




Article

Demographics and Health Behavior of Video Game and eSports Players in Germany: The eSports Study 2019

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Received: 17 January 2020; Accepted: 9 March 2020; Published: 13 March 2020



Abstract: The number of video game and eSports players is steadily rising. Since little is known about their health behavior to date, the present study examines the demographics and health behavior of video game and eSports players. In this cross-sectional study, data on demographics, health status, physical activity, nutrition, sleep, and video game usage were assