholar, and ResearchGate. However, searching for the articles cited by the studies and the articles that cited the studies greatly reduces this bias. Although English is the universal language of research, the restriction to English-language articles might also be a limitation given the popularity of esports in Asia. Finally, the small number ($n=18$) of existing and included studies on a topic as complex and multi-faceted as esports (different games, modalities, and levels of expertise) and PA prevents us from establishing meaningful conclusions that could resolve important controversies.

Implications

Further quantitative research with different populations of esports athletes is welcome. These studies should clearly specify the levels of expertise of the subjects and the types of games played. These studies could provide data on a population of players of specific game genres and levels, such as high-level sim racing players or amateur fighting game players. These studies could focus on a specific geographical region or study players from different geographical regions. They might also choose to examine players from different games and of different levels within the same study. It would then be important to differentiate and compare players in the results according to geographical region, game genre, and level to better understand the impact of these variables on PA.

Data on the nature of PA are expected (e.g., running, weight training, football, basketball, cycling, etc.). It would also be interesting to differentiate these activities according to the level and type of sport. Beyond the nature of the activities, details on their modalities are welcome. We invite future studies to characterize the PA of esports players according to whether it is formal (institutionalized practice in a club or sports federation) or free and informal (self-organized; Crosset & Beal, 1997; Travert & L'Aoustet, 2003). Types of PA can also be differentiated according to whether they are supervised by professionals. Finally, physical practice can also be differentiated according to whether players consider it to be independent of their esports practice or a complementary activity (i.e., activity and utilitarian function linked to esports). We imagine that these modalities and motives evolve depending on the level of expertise (e.g., professional or amateur), or even according to the type of game played. Thus, how does a player's level and the game they play influence the nature and modalities of the PA they engage in?

In addition, the inclusion of data on the different relationships between playing time, sedentary time, level of expertise, and PA levels is encouraged.

No measurement tool is perfect; the researcher must be aware of the strengths and weaknesses of each tool. Given the almost exclusive use of self-reported questionnaires and their limitations, we strongly encourage the use of objective measurement tools to assess subjects' activity levels. These have greater validity, greater reliability, and less variability in results (Dowd et al., 2018). While pedometers are a valid and reliable tool that can be used to assess the step counts of subjects (Dowd et al., 2018), triaxial accelerometers could be a good choice for assessing more complex movements (Arvidsson et al., 2019; Trost et al., 2005). However, while they are reliable tools, they also have limitations. Non-ambulatory and static activities such as cycling or weight training will remain poorly distinguished. While accelerometers are equally accurate when worn on the hip or wrist (Migueles et al., 2017; Vanhelst, 2019), we recommend removing accelerometers that are worn on the wrist during periods of playing, as some games require players to make hundreds of small movements per minute with their forearm, wrist, and hand. Since the tool is unable to correctly distinguish between two activities that produce similar total acceleration over time but have different energy costs, it could incorrectly record activity levels (Farrahi et al., 2019). Given these limitations, the use of a heart rate measurement could represent an interesting option for determining energy expenditure, and therefore PA levels. However, the accuracy of the heart rate measurement is limited during low levels of PA because the pulse rate is relatively stable, but the heart is always being used. Heart rate can also be affected by stimuli other than PA, such as medication, medical conditions, or stress levels (Ainsworth et al., 2015; Garet et al., 2005), and therefore by play as well (Valladão et al., 2020). Heart rate monitors and accelerometers would also tend to underestimate energy expenditure (Dowd et al., 2018). Given these limitations, the use of measurement tools that combine both an accelerometer and a heart rate monitor may be a relevant solution (Butte et al., 2012), although these tools tend to overestimate energy expenditure (Dowd et al., 2018). These different tools also have the advantage of objectively and accurately measuring the sedentary levels of players because they allow waking time to be divided into sedentary, light, moderate, and vigorous PA levels.

If studies use questionnaires, we recommend they use validated questionnaires, such as the IPAQ, supplemented with other questionnaires depending on the study objectives. To address social desirability bias and over-reporting of PA levels, the use of a social desirability scale for self-reported data could be considered (Perinelli & Gremigni, 2016).

We believe that the ideal would be a mix of methodologies combining objective quantitative data and qualitative data obtained through interviews. These interviews would identify the players' relationship with their body and their practice, help with understanding their physical habits, provide information about their sports career and experience, and, above all, describe and explain the influence that esports has had on their PA engagement, re-engagement, retention, or withdrawal. Following the conclusions of the scoping review by Monteiro Pereira et al. (2022), with which we agree, we also encourage the conduction of longitudinal studies.

Conclusion

This systematic review allows us to examine the state of research regarding the PA of esports players. The reality of the physical practices of esports players appears so complex and multifaceted that it seems inconceivable to be able to make a general statement on the activity or inactivity of the group of players based on a single study (or even 18 of them). Indeed, wanting to measure the activity of esports athletes in general can be compared to wanting to measure the activity of sports athletes in general. Considering the results, further research is encouraged in both life sciences and social sciences. Therefore, we call for a multidisciplinary approach to obtaining a better understanding of the complex phenomenon of PA. As esports is becoming institutionally structured and recognized in several countries (Abanazir, 2019), and its potential supervision by sports authorities is being discussed (Witkowski, 2022), it seems important to learn more about the relationship between the practice of esports and PA. It seems even more important to know whether playing esports pushes players to engage in PA, resume it, pursue it, or, on the contrary, abandon it. Therefore, following the example of Kari et al. (2019), we believe it is more important to be concerned with the time young players spend training physically rather than the time they spend playing.

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Can the Media Discourse Surrounding the Paralympic Games Alter the Perception of Disability Held by Children With Disabilities and Their Families?

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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Abstract

This qualitative and exploratory study aimed to investigate whether contact with media content related to the Paralympic Games (PG) could affect the perception of disability held by children with disabilities (CWD) and their families. The research featured 12 CWD not involved in sports and 13 of their relatives. It consisted of two sessions, one before and another after participants viewed two videos related to the PG that showed athletes and other people with disabilities (PWD) successfully playing sports and/or performing other activities. In both sections, we asked them to write the first five words that came to mind upon hearing the expression PWD. Next, we conducted in-depth semi-structured interviews to explore their views on disability. We computed the words mentioned in the first dynamic and conducted an inductive reflexive thematic analysis of the interviews. Before the videos were shown, the words written most were “difficulty,” “problem,” and “limitation.” During the interviews, they focused on impairments and difficulties associated with disability. Following the videos, the most predominant written words were “overcoming” and “capacity.” Throughout the interviews, they focused more on the potential and capabilities of PWD. This study suggests that materials such as those that we used can help CWD and their families develop a more positive view of the potential and capabilities of PWD. These materials might also be used in other contexts (e.g., in schools and community education programs), especially in places where it is still rare to see PWD practicing sports and performing other activities such as those shown in the videos.

Keywords: Paralympic Games, media, people with disabilities, contact theory, change of perception

Introduction

People with disabilities (PWD) have historically been judged, marginalized, and excluded because of social constructions that stereotype disability (Smith-Chandler & Swart, 2014). They tend to be perceived as imperfect, incomplete, helpless, vulnerable, and abnormal (Barnes, 1992; Campbell, 2009; Davis et al., 2021; Goffman, 1963; Mello et al., 2021; Titchkosky & Michalko, 2009). Many believe that disability is a problem and therefore needs to be improved, cured, or even eliminated (Campbell, 2009; Mello et al., 2021).

The capitalist system values physically fit bodies, that is, those capable of being productive (Mello et al., 2021). Thus, old, sick, and incapable bodies tend to be rejected because they are not considered as capable (Hilgemberg, 2021). Such discrimination in favor of people perceived as able is called ableism (Hopkins, 2008; Pérez-Garín et

al., 2021). Ableism operates in a similar way to racism, sexism, and other types of discrimination. It is based on the premise that everyone should function perfectly within hegemonic patterns (Campbell, 2009). Within ableism, disability is tolerated rather than accepted as one of the forms of human diversification (Campbell, 2009).

The presumed abnormality of PWD leads to stigmatization. As Goffman (1963) asserted more than 60 years ago, stigmatization is a process of overvaluing the supposedly negative attributes of a person (for example, their disability), as if they had no other attributes. Stigma causes and/or enhances exclusion and oppression, making it difficult for them to be fully socially accepted (Goffman, 1963; Wahat et al., 2021).

From birth, many PWD learn that to be disabled is to be less than (Campbell, 2009). In other words, they internalize the labels and stigmas attributed to them and come to believe that the negative stereotypes about their identity are true (Herek, 2007; Pérez-Garín et al., 2021; Quinn et al., 2014). Internalizing stigma can cause identity problems (Anaby et al., 2013), suffering (Wendell, 1989), low self-esteem, self-loathing (Campbell, 2009), bullying (Dane-Staples et al., 2013), loneliness, self-acceptance difficulties (Kong et al., 2020), rejection of assistive technologies (Dos Santos et al., 2022), and mental health problems (Berg et al., 2015; Wahat et al., 2021). It can also cause increased levels of anxiety, depression, frustration, anger, and self-pity (Pérez-Garín et al., 2018; Quinn et al., 2014). The internalization of stigma becomes a weapon that PWD end up involuntarily using against themselves, further aggravating the way they feel.

In the mid-1950s, Allport (1954) posited that contact between groups under certain circumstances (common goals, equivalent social status, collaboration, and institutional support) can lead to positive attitudes between them and, consequently, reduce existing prejudice. Since then, scholars have developed this hypothesis into what has become known as “contact theory.” Contact is believed to help reduce prejudice as it generates knowledge about the outgroup, thus increasing empathy and reducing anxiety in interactions with members of the other group (Pettigrew & Tropp, 2008).

Interactions can be direct or indirect, that is, either with or without face-to-face interaction between members of the groups (Lemmer & Wagner, 2005; Ramasubramanian & Costantini, 2020). Since only a small share of the population has the opportunity to interact with groups other than their family, school, religious, and work circles, indirect contact with people from other groups can create opportunities to learn about them without face-to-face interaction (Wojcieszak & Azrout, 2016).

One of the ways to establish indirect contact is by observing members of other groups in media content (Massey et al., 2021; Ramasubramanian & Costantini, 2020), a type of interaction called indirect mediated contact. Some authors divide indirect mediated contact into two subcategories: vicarious and parasocial. Vicarious contact is defined as the observation of interactions between ingroup and outgroup members in the media (Harwood et al., 2016). Parasocial contact, in turn, is defined as media exposure to an outgroup, without requiring interaction between groups (Schiappa et al., 2005). They are both important in reducing discrimination (Massey et al., 2021).

People draw their ideas about other social groups from what they experience, read, hear, or see through fictitious and factual media sources (Banas et al., 2020; Ortiz & Harwood, 2007; Schiappa et al., 2005). People with little to no direct contact with outgroups rely on the media to access such information (Park, 2012). In such cases, their beliefs are more likely to be shaped by media portrayals. Therefore, it is critical that these portrayals be positive (Ramasubramanian & Costantini, 2020).

Fifteen percent of the world’s population experiences some form of disability (World Health Organization [WHO], 2011). Nevertheless, the media depict PWD only sporadically, and often in oversimplified, cruel, or discriminatory situations based on stereotypes and social stigma (Kolotouchkina et al., 2021; Silva & Howe, 2012). These factors pose major obstacles to the social inclusion of PWD (WHO, 2011).

The negative portrayal of certain groups in the media is related to increased outgroup stereotypes and prejudices (Saleem & Anderson, 2013; Silva, 2006). There is evidence that negative contact encourages prejudiced attitudes, while positive contact encourages favorable attitudes (Paolini et al., 2010). If media representations of minorities are negative, viewers are likely to perceive members of these groups negatively (e.g., as unattractive, fragile, and unreliable). Negative portrayals can also lead ingroup individuals to internalize how they are represented, which can affect their personal development (Schiappa et al., 2005).

Just as the media can reinforce the stigmatization of PWD, it can also help minimize prejudices (Souza et al., 2021) through exposure to content that portrays them in a positive light (Bond, 2020). Inspired by contact theory, we conducted a study to determine whether parasocial contact mediated through the Rio 2016 Paralympic Games (PG) campaigns can impact the perception of disability held by both children with disabilities (CWD) not involved in sports and by their families. We assumed that, although the CWD included in the study share some characteristics with the athletes (they all have an impairment), they can be considered part of distinct groups due to their lack of involvement with sports.

We developed this study in Brazil, where, according to the latest demographic survey (Instituto Brasileiro de Geografia e Estatística [IBGE], 2012), 23.9% of the population has some type of disability. According to this survey, 6.7% have disabilities that seriously compromise their functionality (Botelho & Porciúncula, 2018). There are significant discrepancies between the reality of Brazilians with and without disabilities. The number of people under the age of 15 who have not completed high school is 48.2% for people without disabilities and 61.1% for PWD. In the labor market, 37.1% of the population without disabilities receives less than the Brazilian minimum wage – R\$ 1,212 as of June 2022, which corresponds approximately to US\$ 220 per month. In the case of PWD, this figure increases to 46% (IBGE, 2012). Furthermore, 77% of PWD in Brazil claim that their rights are not respected (Brasil, 2010).

If parasocial contact with selected PG-related materials increases the interviewees' awareness of the potential and capabilities of PWD, this type of intervention could be used in schools, health clinics, and educational centers, among others. Although this research was developed in Brazil, its findings can also be helpful to other countries with similar realities where direct contact with PWD in sports or other high-skill activities is still rare.

Materials and Methods

The research was qualitative and exploratory and was approved by the Ethics Committee of the Federal University of Paraná, Brazil, under Report Number 40602920.7.0000.0102. The participants were 12 CWD aged six to 16 years old who did not practice sports and 13 of their family members. Information about the type and degree of disability was provided by the children's guardians. Seven children had intellectual disability (ID) associated with physical disability (PD). While they were present during the data production dynamics, and while we tried to motivate them to actively participate in these dynamics, they remained quiet, probably due to the type and degree of their impairments. In these cases, only their family members answered the questions. Table 1 describes some characteristics of the research participants, including those who did not speak during the interview.

Table 1. Profile of the research participants

Name of the child/adolescent	Age	Type of disability	Degree of disability	Family member's name	Degree of kinship
Ana	8	ID and PD	Severe	Ana Maria	Mother
Cassiano	6	ID and PD	Severe	Sandro	Father
Davi	14	PD	Severe	Claudio	Father
Guilherme	9	ID and PD	Severe	Michele	Mother
Isabela	10	PD	Severe	Crenilda	Mother
Jessica	10	ID and PD	Severe	Jacinta	Grandmother
João Pedro	9	PD and ID	Mild	Rúbia	Mother
Luiz	11	PD	Severe	Keli	Mother
Marcela	16	PD	Mild	Keila	Mother
Maria Letícia	14	ID and PD	Severe	Caroline and Any	Sisters
Murilo	9	PD	Mild	Adriana	Mother
Yuri	7	PD and ID	Severe	Eva	Grandmother

Note: ID – intellectual disability; PD – physical disability.

The research involved two dynamics. In the first, we asked CWD and their relatives to say the first five words that came to their minds when they heard the expression “person with disability.” We explained that there were no right or wrong answers. In the second, we conducted an in-depth semi-structured interview based on the following questions: (1) What does disability mean to you? (2) Could you talk a bit more about the words you said in the previous dynamic? (3) Do you think that PWD can play sports? Do you know anyone with a disability who practices sports? (4) Have you ever watched the PG? If so, what do you think about them? These questions were adapted, altered, and deepened during the interviews according to the respondents' needs and level of understanding.

After this opening section, we showed two videos related to the PG. The first one, “We are superhumans” (<https://www.youtube.com/watch?v=F65TFzyVxSU>), was produced by UK Channel 4 with the goal of promoting the Rio 2016 PG. It shows PWD successfully performing a variety of sports and other activities such as singing, playing instruments, dancing, working, and playing. The soundtrack emphasizes the expression “Yes I can.” The second video, “Paralympic Movement,” was produced by the Brazilian Paralympic Committee in 2019 (<https://www.youtube.com/watch?v=baY2X5WTG4>). It shows three Paralympic athletes training hard. Only in the final scene is it possible to see that the athletes have a disability. At this point, a written sentence appears – “this is just a detail” – referring to the impairment.

Criticism of the video “We are superhumans” has arisen (the “Paralympic Movement” campaign would probably also come under criticism if it became famous worldwide). Some authors claim that this type of material perpetuates the false belief that PWD can do everything, disregarding any physical and/or mental impairments or sociocultural and environmental determinants that could interfere with their ability to adjust and perform. Another argument is that it could trigger “ableism,” the appreciation of subjects because of certain abilities to the detriment of those who lack them or have a limited level of performance. It is worth remembering that the development of certain abilities is not always possible or desirable for all PWD (Kearney et al., 2019). Despite these objections, we chose those videos because they show successful PWD engaged in different kinds of tasks, providing significant opportunities to challenge negative stereotypes about PWD: they are often seen as frail, sick, dependent, and incapable (Bailey, 2008; Darcy, 2018; de Souza & Brittain, 2020; Francisco & Marques, 2015; Hodges et al., 2014; Oliveira et al., 2019; Poffo et al., 2017).

These videos were used to establish parasocial contact between CWD and their families with PWD fulfilling their full potential, in order to ascertain whether this contact could help reduce prejudices and stigmas and change how CWD and their families perceive disability. After showing the videos, we repeated the five-word dynamic, asking the interviewees to again say five words that came to their minds when they heard the expression “person with disability.” Then, we asked them to talk about what they wrote and asked if the videos changed their perceptions of PWD.

All interviews were recorded and fully transcribed. We computed and contrasted the words that were said before and after the videos during the “five-word dynamics.” To analyze the interviews, we developed an inductive reflexive thematic analysis (Braun & Clarke, 2012). In other words, we did not use pre-established categories to look at the data. We searched for the main shared patterns of meanings – themes – in the data.

Results and Discussion

The results will be presented in two sections, the first concerning the five-word dynamics and the second concerning the interviews.

Five-word Dynamics

In this dynamic, we asked the interviewees to objectively state a maximum of five words that came to their minds when they heard the expression “person with disability.” The results are divided into two tables: Table 2 contains the words spoken by CWD, and Table 3 contains the words mentioned by their family members.

Table 2. Five-word dynamics – perceptions of CWD

Name of the child/adolescent	Words before videos	Words after videos
Davi	Hardworking, achiever, fighter	Effort, possibility, conquest, struggle, independence
Isabela	Not walking	Resilience
Luiz	Shame	Dream, inspiration
Marcela	Difficulty, problem, limitation	Capacity, overcoming
Murilo	Physical impairments, mental impairments	Amazing people, ability

Seven of the 10 words/expressions said by CWD before watching the videos refer to negative characteristics or barriers normally associated with disability: problem (3), difficulty (1), limitation (1), and not walking (1). One of the adolescents, Luiz, mentioned the word “shame,” which suggests that he might have internalized some stigmas

usually associated with disability. As Goffman (1963) explains, when people incorporate social stigmas, they start to believe that they are in fact “defective,” which can make them feel ashamed of their condition. Only Davi mentioned words with a positive connotation, such as “hardworking,” “achiever,” and “fighter.” It is worth mentioning that among the interviewees, he is the only one from a middle-class background. His parents have college degrees, and the teenager attends a private school. This provides him with experiences and information about development possibilities for PWD that, unfortunately, most PWD are not aware of and/or do not have access to in Brazil.

After the videos, all CWD who spoke during the dynamics mentioned positive words related to PWD, which indicates that these materials influenced their perception of disability. This time, they used words focusing on the capabilities and possibilities of PWD. Even Luiz, who previously mentioned the word “shame,” later used the expressions “dream” and “inspiration,” conveying the idea that he felt inspired to expect and/or go after a better reality for himself.

Table 3. Five-word dynamics – perceptions of family members

Family member's name	Words before videos	Words after videos
Adriana	Limitation	Overcoming, determination, focus, incredible, self-esteem
Ana Maria	Fright, non-acceptance, difficulty, overcoming	Family, overcoming, financial difficulty
Any and Caroline	Intelligence, problem, special	Able, encouragement
Claudio	Overcoming, commitment, strength, faith, growth	Energy, focus, development, resilience
Crenilda	Love, suffering, hope, difficulty, learning	Pride, overcoming
Eva	Dependency	Able, joy
Jacinta	Affection, love, support, prejudice	Happiness, poverty
Keila	Difficulty, limitation, learning	Overcoming, willpower, inspiration
Keli	Shame, prejudice, difficulty, frustration	Capable, overcoming
Michele	Emotion, affection, patience, honesty, neediness	Capable, happy, fighters
Rúbia	Difficulty	Potential, amazing, support, financial struggle
Sandro	Pity, care	Overcoming, potential

Before watching the videos, the family members mentioned 39 words/expressions in total. Of these 39 words, 20 refer to a negative perception of disability: difficulty (5), limitation (2), prejudice (2), problem (1), suffering (1), dependency (1), frustration (1), shame (1), pity (1), non-acceptance (1), lack (1), neediness (1), emotion (1), and fright (1). Another 13 words refer to the supposed needs and feelings of PWD and/or their caregivers: love (2), affection (2), learning (2), hope (1), support (1), care (1), commitment (1), strength (1), patience (1), and faith (1). Only five words had a rather positive connotation: overcoming (2), growth (1), intelligence (1), and sincerity (1). It should be noted that the expressions “intelligence” and “honesty” might express a distorted view of PWD, as disability is not necessarily related to these characteristics. The word “special” does not seem to belong to any of the aforementioned categories. This word was possibly used affectionately to refer to people who have different characteristics and, therefore, need adaptations in many cases.

After the family members watched the videos, 35 words were cited. Most of them convey a more positive image of PWD and/or a more positive image of their condition: overcoming (6), ability (4), happy/joyful (3), potential (2), determination (1), willpower (1), focus (1), warriors (1), energy (1), resilience (1), development (1), incredible (1), amazing (1), self-esteem (1), pride-worthy (1), and inspiration (1). Three people mentioned words related to family support, such as family (1), encouragement (1), and support (1). Three family members mentioned words related to financial hardships. As we will explain later, participants used these words to complain about the fact that CWD from households with low purchasing power cannot afford to play sports.

The results of this dynamic show that watching the videos improved the participants' perception of disability. Both CWD and their family members who participated in the dynamics started to mention words focusing on

capabilities and no longer focused on the supposed impairments and limitations of PWD. Similar results were found by Souza, Colere, and Vieira (2021), who conducted similar dynamics using materials related to the PG, but interviewed children without disabilities. The findings of both these studies indicate that contact with materials related to the PG can improve how people understand disability.

Interview Dynamics

We will present the results of the interviews divided into two subtopics. The first addresses stigmas and prejudices related to disability and the importance of direct contact with a relative with a disability in changing the perception of disability. The second subtopic addresses stigmas, prejudices, the impact of indirect contact with PWD through videos, and some barriers to the development of the full potential of PWD.

Stigmas, prejudices, and changed perception after direct contact with a disabled family member

Nine family members and one of the children interviewed regretted the fact that society perceives PWD as “pitiful”:

“[There are] people who say ‘oh, your son, poor thing’ ... Poor thing why? He just can’t walk! ... I don’t like this ‘poor thing!’” – Rúbia, João’s mother

“I am not a poor thing, because ‘poor things’ are those people who have no home, no food, no money, no father, no shelter, nothing. I have it all!” – Murilo, 9 years old, PD

The “poor thing” stigma denigrates and dehumanizes PWD (Martins & Barsaglini, 2011) because the person is seen as a victim – incapable and dependent. The focus tends to shift only to the disability and the supposed problems stemming from it (Hilgemberg, 2014). Stigmas and prejudices against people who do not fit into what is considered “normal” might be due to a lack of contact with those people (Allport, 1954; Schiappa et al., 2005).

Out of the nine family members mentioned above, six admitted how prejudiced they were before living with their family members with disabilities. They acknowledged that the “poor thing” stigma is a problem caused by a lack of information and interaction with PWD:

“I also saw [PWD] as poor things because we come from a culture that teaches that. Disabled people are kind of hidden by society... Before [my child was born], I didn’t have access to information and I didn’t know anyone like him, ... so I used to think like everybody else, ‘oh, poor thing, he can’t walk!’” – Rúbia, João’s mother

Living with PWD helped these six family members fight their own prejudice:

“I had no contact [with PWD]. So I didn’t have any saying or opinion on the matter... If Murilo [child with a physical disability] hadn’t been born, I wouldn’t have had the opportunity to meet people with disabilities. I would be just another person in society [...] discriminating for lack of understanding.” – Adriana, Murilo’s mother

The coexistence between PWD and people without disabilities favors the construction of relationship patterns that were previously non-existent, which in turn facilitates positive forms of interaction between groups (Magalhães & Cardoso, 2010). Six interviewees claimed that part of the prejudice of people without disabilities towards PWD arises from their fear that one day they might develop a disability, or that this could happen to someone in their own family:

“People are prejudiced because they fear developing it [a disability] or having a child like that... It can happen to anyone! Today we are ok, tomorrow anyone might suffer an accident and be bound to a wheelchair.” – Ana Maria, Ana’s mother

For many people, PWD conjure up the image of human imperfection, reminding us of a fragility that we want to deny (Silva, 2006). Disability is perceived as a sign of weakness, something that reminds us of our susceptibility to illness and death. Therefore, they avoid contact with PWD to avoid being reminded of an undesirable reality (Hunt, 1966).

Some interviewees revealed that they prefer to stay at home to avoid constraints because of their disability. We live in a society that values strength, power, and production, which makes people try to avoid and/or hide their weaknesses (Wendell, 1989). This makes the process of disability acceptance by PWD difficult, which in turn inflicts suffering. This can be observed in the statements below from a mother and her daughter:

“It’s very complicated because we would like to go out more, it’s just annoying to be out there and have people looking at us... So we’d rather stay at home with her, but it’s too bad... My family is not that evolved to face it out there, you know? [she cries]” – Keila, 36 years old, Marcela’s mother

“[I feel] bad because we can’t go out because of other people. But why do I have to lock myself inside because of them? That’s not fair... It’s not nice to have people staring at you because of your disability.” – Marcela, 16 years old, PD

These data are similar to the findings of Martins et al. (2018), who interviewed 15 elderly people with physical disabilities. They found that some of their interviewees also isolate themselves because they feel safer at home, where other people will not judge them. Stigmatized people tend to incorporate and relate to certain negative labels, which influences how they behave (Goffman, 1963; da Silva, 2006).

Isolation does not allow for healthy feedback from the daily social exchange that would occur if they maintained contact with other groups. In this way, the isolated person can become mistrustful, depressed, hostile, anxious, and confused (Goffman, 1963). In addition to harming PWD and their families, isolation is likely to harm the social acceptance process of PWD, as the more a person is isolated, the less they are seen. The result is that people without disabilities who have no contact with PWD remain ill-informed, slowing down the normalization process for PWD and maintaining the stigma (Wendell, 1989).

Stigmas, prejudices, barriers, and changed perception after indirect contact with PWD through videos

Before the video-based contact, when we asked participants about their perceptions of disability, two children and five relatives focused on the limitations and degree of dependence of PWD:

“Disability is a problem that causes limitations. There are people who play ball, in my case I can’t play ball! This is a limitation. I can’t cook, another limitation. I cannot wash clothes or clean the house, another limitation.” – Murilo, 9 years old, PD

“A person with a disability is very dependent... They need our help for everything!” – Michele, Guilherme’s mother

The focus on the limitations of PWD, rather than on social, cultural, and environmental barriers that cause such limitations is the result of what has been called the medical model of disability. In this model, disability is considered a medical problem that needs to be solved by the individual with the assistance of a health care team. Social models of disability, in turn, oppose this view. They understand that disability is also a consequence of economic, social, cultural, and environmental factors that interfere with the development of the capabilities of PWD (Barnes, 1992; Gaudenzi & Ortega, 2016; Oliver, 2004; Shakespeare, 2010).

One of the questions we raised before showing the videos was whether the interviewees believed that PWD could play sports. Only three family members said yes. Another three said it depends on the person’s degree of impairment. After watching the videos, all CWD who participated in the interviews and eight family members recognized that a PWD can play sports, even when they have a high degree of impairment. Nine participants were surprised by the athletes’ achievements, “despite” their disabilities. This can be seen, for example, when they used expressions such as “amazing to see,” “incredible,” “awesome,” and “wonderful”:

“These people are amazing, they can do things with their feet and other parts of their body. How can they do this?... My jaw dropped down to earth when I saw it!” – Murilo, 9 years old, PD

“I think this [the videos] is awesome! I think it’s beautiful! I think it’s wonderful! I don’t even have words to say, because... it’s hard enough for people who do not have any limitations, we create limits for ourselves, always with an excuse not to do this or that. You gotta have a lot of determination, a lot of resilience.” – Ana Maria, Ana’s mother

One of the main legacies of the PG is the potential to inspire people both with and without disabilities through the example of athletes, encouraging them to become active and play sports (IBGE, 2012). The videos we showed motivated four of the interviewed mothers to explore the potential of their children:

“When I watch these videos, they give me further strength to... explore his potential in different areas.” – Adriana, Murilo’s mother

“I think this is amazing, I want it for my son!” – Rúbia, João’s mother

Three CWD mentioned they felt inspired to engage in sports:

“Before watching the video, I thought it couldn’t be done and now I see that it can... This shows that disabled people can also do what normal people do.... I saw that tennis player and I thought, if he doesn’t have a leg and he’s playing, then I can play it too!...” – Marcela, 16 years old, PD

While the success of Paralympic athletes can be positive for all the above reasons, it can also help fuel a false belief that all PWD can – and are capable of – doing whatever they want:

– “There are no limits to anything!... They can do whatever they want, regardless of their disabilities! With willpower, they can do it all!” – Crenilda, Isabela’s mother

– “After [the videos] I saw that everything is possible, even dancing, playing sports, parachuting, flying a plane. Everything!... I came to realize that virtually anything is possible... If I want, I can do whatever I want!” – Davi, 15 years old, PD

In recent years, the media has sought to portray PWD using a positive and inspiring approach, focusing on sports and everyday skills (Kolotouchkina et al., 2021). This focus on performance values PWD who have certain

types of skills and who achieve outstanding results (Berger, 2008), almost as if they were superhuman (Bush et al., 2013; Silva & Howe, 2012). Some researchers claim that this representation conveys a positive view of disability (Zhang & Haller, 2013) that could educate, inform, and challenge prevailing stereotypes of disability (IBGE, 2012; McPherson et al., 2016). Others argue that showing off the capabilities of PWD can arouse expectations that all PWD can do the same. This can be an issue, as not everybody can achieve the same levels of autonomy and performance as the people featured in the videos. Many people could therefore create false expectations regarding their own capabilities, without considering the limitations of their impairments and the barriers they face on a daily basis (Kearney et al., 2019; Nelson, 1994; Silva & Howe, 2012).

PWD can internalize the perception that they can do anything, assuming the responsibility to make it happen for themselves. If they fail, they might believe that their personal attributes are the problem and, in many cases, try to hide or correct them. However, this is often very difficult or even impossible, thus triggering frustration and suffering (Campbell, 2009; Wolbring, 2008). It is necessary then to consider other factors that can affect this process, such as the degree of impairment, health conditions, and a lack of means (Brittain & Beacom, 2016; Silva & Howe, 2012).

Six interviewees mentioned the degree of impairment as a barrier that can prevent PWD from doing certain things:

“I believe it depends on each disability; in the case of the videos, amputees are able to use their strength. But in the case of my boy, what sports could he possibly play? As any sport requires physical strength and he cannot put in any effort... So it is not like anyone can do it!” – Keli, Guilherme’s mother

Personal factors such as the degree of impairment, perception of self-efficacy, motivation, and age can influence how PWD can play sports (Ploeg et al., 2004). It is worth remembering, however, that the belief that disability necessarily makes playing sports unachievable may be due to the lack of information about the real possibilities (Marmeleira et al., 2018).

Other barriers were also mentioned. Five people mentioned financial hardships, and four people mentioned the lack of an appropriate sports location as limiting factors for PWD to play sports:

“[This is] for rich people... I feel very sad, very upset because we don’t have the means, we don’t have any money. Those who do it is only because they can afford it!” – Jacinta, Jessica’s grandmother

“Most of the time... the family does not have the financial means to do it... Sometimes... you can’t find a facility even if you can pay for it... He [son] once wanted to play sports, but there is nowhere he can go.” – Rúbia, João’s mother

Financial hardships (Vieira et al., 2021) and the lack of appropriate facilities/locations for sports also appeared as barriers to the engagement of PWD in sports in other studies (Biduski et al., 2016; Legood et al., 2002; Marmeleira et al., 2018; Seron et al., 2015).

Eight interviewees stressed how important it was to have contact with the videos that we showed:

“I think this type of video, this information needs to circulate in schools because people don’t have access! Like I told you, when you don’t have access to information, when you don’t live with anyone like this, you don’t understand how it is!” – Rúbia, João’s mother

The words above as well as the data presented in this paper emphasize the importance of materials such as those that we used.

Conclusions

All the children who talked during the interviews and all the relatives who participated in the research developed a more positive view of the potential and capabilities of PWD after watching the videos. They remarked, however, that there are some barriers that may limit the full development of PWD, such as type and degree of disability, financial constraints, and a lack of appropriate spaces for playing sports.

Some participants also remarked that the lack of contact with PWD helps perpetuate stigmas and prejudices towards PWD. The most common stigma, according to many of them, is that PWD are “poor things.” Some family members admitted that they previously held this view until the experience of living with a relative with a disability changed their perspective.

Some interviewees revealed that they prefer to stay at home to avoid constraints related to their disability. Isolation, in addition to harming PWD and their families, is likely to hinder the social acceptance process for PWD, given that the more a person is isolated, the less he or she is seen. As a result, people without disabilities who have no contact with PWD remain ill-informed, and the normalization process for PWD is delayed.

This study indicates that media materials such as those shown to the interviewees can be used as tools to help change the perception that CWD and their families hold about the potential of PWD. These materials can perhaps also be used in other contexts, especially where PWD are still isolated in their homes, are not sufficiently visible in society, or are not commonly seen practicing sports, arts, or other activities depicted in the videos. We recommend the development of other similar studies involving CWD with different profiles. We also recommend that future studies verify whether the observed changes remain over the long term.

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Does “We” Matter for Esports Fans? Analyzing the Mediating Effects of the Sense of Fan Community on Team Identification and Fandom Behaviors

Authors' contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
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Abstract

As an emerging field of study, scholars have constantly compared esports and traditional sports to find similarities and differences between the two sports fields. As various studies have called for more studies regarding the fan communities of esports, the present study analyzed the mediating effect of the sense of the esports fan community between team identification and consumer behaviors. This study employed a path analysis technique, utilizing online survey responses from 182 participants who identified as fans of the esports team. The findings revealed that a sense of fan community did not have mediating effects by showing statistically non-significant (in)direct effects on consumer behaviors. In contrast, team identification showed a significant positive effect on the sense of fan community and some consumer behaviors. The implications of the study suggest that esports organizations should focus their marketing strategies on individual fan bases and strive to maintain the competitiveness of their leagues to attract more fans to esports.

Keywords: Esports fandom, team identification, sense of fan community, fandom behaviors, consumer behaviors

Introduction

According to a recent literature review by Cranmer et al. (2021), scholars have been turning their attention to esports and seeking to define the concept with reference to various academic theories and terminologies (e.g., sports management, psychology, philosophy, sociology, cultural studies, marketing, and economics). The main motivation for the academic interest in the topic is esports' growing share of the sports industry. The global esports industry brought in USD 696 million in 2017 (Newzoo, 2017), and the esports industry in South Korea (hereafter simply “Korea”) alone brought in USD 120 million in 2019 (KOCCA, 2020). Moreover, live-streamed esports games such as Fortnite and League of Legends attract millions of viewers, sometimes surpassing the viewership numbers for traditional sports such as baseball and basketball (Bowles, 2018; Burroughs & Rama, 2015; Steinkuehler, 2019). For example, the League of Legends Championship Korea (LCK) 2022 Spring event set a new viewership record, with over 3,000,000 viewers watching the finals (Park, 2021).

Most of the recent articles on the relatively new field of esports in international journals have looked at populations or web communities (such as Reddit) based in the western hemisphere, and in the United States in particular

(e.g., Cushen et al., 2019; Qian et al., 2020; Hamari et al., 2016; Sjoblom & Hamari, 2016). This focus is natural given that esports events in this country have been paying out the most prize money, although China and Korea rank second and third, respectively, among countries that host esports events (Statista, 2021). At the same time, there is a need for studies of sports fandom in contexts ranging from esports to traditional sports management that take into account the race and ethnicity of fans. Thus, for instance, in a recent book on the psychology of sports fans, Wann and James (2019) attributed the inconsistent findings of previous scholars on the subject to variations in the racial and ethnic makeup of fandoms and called for further investigation. Likewise, a recent literature review by Cranmer et al. (2021) touched on variations in esports environments specifically across the United States, Asia, and Europe and emphasized the importance of understanding the distinct characteristics of the fans on each continent, asserting that esports is a more “accepted and well-represented activity with a large follower base” (p. 9) in Korea, Europe, and the United States than elsewhere. Moreover, Levental et al. (2022) mentioned the rise of a new fandom group, transnational fans, who identify as fans of a foreign team even though they cannot visit the stadium or gather with the fans while keeping their identification with the local team. As such, the geographical aspect of fans needs to be considered further in esports studies since esports fans do not only watch the games held in their own country, but also watch foreign leagues, such as LCK.

The tendency to compare the behaviors of esports fans with those of traditional sports fans can also be attributed to the immaturity of esports studies in the sports management literature. In the traditional sports aspect, according to Giulianotti (2002), fans are categorized into four types of spectator categories (e.g., supporter, fan, follower, and flaneur) depending on their investment and identification towards the team, emphasizing that not all fans are devoted fans. For instance, the author defines fans who identify with a certain team for longer and in a more local environment as traditional/hot fans (supporters), while there is also a type of fan who watches sports as a kind of entertainment (flaneur). In traditional sports, fans’ feelings of belonging to a fan community were shown to significantly affect their consumer behaviors, such as revisiting the game, purchasing the team’s goods, and recommending the game to others (Hedlund, 2013). The discovery of the importance of a sense of fan community on commercial sports’ revenue caused a shift in the marketing strategies of a professional sports team from an emphasis on the individual fan to like-minded fan communities (Hedlund, 2013; Wakefield, 1995; Woratschek et al., 2014). Sports fans’ perception of belonging to a community is a widely studied topic in traditional sports management. McMillan (1976) defines this sense of community as “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and shared faith that members’ needs will be met through their commitment to be together” (McMillan & Chavis, 1986, p. 9).

Similarly, for example, Cushen et al. (2019) and Sjoblom and Hamari (2017) investigated the motivations behind the consumer behaviors of esports fans, such as the amount of time and money spent on esports, and pointed to integrative social motivators including self-identification as a fan of esports. Moreover, previous studies (Cushen et al., 2019; Sjoblom & Hamari, 2017) used scales or a single question that did not pertain specifically to participation in fandom to measure the social integrative motivators. There is, then, a need to determine the extent to which the scales used in traditional sports studies are appropriate for efforts to measure esports fans’ perceptions of social integration. Hence, the “sport fan sense of community” concept developed by Mastromartino et al. (2020) serves to measure social integration. More specifically, while previous studies dealing with traditional sports have tested whether sports fans’ identification with a team can lead to the development of a sense of community (Wann, 2006), further research is needed to define whether identification with an esports team can also lead to a sense of community, especially with respect to fandom communities for specific teams.

The effort to compare the process of forming a sense of community for traditional and esports fans is a relatively new field of study. For instance, previous esports studies aimed to analyze how esports fans utilize digital platforms, such as Reddit, to form their identities and communities (see Xue et al., 2019 for a detailed process of the formation of esports fans’ sense of community through Reddit). Hence, the purpose of this study is to further add to the previous studies (Cushen et al., 2019; Sjoblom & Hamari, 2017; Xue et al., 2019) and test whether a causal relationship between identification with an esports team and the sense of community rooted in fandom produces behavioral outcomes such as investing time and money in watching and playing esports. In this sense, Korean fans were selected as the specific target of the study as Korea is one of the leading countries in esports development. The use of personal computer rooms (PC Bang) starting in the late 1990s led to the development of Korea’s online gaming empire (Jin, 2010). Furthermore, a recent Delphi study regarding Korea’s esports research shared studies focused on publicizing esports, but more literature is needed to establish a recognized field of study with a firm foundation (Lee, 2019). Therefore, the present study aims to help fill this gap in the literature by focusing on Korean fans and

social integration within the esports fandom. Therefore, the analysis presented here accounts for the mediating effect of esports fans' sense of community between team identification and consumer behaviors.

Literature Review

Theoretical Background

Team identification in esports and traditional sports

Since the 1990s, fans' identification with their favorite teams has been a consistent focus of the academic study of sports from such perspectives as management, marketing, and psychology (James et al., 2019). In particular, Wann and Branscombe (1993), building on Tajfel and Turner's (1979) concept of social identity, developed the Sport Spectator Identification Scale (SSIS) to explain sports fandom behaviors (Lock & Heere, 2017). Since the development of the SSIS, sports management scholars have applied the team identification concept widely in various contexts (James et al., 2019), citing the index nearly 2,000 times by 2022 (Google Scholar, 2022). However, as James et al. (2019) pointed out, the SSIS, at least in its original form, does not account for fans who do not identify with specific teams at all; they suggested that the score for this population of fans should be recorded as 0 instead of 1. These scholars, therefore, revised the scale as the Sport Spectator Identification Scale-Revised (SSIS-R) to detect and screen members of this population.

The emergence of esports has naturally attracted the interest of sports management scholars. A study by Qian et al. (2020) observed that esports fans are often interested in both playing esports and watching professional esports players compete. Other scholars have highlighted the tendency of esports fans to interact socially using the chat function during the live streaming of games (e.g., on Twitch; Hamari & Sjoblom, 2017; Hamilton et al., 2014; Seo, 2015). Studies of esports fans' consumer behaviors have tended to compare their motivations with those of traditional sports fans (Brown et al., 2018; Hamari & Sjoblom, 2017; Lee & Schoenstedt, 2011; Lee et al., 2014; Pizzo et al., 2018). In their effort to define esports fan behaviors, Cushen et al. (2019) drew on the concept of team identification widely utilized in studies of traditional sports and found that both types of fans shared some motivations for identifying with specific teams. These scholars also reported that esports fans often identified with traditional sports teams and suggested that fandom can serve as a general construct, with no need to distinguish between esports and traditional sports.

Sense of community in esports and traditional sports fandom

The ways in which people form relationships have, of course, evolved over time. Thus, for example, Putnam (2000, 2020) argued that individuals are less likely to form close relationships with their neighbors than in previous centuries. This brings up the notion that the term "community" is perceived differently by people in modern society than in the past, when "community" was perceived as a place that "...allows citizens to share with each other and participate actively together for the common good" (Duncan, 2016, p. 37). Instead, individuals today often interact with those who share similar interests or lifestyles in the context of informal groups thanks to the affordances of digital technology and, in cities, transportation systems and urbanization. One of these shared interests is sports. Thus, for instance, a sense of community is shown to be developed in various forms among fans (Heere & Katz, 2014; Katz & Heere, 2016; Sung et al., 2015) and among players (Duncan, 2016, 2022). More specifically, when players of a professional sports team have fun playing the game, they are able to feel bonded and form a sense of community within the team, leading to an improvement in the team's overall performance (Duncan, 2016, 2022). Previous studies have also shown how traditional sports can contribute to fans forming a sense of community (Heere & Katz, 2014; Katz & Heere, 2016; Sung et al., 2015) through the shared identification of sports teams. Yet, sports fans tend to identify not only with specific teams, but also with the other fans of these teams (Katz et al., 2018). This identification with others can create a sense of connection for fans and foster the formation of fan communities (Kloos et al., 2012; Mastromartino et al., 2019). In a foundational study, McMillan and Chavis (1986) observed that a sense of community is often defined in terms of perceptions of belonging, interdependence, and commitments that bind the members of communities together. Thus, previous studies have sought to explain the causal relationship between sports fans' perceived sense of community and their consumer intentions and behaviors (e.g., Hedlund, 2014; Yoshida et al., 2015). However, Mastromartino et al. (2020) argued in a recent study that fans' sense of community involves more connections with a team than with other members of the fan community. Accordingly, they developed the Sport Fan Sense of Community (SFSC) scale to "measure the connection among fans themselves as

opposed to measuring the connection between fans and team” (p. 20). In another study, they further identified five factors that contribute to the formation of sports fans’ sense of community: (a) collective unity, (b) positivity, (c) inclusivity, (d) social opportunities, and (e) knowledgeable members (Mastromartino et al., 2019).

While esports fans may also develop a sense of community, they do so in ways that are distinct from traditional sports fans. Thus, Qian et al. (2020) emphasized the online and interactive spectatorship environment as one of the key differences between traditional sports and esports. More specifically, traditional sports fans watching their teams play on television need to use a second screen (i.e., a device such as a phone or a tablet) to interact with other fans. For instance, Tamir (2020) analyzed the use of a second screen (such as WhatsApp) while watching World Cup games and found how various discourses and discussions are frenetically formed via chats. In contrast, esports fans can interact using the same screen on which they watch the action. Studies of the streaming of esports (Hamilton et al., 2014; Kaytoue et al., 2012; Shaw, 2013) have likewise emphasized the importance of this form of social interaction as an aspect of spectatorship. Since the consumption of esports takes place mostly online, any bonds that form among fans of the same teams naturally occur in a space that is mediated by the Internet (Hamari & Sjoblom, 2016). Furthermore, Xue et al. (2019) analyzed the narratives of esports fans on Reddit and found that they show both inclusive and exclusive aspects of forming a community. Both McMillan and Chavis (1986) and Duncan (2016) emphasize participation in pursuing a common goal as one of the distinctive features of a community, and, according to Xue et al. (2019), this happens when esports fan communities form their own group (exclusive) and pursue the common goal of their group (inclusive within members). Hence, this study is grounded in the various concepts and theories related to sports fans’ sense of community (Duncan, 2016, 2022; McMillan & Chavis, 1986; Putnam, 2000, 2020), as well as esports fans’ formation of a sense of community (Xue et al., 2019). Furthermore, drawing on previous esports spectator studies that focused on analyzing social interactions with other fans, the following hypothesis was formulated for this study:

H1: The team identification of esports fans has a significant positive effect on their sense of community with other fans.

The Influence of Team Identification and Sense of Community on Consumer Behavior

As noted, sports management scholars have since the 1990s been analyzing fans’ identification with their favorite teams as a window into such consumer behaviors as team loyalty, the purchase of team-related merchandise, game attendance, and the use of various forms of media to follow a team’s progress (Fisher & Wakefield, 1998; Gwinner & Swanson, 2003; Madrigal, 2000; Wann & Branscombe, 1993). These early studies found that consumers may identify with specific teams, players, and coaches associated with various cities, states, or universities in ways that can promote such consumer behaviors as attending games, watching them remotely, and purchasing merchandise (Hunt et al., 1999; Kwon et al., 2005). However, in the early 2010s, the interest of sports scholars shifted somewhat toward the mediating effect of consumers’ identification with specific teams and players. From this perspective, consumers’ identification with their favorite teams mediates the causal relationship between their identification with other organizations (cities, universities, etc.) and their consumer behaviors (purchasing merchandise, attending games, etc.; Heere et al., 2011), and team identification mediates identification with professional players as well as the re-patronage intention (Wu et al., 2012).

Sports management scholars have been approaching sports fans’ consumer behaviors as an effect of belonging to a fan community. Thus, in the context of college football, there has been interest in the significance of fans’ perceived camaraderie and belonging for the frequency of attendance (Kahle et al., 1996; Swanson et al., 2003). Early on in this effort, Melnick (1993) argued that fans attend games at least in part as a means of strengthening their social ties with other fans, and subsequent studies have continued to emphasize the importance of social ties, or horizontal relationships, for the fandom (Carlson et al., 2008) and re-patronage behaviors. Katz and Heere (2013), Mastromartino et al. (2019), and Yoshida et al. (2015) are among the scholars who have described membership in a fan community as a more accurate predictor of consumer behaviors than identification with a specific team.

Although esports is relatively immature as a field of study compared with traditional sports, scholars have already begun to investigate the importance of social ties for predicting the behaviors of esports fans (Hamilton et al., 2014; Hamari & Sjoblom, 2016; Qian et al., 2020; Scholz, 2012; Sjoblom & Hamari, 2017). However, additional research is needed to analyze the causal relationship between social ties among peer fans and esports consumption behaviors. While some studies have reported a positive correlation and a causal relationship between social integration among fans and spectator behaviors such as hours spent watching esports (Hamilton et al., 2014; Scholz, 2012; Sjoblom & Hamari, 2017), there have also been reports that watching esports produces social gratification, although no causal relationship to spectating frequency has been established (Hamari & Sjoblom, 2016).

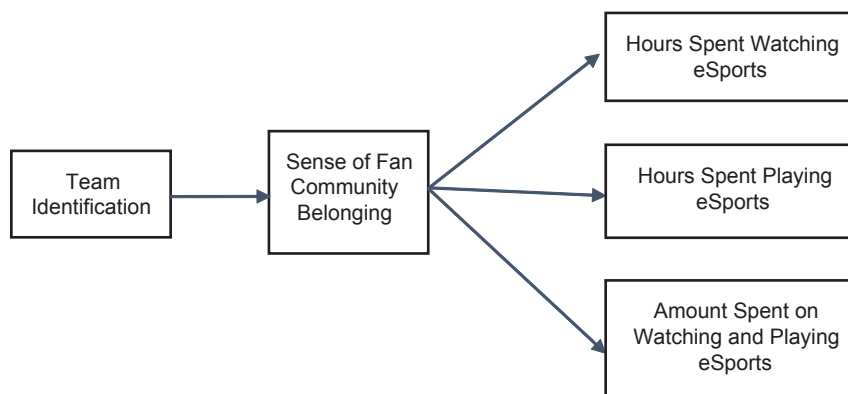


Figure 1. Preliminary model for esports fandom behavior

Thus, two more hypotheses were formulated for this study to analyze the consumer behaviors of esports fans, building on previous research comparing traditional sports fans and esports fans with regard to their identification with specific teams and perceptions of forming a community with other fans:

H2: The team identification of esports fans has a significant positive effect on the number of hours they spend playing and watching esports, as well as the amount of money they spend on esports.

H3: The sense of community felt by esports fans has a mediating effect on the relationship between their team identification and the number of hours they spend playing and watching esports, as well as the amount of money they spend on esports.

The model shown in Figure 1 was proposed based on the research hypotheses.

Method

Most previous studies of consumer behavior related to esports have adopted measures from analogous studies of traditional sports (Brown et al., 2018; Hamari & Sjoblom, 2017; Lee & Schoenstedt, 2011; Lee et al., 2014; Pizzo et al., 2018). The concepts of team identification and sense of community that are the focus of the present study likewise have been used mainly in the context of traditional sports. The former concept, developed by Wann and Branscombe (1993), has been associated with spectator studies, and the latter, developed by Warner et al. (2013), has been associated mainly with studies of actual participation in sports. As noted, Mastromartino et al. (2020) developed the SFSC scale for the purpose of analyzing the sense of community in spectator sport settings, and it served in the present study to measure this sense among esports fans.

Participants

After the proposed study received IRB approval, Korean esports fans were recruited through purposeful sampling. Thus, content with a link to a survey was posted in various Korean online esports communities, and Qualtrics, an online survey platform, was used to collect the data during the period from October 2021 to April 2022. As the study was based on a questionnaire in English, the primary author translated this questionnaire into Korean and asked the co-authors to back-translate it to confirm the accuracy of the Korean translation. Moreover, the authors decided to include an English version of a keyword (“collective unity”) to help the participants make sense of the translation, as many Koreans have some knowledge of English. The survey consisted of 36 items and required about 10 minutes to complete. A total of 436 participants initially showed interest in participating in the study and responded to the posting of the survey, but 84 of them identified as not being esports fans, and 170 did not finish the survey. Excluding these questionnaires, a total of 182 valid responses were collected and utilized for the analysis. Table 1 presents the participants’ demographic information.

Measures

In this study, the SSIS-R scale developed by James et al. (2019) and the SFSC scale developed by Mastromartino et al. (2020) were used to measure the potential effect of the participants’ sense of community in mediating between their team identification and spectator behavior. Three items on the questionnaire addressed the participants’

Table 1. Demographic Characteristics of the Participants (N = 182)

Characteristics	n	%
Gender		
Male	156	85.7
Female	26	14.3
Age (years)		
20–29	82	45.1
30–39	84	46.2
40–49	14	7.7
50–59	1	0.5
60–69	1	0.5

esports-related behaviors of watching and playing esports games and spending money on them. Thus, they were asked how much they typically spend on streaming esports and purchasing “skins,” which are decorative in-game goods that do not enhance performance in the game (the sums were expressed in Korean won).

The SSIS-R scale consists of seven questions about the importance of being a fan of a certain team and one question to determine whether those filling out the questionnaire are themselves interested, even slightly, in a certain team. This step served to distinguish participants uninterested in esports from those with at least a modicum of interest in a team since a minimum average score of 1 on the scale does not indicate complete disinterest (James et al., 2019). The possible answers on the Likert-type SSIS-R scale range from 1 to 8—for example, 1 = “slightly a fan” to 8 = “very much a fan.” The results of the original study showed the scale to have acceptable reliability (alpha coefficient = .96) and validity (TLI = .99, CFI = .99, RMSEA = .06, and SRMR = .01). The questions included “How important is it to you that

the esports team you are following win?” and “How strongly do you see yourself as a fan of the esports team you are following?”

The SFSC consists of 16 items with 5 subscales (collective unity, positivity, inclusivity, social opportunity, and knowledgeable members). A composite score was derived by summing and averaging the scores. The 7-point Likert-type scale used for all of these questions ranged from 1 = “strongly disagree” to 7 = “strongly agree.” The original study by Mastromartino et al. (2020) reported a moderate fit (RMSEA = .06, SRMR = .06, and CFI = .90) and acceptable reliability for each of the subscales (alpha coefficient = .60 to .82). Sample questions included “I feel a sense of collective unity among the fan base,” and “We embrace positive news stories together.”

Data Analysis

A path analysis was used to assess the proposed model (Baron & Kenny, 1986; Figure 1). The model investigated whether esports fans’ sense of community acted as a mediating variable between team identification and consumer behaviors. SPSS 25 software was used to manage the data and run the descriptive statistics, and SAS 9.4 with a maximum likelihood estimation was used to analyze the proposed path model.

Results

Descriptive Statistics and Correlations

The descriptive statistics (means and standard deviations) for the variables and the correlations among the variables utilized in this study were first computed in order to confirm the assumptions underlying the analysis (i.e., the normality of the variables). While the team identification and sense of fan community variables met the normality assumption, the consumer behavior variables (watching, playing, and spending on esports) did not, showing absolute values for kurtosis and skewness of greater than 7 (Blanca et al., 2013; Kline, 2015). Hence, prior to the path analysis, log transformations of the consumer behavior variables were conducted, after which all of the variables met the normality assumption (Table 2).

Path Analysis

Next, path analysis was used to analyze the mediating effect of the participants’ sense of belonging to a fan community between their team identification and consumer behaviors. The fit of the proposed model was not tested since it is saturated with zero degrees of freedom. The composite scores for the two measures (i.e., team identification and sense of fan community) were calculated and applied to the proposed model. The results indicated that the participants’ team identification directly affected their sense of fan community, thereby supporting H1. Moreover, team identification was directly associated with the number of hours they spent playing games and the amount of money they spent on gaming, thereby supporting H2. However, the participants’ sense of belonging to a fan community did not mediate between team identification and consumer behaviors, as there was no significant direct or indirect effect on the latter, so H3 was not supported. Overall, the proposed model was able to account for 40% of the variance in

Table 2. Descriptive Statistics (N = 182)

Measure	M (SD)	Skewness	Kurtosis	1	2	3	4	5
1 Team Identification	5.08 (1.45)	-.30	-.18	–				
2 Sense of Fan Community	4.35 (1.28)	-.30	.13	.61**	–			
3 Log _{Hours Spent Playing} esports Games	1.22 (1.06)	.33	-.55	.05	-.002	–		
4 Log _{Hours Spent Watching} esports Games	1.60 (1.03)	-.16	-.63	.14	.01	.39**	–	
5 Log _{Spending on esports} Games	1.45 (1.38)	.40	-1.09	.26**	.10	.29**	.36**	–

* $p < .05$, ** $p < .01$.

Table 3. Standardized Path Coefficients

Path	Direct Effect	Indirect Effect	Total Effect
Team Identification → Sense of Belonging to a Fan Community	.61**		.61**
Team Identification → Hours Spent Watching esports	.08	-.03	.05
Team Identification → Hours Spent Playing esports	.22**	-.07	.14*
Team Identification → Amount of Money Spent on esports	.32**	-.06	.26**
Sense of Belonging to a Fan Community → Hours Spent Watching esports	-.05	–	-.05
Sense of Fan Community → Hours Spent Playing esports	-.12	–	-.12
Sense of Fan Community → Amount of Money Spent on esports	-.10	–	-.10

* $p < .05$, ** $p < .01$.

the participants' sense of belonging to a fan community, for 3% of the variance in the hours they spent playing, and for 7% of the variance in the amount of money they spent on esports (Table 3 and Figure 2).

Discussion

The results of the analysis indicate that the identification of the Korean esports fans who participated in this study with their favorite teams had a significant positive effect on their development of a sense of belonging to a fan community. This finding is consistent with the finding by Katz et al. (2018) that sports fans tend to identify with both their favorite teams and other fans of those teams. Furthermore, Mastromartino et al. (2019) found that this identification with teams could create connections among fans by fostering a sense of belonging to a fan community. However, these studies focused on traditional sports fans, while the present study shows that identification with an esports team could have the same effect. This study also went beyond previous research indicating that bonding occurs among fans of the same esports teams (Hamari & Sjoblom, 2016) by utilizing the specific concept of the sense of fan community—rather than a single-item question – to assess whether esports promote bonding among

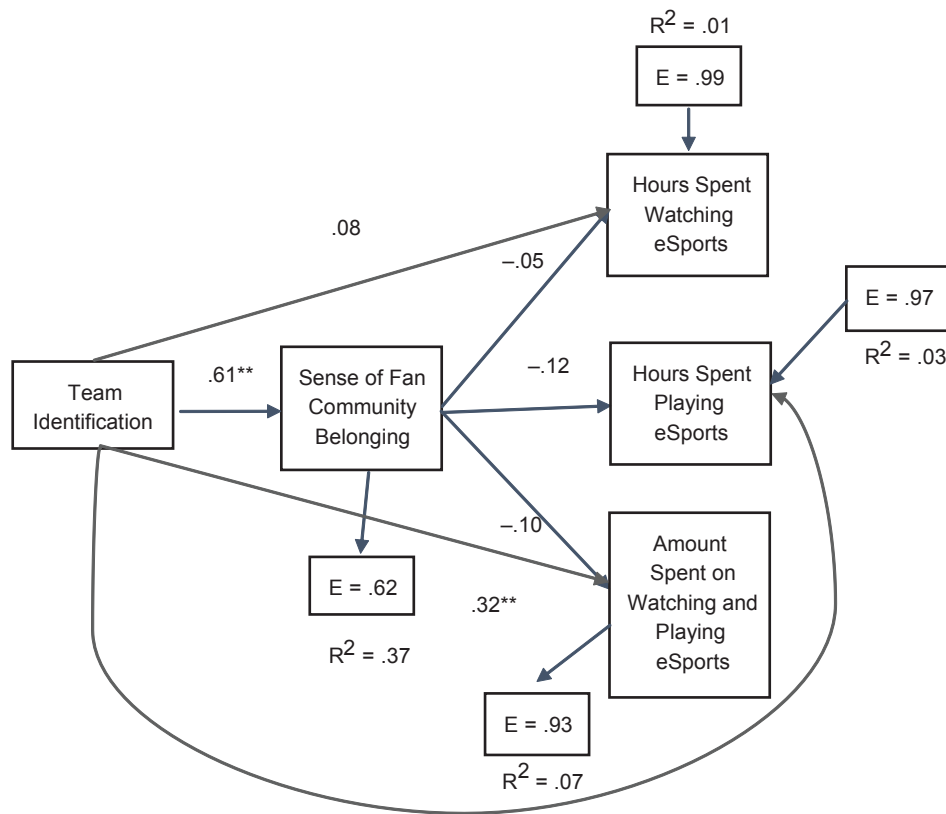


Figure 2. Behavior Path Model of esports Fandom

fans of the same teams. Moreover, this study's results also add to Xue et al.'s (2019) study showing that esports fans form their sense of community by identifying themselves with the team in addition to utilizing a virtual community such as Reddit. Additionally, our study provides significant findings by offering statistical support for esports fans' formation of a sense of community within a fan community.

Interestingly, while the present study shows a direct positive causal relationship between esports team identification and the consumer behaviors of watching, playing, and spending on esports, the sense of belonging to a fan community shows no direct or mediating effect on these behaviors. This finding is significant as it shows how esports fans' consumer behaviors may be different from those of traditional sports fans. For instance, Hedlund's (2013) study showed how forming a sense of community contributes to consumer behaviors for traditional sports fans. More specifically, traditional sports fans may purchase goods related to the teams they follow and share their commonalities. The SSIS-R scale (James et al., 2019) utilized in this study also includes an item asking how often fans display their team preferences using items related to the teams. Hence, traditional sports fans are able to share a sense of community, which ultimately leads to them engaging in consumer behaviors such as attending games, sharing through word of mouth, etc. (Hedlund, 2013). Yet, our study provides support for the finding of Hamari and Sjoblom (2016) that gratifying the need to participate in social activities does not significantly affect the frequency with which participants watch esports. The results of this study also extend those of Hamari and Sjoblom by showing that feelings of connection with a fan community do not significantly affect either the number of hours or the amount of money spent on watching and playing esports. In addition, since most esports teams do not have a physical affiliation, the sense of community that esports fans develop by following esports teams may be weaker than with traditional sports. While the symbols or marks of professional or college sports teams can be easily seen, this is not the case for esports teams. Furthermore, this result may be explicable in terms of differences between the environments of esports leagues and traditional professional sports leagues. For instance, according to a recent report on the Korean esports industry by the Korea Creative Content Agency (2021), the average length of a professional esports player's contract is about a year, as is the case for professional players of traditional sports. Hence, since professional esports players often change teams, their fans may do the same and follow their favorite players, or they may remain loyal to teams that may experience a great deal of turnover over the course of a year. The

result may be attributable to the different levels of commitment to fan communities of esports fans compared with traditional sports fans, and this distinction may account for the inconsistency between the results of this study and previous studies emphasizing connection with a fan community as an explanation for positive consumer behaviors (Hamilton et al., 2014; Hamari & Sjoblom, 2016; Qian et al., 2020; Scholz, 2012; Sjoblom & Hamari, 2017).

However, the identification of the participants in this study with their favorite teams did not significantly affect all of the consumer behaviors measured here. Thus, while this form of identification did have a positive effect on the amount of time and money spent playing, the number of hours spent watching esports did not show a significant causal relationship with participants' identification with particular teams. Further, although past studies (Fisher & Wakefield, 1998; Gwinner & Swanson, 2003; Madrigal, 2000; Wann & Branscombe, 1993) found a direct causal relationship between sports fans' identification with teams and consumer behaviors, such as attending professional sporting events and purchasing merchandise related to the teams that they followed, the findings presented here indicate that it is indeed necessary to differentiate the traditional sports fandom from the esports fandom (Cushen et al., 2019). Specifically, most of the participants in this study watched esports for an average of 6 hours per week. Since most were recruited from one of the Korean League of Legends fan community websites, where the average match lasts around 2 hours (matches consist of either two or three games, each lasting around 35 minutes; Seo, 2022), they seem to have been fond of this form of entertainment. The finding that not all of the participants who watched the games identified with a specific team indicates that at least some esports fans differ from traditional sports fans in that they focus their fandom on the action itself rather than on the players' affiliations.

Conclusion

Practical Implications

One of the practical implications of the findings of this study is that esports teams would benefit from a focus on attracting individual fans rather than appealing to fan communities, as the sense of togetherness built within the latter does not appear to promote consumer behaviors—in particular, spending a significant amount of time and money on esports—while individuals' identification with specific esports teams does appear to have this effect. This situation may be attributable to the fact that most esports teams lack a physical location, while most traditional professional sports teams are associated with a specific city. In other words, many traditional sports teams have a reason to promote the representativeness of their cities and encourage togetherness within the fan community, but esports teams are likely to be more effective in fostering consumer behaviors by focusing on the fans as individuals—for instance, by using the pronoun “you” rather than “we” or “us” in advertising so as to reinforce fans' identification or commitment to their favorite teams.

Additionally, the fact that the participants in this study spent around the same amount of time—6 hours weekly – watching esports, irrespective of whether they identified with a team, suggests that the managers and organizers of professional esports leagues and teams should strive to keep the games as competitive as possible. That is, fans are likely to watch entertaining or “close” games in terms of the final score, even without a commitment to one of the teams or when their favorite team is not involved. Hence, competitiveness should be a priority for the organizers of games.

Limitations and Opportunities for Future Research

A clear limitation of the present study is the inclusion of only Korean participants. Therefore, the findings cannot be generalized to other countries where esports are popular (China, the United States, etc.). Future studies could circumvent this limitation by seeking participants from fan communities in these other countries. Furthermore, regarding the sample, although an effort was made to recruit participants from multiple fanbases, most were followers of the League of Legends Championship Korea (LCK). Other popular esports leagues have global fanbases, such as Player Unknown's Battle Ground (PUBG), Dota 2, and StarCraft II. Therefore, considering more diverse fan communities would increase the generalizability of studies such as this one. Lastly, consideration of additional determinants of team identification and the sense of community using diverse samples would add complexity and detail to the model proposed here. The relatively small number of participants in this study may have been insufficient for providing a comprehensive picture of consumer behaviors. Taking into account factors such as gender and income level in the context of a more nuanced consumer behavior model would shed much-needed light on this relatively new market.

Ethics approval and informed consent

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“We Should Not Have the Same Restrictions as Everybody Else:” Southeastern US CrossFit Coaches’ Perceptions of COVID-19 Restrictions

Authors’ contribution:

- A) conception and design of the study
- B) acquisition of data
- C) analysis and interpretation of data
- D) manuscript preparation
- E) obtaining funding

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Abstract

The spread of the COVID-19 virus significantly impacted the fitness industry with government restrictions including mandated closures. CrossFit, a major player in the global fitness industry, faced a new industry landscape and significant internal division while coping with the crisis. This study contributes to the literature on CrossFit coaches, who are important cultural figures in fitness services. This study investigated CrossFit coaches’ perceptions of COVID-19 restrictions through semi-structured interviews with a diverse sample in Georgia and Florida, U.S. The coaches displayed CrossFit exceptionalism, believing that fitness facilities should have been treated differently, and CrossFit gyms in particular were distinctive enough to merit special consideration. Some coaches approved of the governmental response, but others disapproved, and many expressed gratitude that they were in states with short restriction periods. Their demonstration of uncertainty, however, somewhat conflicted with their exceptionalism. These perceptions may influence coaches’ behaviors and impact CrossFit participants, which makes the topic worthy of additional study.

Keywords: exceptionalism, gratitude, gyms and fitness centers, uncertainty

Introduction

The COVID-19 pandemic transformed the performance and consumption of sports and fitness activities. The spread of the virus had an unprecedented effect, touching all aspects, levels, and stakeholders of the sport and fitness industries. It drastically changed many aspects of sport and physical culture, including management, marketing, development, policy, training, performance, and coaching (Glebova et al., 2022). The lockdowns governments imposed to stop the accelerated spread of this highly contagious virus (Kaur et al., 2020) triggered many of these changes. In spring 2020, public health leaders categorized gyms and fitness centers as high-risk venues and recommended they be closed (Stone, 2020). In mid-March many U.S. states began mandating gym and fitness center closures. By April 6, all but Nebraska and South Dakota (Ballotpedia, 2020) had forced gyms to cease in person operations (Davalos, 2021; DeMartini & Willett, 2022). These restrictions resulted in a significant impact on the fitness industry (DeMartini & Willett, 2022; Scott, 2020).

The fitness industry endured monumental and long-lasting financial impacts due to these COVID-19 restrictions (DeMartini & Willett, 2022; Yinger, 2021). Fitness businesses and coaches found themselves in a new reality after the changes and restrictions (Jankowska, 2021). According to industry associations, twenty-two percent of gyms and fitness studios closed by July 2021 (Fernandez, 2021). In the U.S., 1.5 million employees in the fitness industry lost their jobs to the pandemic (Fernandez, 2021). CrossFit, a major player in the fitness industry (Woolf & Lawrence, 2017), also suffered. Twenty percent of its affiliate gyms folded during the pandemic (Hart, 2021).

CrossFit has dual meanings, considered both a physical fitness regimen as well as a lucrative fitness brand (DeMartini & Willett, 2022; Glassman, 2004). As of 2015, CrossFit generated approximately \$4 billion in annual revenue globally (Ozanian, 2015; Woolf & Lawrence, 2017). Recently, the organization started taking bigger steps in trying to combat chronic disease through the health care system (Belluz, 2018; DeMartini & Willett, 2022) and launched CrossFit Health, which offers training workshops to medical doctors.

Recent research has been conducted on CrossFit participants (Beasley et al., 2021; Coyne & Woodruff, 2020; Dominski et al., 2021; Lautner et al., 2021; Malcom et al., 2021; Redwood-Brown et al., 2021; Thompson & Isisag, 2022; Whiteman-Sandland et al., 2018; Woolf & Lawrence, 2017), however fewer studies focus on its coaches (DeMartini & Willett, 2022; Heinrich et al., 2017; Heywood, 2016; Nash, 2017; Waryasz, et al., 2016). U.S. personal trainers serve as ‘cultural intermediaries’ between their clients and public health agendas (Smith Maguire, 2008). Additionally, studies on CrossFit coaches have community-wide public health implications (Heinrich et al., 2017). Since CrossFit coaches, similar to personal trainers, are key figures in the production, promotion, and consumption of fitness services (Nash, 2017) their thoughts are relevant at this time of great change in the fitness industry precipitated by the pandemic (Jankowska, 2021; Moustakas, 2020). Therefore, this study investigates CrossFit coaches’ perceptions of COVID-19 restrictions in Georgia and Florida, United States.

Literature Review

CrossFit

Greg Glassman and Lauren Jenai founded CrossFit in 2000, sparking one of the biggest fitness trends of the twenty-first century and branding it the sport of fitness (Dawson, 2017). In CrossFit affiliate gyms, coaches lead high intensity group exercise classes typically located in warehouses with large open spaces (DeMartini & Willett, 2022; Maslic, 2019). The company’s intensity, both inside and outside the gym, has been both celebrated and criticized (Hart, 2021). In 2020, Berkshire Partners, a private equity firm, and technology entrepreneur Eric Roza bought CrossFit from Glassman (Landsverk & Warren, 2020) after significant controversy (Hart, 2021).

In 2022, CrossFit had more than 10,000 affiliates across the globe (Kalil, 2022). CrossFit utilizes an “affiliation” model, rather than a traditional franchise system, espousing a libertarian free market ideology (Mannix, 2014; Nash, 2017). Compared to the mainstream commercial fitness franchise business model, CrossFit has lower barriers to entry (Mannix 2014; Nash, 2017). To affiliate, trainers need only have a CrossFit Level 1 trainer certification and pay a relatively low, annual licensing fee in order to utilize the brand’s name (Helm, 2013; Nash, 2017). Unlike franchisees, affiliate owners are free to run an affiliate with few restrictions and do not share revenue with CrossFit headquarters (HQ) (Nash, 2017). CrossFit gyms retain significant autonomy, determining membership prices, programming workouts, and purchasing equipment (DeMartini & Belasik, 2020; Sahlberg, 2012). CrossFit HQ does not accredit or inspect affiliate gyms in order to retain the brand name, due to the company founder’s belief that ‘good’ affiliates will succeed, and ‘bad’ affiliates will fail (Beers, 2013; Nash, 2017).

CrossFit Culture

An essential element of the CrossFit experience is a sense of community, and the overarching culture is one of camaraderie (Lautner et al., 2021). CrossFit participants reported higher levels of social bonding and belonging compared to participants who trained at traditional gyms (Claudino et al., Whiteman-Sandland et al., 2018). CrossFit fosters unforeseen connections among participants of different genders, abilities, ethnicities, and ages who would not normally exercise together (Crockett & Butryn, 2018). Though, in what can be viewed as a contradiction, CrossFit culture also emphasizes the neoliberal tenets of self-sufficiency and individual responsibility (Nash, 2017), and an ethos of self-improvement (Edmonds, 2020; James & Gill, 2018). The same premise that a CrossFit affiliate is individually responsible if it thrives or fails is often passed down to the members, who ultimately are accountable for their own success for failure (Heywood, 2016).

Distinctive features of CrossFit include positioning of CrossFit as a sport and clients as athletes (Woolf & Lawrence, 2017). CrossFit distinguishes itself from other types of training programs by utilizing the element of competition to encourage fitness results (Schrijnder et al., 2021). Crockett & Butryn (2018) found CrossFit gyms were achievement focused, highly disciplined, and the workouts could be brutal. The training seeks to optimize human performance by preparing participants for the “unknown and unknowable” (Musselman, 2019). Dawson (2017) argued that CrossFit gyms are reinventive institutions that offer an opportunity for transformation not only of the client’s body, but their identity. The willingness of CrossFit participants to do whatever it takes, the mutual connection and identification derived from shared suffering (Dawson, 2017), and a distinctive nomenclature (Musselman, 2019) has led to CrossFit being labeled a cult (Dawson, 2017; Heywood, 2016).

CrossFit Coaches

In the past five years, sources reported the number of licensed CrossFit trainers at 80,000 (*CrossFit v. NSCA*, 2016) to 116,000 (Nash, 2017) but CrossFit does not publish exact totals of number of trainers nor the demographic profile of their trainers for legal and licensing reasons (B. Millsaps, personal communication, May 5, 2022). Many CrossFit coaches hold other personal training and strength and conditioning certifications in addition to their CrossFit credential (Waryasz, et al., 2016). CrossFit instruction combines the skills of a personal trainer, group exercise instructor and traditional sport coach, creating a hybrid role (Nash, 2017). CrossFit coaches shift the traditional role of a sport coach from a authority figure to one who engages in emotional labor (Heywood, 2016). CrossFit coaches believe that the positive physical and psychological outcomes participants experience influence exercise participation and adherence (Heinrich et al., 2017).

CrossFit coaches can be characterized as cultural intermediaries. Bourdieu (1984) defined cultural intermediaries as those engaged in occupations involving presentation and representation and in cultural production and organization. Cultural intermediaries legitimate their advice and influence others by utilizing appearances, attitudes, and images (Smith Maguire, 2008).

Personal trainers inhabit a vital role in health-promoting social discourses (Donaghue & Allen, 2016). Personal trainers create their role as intermediaries between their clients’ personal goals and public health agendas (Donaghue & Allen, 2016; Smith Maguire, 2008). CrossFit coaches, similar to personal trainers, are key figures in cultural production, promotion, and consumption of fitness (Nash, 2017). CrossFit utilizes its coaches to advocate for members to devote themselves to the philosophy that emphasizes neoliberal physical and psychological self-improvement as the primary avenue to health (Nash, 2017). CrossFit coaches form relationships that involve facilitating individual athletes in the achievement of their personal goals both inside and outside the gym (Heywood, 2016). Therefore, they mediate between government messages of public health and their athletes’ health goals. CrossFit coaches’ perceptions of the governmental actions taken to protect public health during the COVID-19 pandemic are important due to their influence over the athletes in their CrossFit gyms.

COVID-19 Restrictions

Based on the severity and spread of COVID-19, lockdown measures and access to gyms and fitness center facilities varied significantly between U.S. states (Huebner et al., 2021). Florida Governor DeSantis signed an executive order which closed most gyms and fitness centers (Fla. Exec. Order No. 20–71, March 20, 2020). Georgia Governor Brian Kemp decreed a stay-at-home order on April 2, 2020 (Ga. Exec. Order No., 04.02.20.01, April 2, 2020) that specifically mandated gyms and fitness centers terminate in-person operations (DeMartini & Willett, 2022).

Because industry advocates believed that fitness facilities provide preventative care and health benefits, they questioned the governments’ decision to close sports and recreation facilities. They argued that they should not be lumped into the entertainment sector, but fitness facilities should have been classified as part of the health and prevention sector (Piotrowski & Piotrowska, 2021). Due to the beneficial effects of exercise on both mental and physical health, they petitioned for the fitness industry to be allowed to function more freely during the pandemic both in the U.S. (Community gym coalition, n.d.; Scott, 2020) and Europe (Joskin, 2021; Piotrowski & Piotrowska, 2021). IHRSA, a professional association that represents thousands of fitness facilities worldwide, employed lobbyists in the U.S. at the state and federal level and encouraged cooperation among various segments of the fitness industry (Scott, 2020). IHRSA produced scientific data and reports to help push governments toward reopening and advocated for gyms and fitness centers to be a part of the economic relief package (Perkins, 2020; Scott, 2020). After an intense lobbying campaign (Perkins, 2020; Scott, 2020), which included CrossFit, (Community gym coalition, n.d.; Scott, 2020), gyms and fitness centers were reopened in phase one (Warren et al., 2020).

The state of Georgia had one of the most aggressive timelines for re-openings and allowed gyms and other service-oriented businesses to reopen their doors at the end of April 2020, pitting the governor against mayors of the state's largest cities (Andone et al., 2020). The executive order provided additional guidance to gyms upon reopening (Ga. Exec. Order No., 04.23.20.02, April 23, 2020), and by mid-May, gyms could resume group classes with social distancing (Ga. Exec. Order No., 05.12.20.01, May 12, 2020).

Similarly, Governor DeSantis declared Florida gyms and fitness centers could re-open to 50% of their building capacity with added safety measures in May (Fla. Exec. Order No. 20–123, May 14, 2020). By June 5, 2020, gyms and fitness centers could operate at full capacity with social distancing and frequent cleaning (Fla. Exec. Order No. 20–139, June 5, 2020).

CrossFit published guidelines for affiliate owners in an effort to mitigate the risk of COVID-19 transmission in December 2020 (Gillin et al., 2020). CrossFit argued that their gyms played a vital role in combating COVID-19 and reversing chronic disease. These guidelines highlighted CrossFit's perceived role in reversing diseases like hypertension and diabetes, which increased morbidity risks in COVID-19 patients. CrossFit advised gyms to adhere to all local health regulations and use the stricter requirements if there was a discrepancy between local and state regulations. Other suggestions encouraged symptom screening, CO2 level monitoring, changing class times, limiting class sizes, and utilizing reservations, social distancing, sanitization, and signage. Masks were recommended for both staff and clients when social distancing could not be maintained (Gillin et al., 2020).

CrossFit Reaction to Restrictions

The CrossFit space contains contradictory discourses about health and fitness (Crockett & Butryn, 2018). Therefore, it is not surprising that CrossFit's response to the pandemic was significantly divided, even more obviously than other fitness brands (Mestel, 2020). The pandemic response reflected and exacerbated the huge culture war within the affiliate community (Royse, 2021). CrossFit's libertarian ethos is based on "no rules" (Royse, 2021) and values personal responsibility (Nash, 2017), a principle of conservatism, which historically has been central to the company (Mestel, 2020).

CrossFit HQ attempted to carefully balance advocating for gym owners to reopen cautiously with disturbing its large right-wing base by being perceived to be infringing on individual freedoms in any way (Mestel, 2020). CrossFit did publish guidelines calling for affiliates to follow local government health guidelines and the Center for Disease Control recommendations (Gillin et al., 2020). Though difficult to measure, most gyms appear to have followed government guidelines.

However, a CrossFit affiliate owner in New York made national news by operating against the local COVID regulations and went viral in a news clip tearing up his fines (Royse, 2021; WGRZ staff, 2020). He remained an affiliate through that incident and a high-ranking CrossFit HQ employee promoted him on social media (Royse, 2021; Mestel, 2020). An affiliate in California received funds from crowdfunding campaigns to pay the fines it accrued as a result of operating against state and local mandates (Royse, 2021; Mestel, 2020). This behavior could have been interpreted to be condoned by CrossFit HQ because the gym-owner was an official affiliate representative (Royse, 2021; Mestel, 2020).

CrossFit gyms' pandemic responses were also complicated by another split within the community in 2020. Glassman admitted to creating a rift in the CrossFit community due to his remarks making light of George Floyd's murder, recounting unfounded COVID-19 conspiracy theories (Bieler & McGregor, 2020), and downplaying the existence of racism (Demopoulos, 2020). Gyms across the country were abandoning their affiliation (Bieler & McGregor, 2020), sportswear giant Reebok ended a longtime sponsorship, and elite level professional CrossFit athletes cut ties (Demopoulos, 2020). However, CrossFit retained the support of many community members, some of whom objected to Glassman being called racist (Saran, 2020; Wischhover, 2020). Amid the community division, Glassman announced he was stepping down as CEO, though he remained sole owner, and CrossFit appointed another long-term employee as his replacement (Wischhover, 2020).

Method

Participants

The investigators engaged in opportunity sampling to recruit (N=20) CrossFit coaches in the Southeast U.S. Nine coaches were located in northeast Florida and eleven coaches worked in the metropolitan area of Atlanta, Georgia. Having previously conducted research in the CrossFit area, the investigator relied on existing connections as

well as internet searches to identify CrossFit coaches in the target regions. This led to additional snowball sampling (Ritchie et al., 2003) based on recommendations from interview participants.

Seventy percent of the sample was male while thirty percent was female coaches. This is similar to Nash's (2017) sample of CrossFit coaches, which was 75% male and Waryasz et al. (2016) at 65%. The sample was racially diverse, with 10% Asian, 30% Black or African American, 5% Hispanic or Latina/o/e, 5% Bi – or multi-racial, and 50% white participants. This contrasts with both Nash (2017) and Heinrich et al. (2017) samples which were exclusively white or "Anglo." Eighty-five percent of the interviewees identified as under 45 years of age with the majority (45%) falling into the 35–44-year-old range.

The group held high levels of CrossFit experience. The average amount of time the participants had been involved in CrossFit (including participation as an athlete and a coach) was 8.3 years, with a median of 7.5 years, and a range of four to sixteen years. This is consistent with Waryasz, et al. (2016) which found CrossFit coaches averaged 8.5 years in exercise related employment.

The sample was highly educated which was similar to Heinrich et al. (2017). The majority (90%) indicated they earned a bachelor's degree or above while only two participants reported trade school as their highest educational attainment. Like most Americans (Wenger & Zaber, 2021), all participants responded that they were a version of middle class.

In terms of political affiliation, the sample skewed to the political right. Six (30%) participants chose "Slightly conservative" and one (5%) "Very conservative." Seven (35%) participants identified as Independent, with four of those "Independent leaning left" and three "Independent leaning right." Only one participant indicated they were "Slightly liberal." Four participants (20%) chose "other" and one (5%) preferred not to answer.

Data Collection and Procedures

After an extensive review of literature, eleven scripted questions about COVID restrictions were developed for interviews. These questions asked coaches about their experience with and thoughts about the COVID-19 restrictions their gym endured. See Appendix A. The investigators' institutional review board granted ethics approval. The interviews were recorded and transcribed using Rev. Participants were contacted via email, by phone, or in person to schedule interviews. Interviews were conducted in northeast Florida from April through June 2021, and in Georgia from July to September 2021. All interviews took place in the coach's CrossFit affiliate and lasted on average 15–45 minutes. The investigators offered no incentives for participation in the semi-structured interview.

The investigators utilized descriptive coding for the interview transcripts. Descriptive coding assigns basic labels to the data which provides a topic inventory (Saldana, 2015). Semantic codes, which identify and report on explicitly stated ideas, concepts, meanings, and experiences (Braun et al., 2016), were developed. Investigators coded manually on hard copy transcripts without the assistance of computer-assisted qualitative data analysis software. To ensure reliability, each coder reviewed transcripts individually and the primary investigator resolved any disputes.

As described by Braun et al (2016), the data-coding and theme development was conducted in an inductive way, where the content itself guided the developing analysis. Although investigators did not create a coding scheme before engaging in the analysis, the research question guided the coding, which was: How do CrossFit coaches perceive COVID-19 restrictions placed on gyms? Similar to Lautner et al. (2021), investigators implemented a coding reliability thematic analysis (Braun & Clarke, 2021) to derive meaning from the data (Holton, 2007). Investigators developed themes by engaging in an active process that involved identifying ways to cluster codes together around larger concepts they all shared (Braun et al., 2016). Investigators began with seven provisional themes and then revised. By analyzing the relationships between the provisional themes and focusing on coherently addressing the research question, the authors were able to narrow them down.

Though data saturation is a contested concept in qualitative research (Saunders et al., 2018), the authors utilized Guest's et al (2020) definition. Saturation refers to the point during data analysis at which incoming new data produces little or no new useful information relative to the study objectives (Guest et al., 2020). The CrossFit coaches responded to questions similarly, there was consistency across responses, and their answers revealed general patterns, indicating that data saturation occurred (Lautner et al., 2021) and additional interviews would be unnecessary to answer the research question. The investigators then paired direct quotations from the transcripts to the themes.

Results & Discussion

The narrowing of the provisional themes led to the central finding of “CrossFit exceptionalism.” Coaches demonstrated CrossFit exceptionalism by expressing a belief that CrossFit gyms improve health during a pandemic and are unique, therefore, CrossFit should be treated differently than other industries and fitness facilities. This central theme of CrossFit exceptionalism yielded subthemes including approval and disapproval of the government’s response to shut down CrossFit gyms due to the risk of COVID-19 and gratitude that their gyms were located in U.S. states with short restriction periods. The coaches’ opinions on the governmental response and their gratefulness supported their CrossFit exceptionalism. Therefore, they are presented as components of, and reinforcing, CrossFit exceptionalism. The theme of uncertainty around the governmental restrictions emerged, but can be interpreted as contesting CrossFit exceptionalism, so it is addressed separately.

CrossFit exceptionalism

Respondents expressed their beliefs that because CrossFit gyms could improve health during a pandemic and were distinct from other types of businesses, they should not be subject to the same COVID-19 restrictions as other industries. They also articulated a desire for CrossFit to be treated differently from not only other industries, but also from other types of fitness establishments due to the unique nature of CrossFit gyms.

James and Gill (2018) previously connected exceptionalism to CrossFit. They utilized a combination of participant observation, interviews, and textual analysis in an ethnographically inspired study of CrossFit. They identified reclamation and self-making as key themes in characterizing the ideal CrossFit member in the discourse surrounding CrossFit. They also found CrossFit discourse constructs CrossFitters as exceptional, placing CrossFit participants in opposition to less admirable others.

Exceptionalism, traditionally considered in terms of American exceptionalism in political science (Restad, 2015), includes the idea that the U.S. plays a special and unique role in world history (McCracken, 2002). However, exceptionalism has also been explored in fields as varied as Canadian housing assistance (Bendaoud, 2021), the psychology of the climate crisis (Weintrobe, 2021), and gender in education (Musto, 2019). Exceptionalism is also found in science, e.g., genetics (Garrison et al., 2019) and HIV management (Benton, 2015), law, e.g., family wealth law (Tait, 2019) and sexual assault law (Mann, 2021), and public art (Hahner & Varda, 2014).

There is very little exceptionalism literature in sport or physical activity spaces. Koh (2022) considered World Wrestling Entertainment’s shift away from American exceptionalism and towards a commercialized transnationalism. Lenskyj (2018) identified sport exceptionalism as related to the Court of Arbitration for Sport, where sport disputes should be treated differently because sport organization reputations are worth preserving (Lenskyj, 2018). We did not find any other applications of exceptionalism in sport or fitness contexts. Therefore, we build on James and Gill (2018) and attempt to situate our CrossFit findings within the broader exceptionalism literature as well as fitness literature.

Respondents emphasized the role that CrossFit plays in health and wellness and therefore, the governmental restrictions did not sufficiently recognize that they should be treated differently from the norm. A coach summarized this position elegantly, saying: “We are a place that inspires health and wellness that should have been taken into account that we can actually help people’s health and immunity. So, we should not have the same restrictions as everybody else.” This supports Bratland-Sanda et al. (2020) finding that personal trainers believed the government overlooked gyms and fitness centers as a health promoting service. Many other coaches echoed this view:

“A large reason why so many people are affected is because of underlying health conditions...and we can’t shut down places that are helping to prevent that.”

“Closing down the thing that makes us healthy was...backwards...It just didn’t make sense that you would close down the one thing that actually keeps us from being sick. So, I didn’t think the gyms necessarily needed the restrictions. Maybe restaurants, but not gyms.”

“For the government to say, ‘You can’t exercise.’ It’s only going to make you healthier and keep you healthy. To me, it was just so hypocritical and so backwards-ass thinking.”

Similarly, multiple respondents argued that CrossFit gyms should have been classified as “essential businesses.

“Gym[s] should have been one of the essential businesses that stayed open during that time, because we are dealing with...health.”

“I think gym should have been deemed an essential... [the industries that were deemed essential] were just companies that had a lot of money and was able to pull strings and... something that’s directly tied to your health and wellness wasn’t deemed essential... there was a lot of things that were deemed essential that were not essential.”

These statements are consistent with Piotrowski & Piotrowska (2021) respondents’ argument that the Polish fitness industry should be allowed to operate in the pandemic since individuals’ mental and physical health can benefit from exercise.

In addition to believing that gyms should be treated differently than other industries, respondents also believed that CrossFit is distinguishable from other types of fitness enterprises. A coach stated, “A lot of these policymakers... aren’t really familiar with the things that they’re making policies for, they don’t understand the nuance.” Comparing CrossFit to high-volume, low-cost gyms, respondents pointed out multiple differences that they thought justified not being subject to the same rules.

“I think that gyms in general were lumped together... They didn’t consider the differences in layout or functions of the different types of gyms, right? So they put a CrossFit gym, a functional fitness gym in the same pool as ‘Anytime Fitness.’ But the way those scenarios are run are very, very different.”

This reflects Heywood’s (2016) characterization of CrossFit as an “oppositional model to the traditional fitness paradigms” (p. 128).

Coaches identified differences in the size and type of facilities in which exercise is conducted, saying,

“When it comes to a globo-gym versus a CrossFit gym, it’s a lot different. We’re in like warehouse spaces... most of the time it’s open doors. So, it’s a lot of air circulation and the government doesn’t see that.”

Similarly, Bratland-Sanda et al. (2020) respondents identified important differences in exposure to infection between large and smaller fitness spaces.

Coaches also mentioned differences in types of exercise equipment, stating:

“CrossFit is not LA Fitness. CrossFit is not one of the big box gyms that allows hundreds of people to share...”

“This is a safe space, a healthy space... I understand [closing] bars and clubs and restaurants... I almost understand the globo-gym aspect of it because... you’re kind of bouncing from one machine to another, it’s packed in there... But CrossFit... it’s a really boutique fitness style space and everyone can have their own barbell.”

Making these distinctions is similar to genetic exceptionalism (Garrison et al., 2019) and HIV exceptionalism (Benton, 2015) where the special or unique nature of the test or disease merits special consideration and should be handled differently than other similar phenomena. CrossFit coaches thought that the unique facility, layout, and equipment of a CrossFit gym should be handled differently than other facilities.

In addition to the differences in physical spaces, respondents also brought up the nature of CrossFit as compared to other types of fitness regimens, implying a sense of superiority. A coach said:

“COVID put people in a serious mental decline, and we should be promoting people to get back to working out because we know exercise reduces anxiety, depression by like 30% in and of itself, right. High intensity exercise – that’s CrossFit.”

The idea the CrossFit can fight COVID-19 better than other forms of exercise may be influenced by CrossFit’s founder Glassman’s claims that CrossFit can solve chronic disease (Metsel, 2020). Similarly, people utilizing an exceptionalism mindset falsely believe they are entitled to see themselves in idealized terms and have whatever they want because they are ideal (Weintrobe, 2021). The CrossFit coaches feel entitled to different regulations because they believe their training regimen is ideal to support health and prevent disease.

Coaches stated, “We’re not just a gym. CrossFit has mobility standards, nutrition standards, all different types of resources, PTs, chiropractors, all of that” and “I think it’s just different for CrossFitters... we’re constantly promoting health and fitness.” This denigration of other forms of fitness is similar to yarn bombing exceptionalism wherein devotees pronounce this type of art exceptional, while concurrently delegitimizing other forms of public art (Hahner & Yada, 2014). CrossFitters pronounce CrossFit as special and other types of fitness centers as less legitimate.

A coach admitted, “There was a lot of arrogance in the CrossFit community of people saying ‘I’m fitness, I’m the picture of health. I’ll be just fine.’ This reflects James & Gill’s (2018) finding that the “discourse surrounding CrossFit constructs the ideal participant by placing CrossFitters in opposition to less admirable others or less

desirable lifestyles” (p. 717) and sets them apart from and elevated above the general population. The CrossFit atmosphere of group bonding creates a sense of “us” against the world (Heywood, 2016). This is similar to high-wealth exceptionalism, which inspires high-wealth families to conceive of themselves as existing separate and apart from the larger polity (Tait, 2019). CrossFit exceptionalism leads coaches to see CrossFit participants as separate from the unfit, typical American. Another coach echoed this when addressing the government decision makers by accusing “...How about you go to a gym and be a little more in shape and learn how to feed your family correctly.”

In addition to identifying differences in the conditions under which CrossFitters participate and the features of the CrossFit program, the coaches also indicated a desire for more individual autonomy. One coach said, “There was a feeling of being punished for no reason...it just would’ve been nice to be able to control our own situations. Let the members and the communities dictate what needed to be done.” CrossFit draws support from neoliberal discourses that have revitalized the primacy of self-governance (James & Gill, 2018). “In the neoliberal view, individual responsibility for one’s own condition is paramount” (Heywood, 2016, p. 199). This desire to self-regulate reflects sport exceptionalism, which argues dispute resolution should remain within the ‘family of sport’ rather than utilize the public legal system (Lenskyj, 2018) and CrossFit’s ethos of self-reliance (Thompson & Isisag, 2022). The coaches did not want a broad governmental mandate, they wanted to be able to make decisions about gym closures themselves. This desire for self-regulation informed their opinions on the governmental response.

Opinion on government response

The respondents’ opinions on the government response to COVID-19 management were divided, which reflected the polarization in CrossFit more broadly (Dawson, 2017; Mestel, 2020). Coaches both approved and disapproved of the governmental actions and their opinions changed over time.

There were examples of approval, particularly at the beginning of the pandemic. Coaches said:

“I think the city did the right thing initially with the shutdown, just because...some people by nature aren’t rule followers. And somethings you to put a foot down...for the betterment of the community.”

“I thought it was necessary...to get people to take it seriously...”

“I do think them going on a little bit of hiatus and closing things down a little bit just to get ahead of it, to see where it was and see what was actually happening, was the smart thing to do.”

As the pandemic progressed, coaches also approved of the re-opening. This is consistent with Bratland-Sanda et al. (2020) where respondents questioned the necessity of keeping fitness centers closed as other health and wellness businesses were allowed to re-open.

“I appreciated how aggressive they [Florida] were in getting us back open.”

“I think they handled it correctly where you let people get back to opening up and back to living their lives.”

However, coaches also indicated disapproval. The disapproval mirrored what Jankowska (2021) found with personal trainers who described the COVID restrictions in their country as ridiculous. The respondents stated:

“I feel like closing the gym was doing a disservice to people.”

“I saw it as a control tactic.”

“I just thought closing down your country was crazy. It’s just crazy.”

This split between approval and disapproval reflects the states’ populations’ divided views on the governmental response. In April of 2020, Georgians were largely divided on the steps the state government took to contain the pandemic. In a sample almost evenly divided between Democrats, Republicans, and independents, about 44% said the measures are appropriate while 41% say the state hasn’t “gone far enough,” and an additional 15% said the state has gone “too far” (Bluestein, 2020). In Florida in April 2020, 41 percent disapproved of the government’s handling of the coronavirus, although 50% of respondents approved (Budryk, 2020). Voters were statistically tied on whether the governor should issue a statewide stay-at-home order during the COVID-19 surge, with 49% answering yes and 48 percent stating he should not (Budryk, 2020).

The resistance to closures is consistent with CrossFit’s history of fighting what it sees as unnecessary government restrictions (Kilgore, 2015) and its’ conservative following (Metsel, 2020).

“I thought any restrictions for a gym was unnecessary.”

“I wasn’t a huge fan [of the restrictions]. I’m pretty much like ‘freedom.’ I’m more pro freedom”

“I just wish they hadn’t forced us to close down...if someone is choosing to go somewhere and they sign a waiver and they know the risks and they want to pay money to do it, you’re preventing me from my livelihood even though I have customers that are willing to come in.”

The coaches’ change of opinion over time to favor aggressive re-opening and the opposition to governmental interference led to a sense of gratitude for being located in states with short shut down periods.

Gratitude

Many of the respondents expressed gratefulness regarding their location in states that did not close gyms for lengthy periods of time. The coaches said:

“Luckily Florida wasn’t shut down too long. If we would have been in other states that were shut down longer, I don’t think it would have been good for us at all...I think everyone is grateful that we are in Florida.”

“I was thankful. I mean, I had a lot of colleagues or friends that I know that own gyms that lost their gym, had to shut down, gyms that haven’t been able to open back up in other places in the United States.”

“[in] Georgia, we were pretty lucky overall.”

Though the studies were conducted on college students, scholars found gratitude may operate as a psychological resource that protects against the damaging mental health effects of the pandemic (Datu & Fincham, 2022) and improve mental well-being during temporary challenges (Geier & Morris, 2022). Feelings of gratitude may be important since those who reported higher levels of gratitude thrived more, showed less psychological distress, and could accomplish more in daily life during the pandemic (Nelson-Coffey et al., 2021). Therefore, the gratitude of the coaches in Georgia and Florida may have helped their personal well-being. If the coaches felt less distress and had fewer interruptions of daily life, that may have also contributed to their opinion that CrossFitters were superior to the general population (James & Gill, 2018), reinforcing CrossFit exceptionalism.

Syropoulos and Markowitz (2021) found those who experienced gratitude to a greater degree in their lives are more likely to act in a way that can help contain the spread of the pandemic, like adhering to health recommendations. Gratitude also motivates pro-social behavior in multiple ways (Syropoulos & Markowitz, 2021). The CrossFit coaches’ gratitude may have influenced their decisions on adhering to public health recommendations, making them more willing to follow the government restrictions for the short time they were mandated in Georgia and Florida, tempering against the resistance observed in CrossFit coaches elsewhere (Royse, 2021).

The gratitude coaches exhibited was predicated on the early re-openings of gyms in Georgia and Florida. The coaches thought CrossFit gyms should not have remained closed for long. This appreciation for a lack of governmental regulation supports CrossFit’s connection to the free market and neoliberalism (James & Gill, 2018; Nash, 2017). For example:

“I understand and appreciate that there was a certain amount of freedom and leeway given.”

“Georgia it was basically a free for all. I’m very fortunate to have that option to have been open during that period versus California, New York.”

“...as far as being able to still run our business, and be open, and having that kind of freedom, I’m very thankful for that.”

CrossFit’s free-market libertarianism (Mestel, 2020; Royse, 2021) is another factor that distinguishes CrossFit from other fitness industry businesses, bolstering the belief in CrossFit exceptionalism.

Uncertainty

In addition to exceptionalism, we also discovered a theme of uncertainty. Typical responses indicated, “There was a lot of uncertainty on exactly what was happening” and “Nobody knew what the hell was going on.” This in itself is not surprising, as the complex structure of laws can produce uncertainty (Sarat, 1990).

“The legality of it was very confusing.”

“Many of us didn’t even know what the law was...literally don’t know the rules and that’s where it became the Wild West and we had to make that shit up because we didn’t understand it.”

Similar to Bratland-Sanda et al. (2020), many of the coaches reported difficulties in interpretation of the rules and the coaches found the guidelines difficult to understand as compared to clearer guidelines for other exercise-related occupational groups like physical therapists. They said:

“There was no rhyme or reason to the way that the restrictions came out.”

“None of us are scientists here. We really don’t know what’s happening.”

However, since CrossFitters view their participation in risky, physically demanding challenges as a method to prepare for unknown and unknowable (Thompson & Isisag, 2022), this uncertainty may have been particularly disconcerting for CrossFit coaches who would not be used to struggling in a novel situation. One might have expected to find that the uncertainty of the pandemic was not worrying to the coaches, since the CrossFit lifestyle is centered on preparedness (James and Gill, 2018; Musselman, 2019), but our findings show the opposite. Their reaction can be interpreted as contradicting their belief that CrossFitters are exceptional. They said:

“I think the confusion and anxiety of not knowing what was going on was probably the worst part of it.”

“We had to take on something foreign and unknown...everyone was on eggshells and trying to navigate the best they could.”

The coaches responded very similarly to Jankowska (2021) whose interviews revealed ubiquitous anxiety and uncertainty in personal trainers faced with the changes in their workplaces due to COVID-19 restrictions. CrossFit coaches had the same worries as other fitness professionals; therefore, they did not display exceptional responses. If CrossFit coaches react the same as other personal trainers, it undermines their justification for an exceptionalism mindset.

Implications

The findings of this study are valuable since societal and scholarly interest in CrossFit has grown (Campbell, 2020) and its coaches contribute to the production, promotion, and consumption of fitness services (Nash, 2017). CrossFit exists at the intersection of community and fitness (Edmonds, 2020). The COVID-19 pandemic has been one of the most arduous disease outbreaks with significantly heightened mortality and morbidity across the global community (Geburu et al., 2021). Therefore, it is valuable to understand CrossFit coaches’ perceptions of the public health response to the virus that seismically changed the fitness industry.

Studies in the UK found it is plausible that perceptions about the pandemic may influence individuals’ behaviors (Hughes et al., 2022). Uncertainty that developed from the belief that the government lacked sufficient planning in the COVID-19 response caused stress and anxiety and stopped individuals from making future plans (Wright et al., 2022). If their perceptions of governmental COVID-19 restrictions influence coaches’ behavior, it could impact more than the coaches as individuals. Due to the size and scope of CrossFit, CrossFit coaches affect a large number of fitness participants. If coaches convey their feelings of uncertainty to their clients, CrossFit participants may experience increased anxiety and hesitancy to make future plans, which could affect more than just their exercise behaviors.

If an exceptionalism mindset leads to people believing they can do whatever they want (Weintrobe, 2021), CrossFit coaches’ perceptions of COVID-19 restrictions could potentially lead to less obedience to public health mandates in the future. Like Hjort (2021), COVID-19, or other communicable diseases, could be seen as only a problem of, and for, others. If CrossFit coaches transfer their exceptionalism to their clients, CrossFit participants may not adhere to future government mandates and may contribute to the spreading of disease by failing to consider their behavior’s impact on the broader community’s health.

Though analyzing international trade and investment law, Arato et al. (2020) concluded the pandemic revealed how exceptionalism poses significant risks to legitimacy and stability of these structures. As CrossFit is engaged in global commerce, coaches’ exceptionalism may similarly present challenges to the legitimacy of the brand and the fitness industry. Though fitness activity trends vary over time (Veiga et al., 2022), CrossFit should be cautious that an exceptionalism mindset does not contribute to a decrease in participant interest in the program.

CrossFit affiliate owners should cultivate relationships with local public officials. Then, if an emergency situation arises in the future where the government is again regulating gyms, the owner will have a channel through which they can get clarifications. Having a personal connection to answer questions could decrease uncertainty around compliance with new laws. Owners should also proactively formulate how they will respond to future governmental restrictions on gyms and clearly communicate that plan with their coaches.

CrossFit affiliate owners and coaches should promote a culture within their gym that minimizes an “us versus them” attitude. If CrossFit participants understand themselves as part of a broader fitness community, it may mitigate their perception of themselves as exceptional. If participants do not view themselves as separate and superior, it may reduce the risk that they will refuse to follow the same rules as other community members.

Particularly due to its increasingly urgent focus on the relationship between health, chronic illness, and fitness (McCarthy, 2021), CrossFit should ensure their emphasis on individual responsibility (Nash, 2017) does not ignore broader community health. Fitness industry advocates and professional associations should continue to educate their constituencies on the role of gyms, including CrossFit, to positively contribute to public health. Sport studies and physical culture scholars should continue to examine the role of fitness coaches in influencing participants' health behaviors.

Limitations

The current study results are not generalizable due to the small sample size from only two U.S. States in the Southeast. Though we cannot generalize in the same manner as in positivist research (Simons, 2009), but we can “demonstrate how and in what ways our findings may be transferable to other contexts or used by others” (Simons, 2009, p. 164). Since the audience for our findings is physical culture scholars, this study can foster knowledge through naturalistic generalizations, which develop as a product of experience by recognizing the similarities of and issues in and out of context (DeMartini et al., 2022; Stake, 1978). Relying on implicit knowledge, generalizations can guide action in familiar contexts (DeMartini et al., 2022; Stake, 1978). Therefore, while the results may not be traditionally generalizable, the perceptions of CrossFit coaches can guide action for those who are familiar with gym and fitness center contexts, like CrossFit affiliate owners and fitness industry professionals.

The study was also geographically limited, focusing on U.S. states with short time frames of governmental restrictions on gyms and fitness centers due to COVID-19. Additionally, some coding reliability researchers advocate for the use of coders who are unaware of the research question to minimize the possible “contamination” of the coding process (Bond et al., 2008; Braun & Clarke, 2021). In this study, coders did have knowledge of and previous work in this research area, so they may lack rigid definitions of “objectivity.” Despite these limitations, the findings are one of the few studies of CrossFit coaches' perceptions of the COVID-19 pandemic and the restrictions placed upon them.

Conclusions

CrossFit, a major player in the fitness industry, faced a new reality with COVID-19 restrictions and internal divisions during the pandemic. This study contributes to the literature on CrossFit coaches, who are important cultural figures in fitness services. This study investigated CrossFit coaches' perceptions of COVID-19 restrictions with a diverse sample from Georgia and Florida, U.S. The coaches displayed CrossFit exceptionalism, believing that fitness facilities should have been treated differently, and CrossFit gyms in particular were distinctive enough to merit special consideration. Some coaches approved of the governmental response, but others disapproved, and many expressed gratitude that they were in states with short restriction periods. However, their assurance that CrossFit is exceptional was contested by the emergence of significant uncertainty.

These perceptions may influence coaches' behaviors and impact the many CrossFit participants, which makes the topic worthy of additional study. This study could extend to include interviews of CrossFit coaches in other regions and U.S. states, or in other countries, which had much more restrictive COVID regulations that persisted for much longer periods of time. Additional research could be done to correlate coaches' perceptions on COVID-19 restrictions and their behaviors, to determine if their perceptions impacted their adherence to COVID-19 regulations placed on gyms. Finally, further study could be conducted on attitudes of exceptionalism in coaches of other niche fitness activities such as yoga or indoor boutique cycling.

Ethics approval and informed consent

Ethics approval obtained 8/11/2021 by Kennesaw State University Institutional Review Board. Reference #: IRB-FY22-61

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Appendix A Interview questions

Question number	Scripted question	Common follow-up question
1	Tell me about yourself.	
2	Please describe your role at this CrossFit gym and how you got into coaching.	
3	How have COVID restrictions impacted your gym?	
4	What was your opinion on how your state and local government dealt with COVID and gyms?	
5	Please describe the protocols you put into place at your gym to deal with COVID.	Can you take me through a timeline of what you were doing when?
6	How did you feel about instituting those protocols?	What was influencing the decisions about the protocols?
7	What is your opinion on the effectiveness of these protocols?	
8	What were your members' reactions to these protocols?	What was your sense of other coaches' reactions?
9	What was your opinion on how CrossFit HQ dealt with COVID restrictions?	What would have been helpful?
10	Is there anything else you'd like to tell me about COVID restrictions and CrossFit gyms?	Is there anything else I should ask?
11	Would you like to ask me any questions?	
12	Who else should I talk to about COVID restrictions in CrossFit gyms?	
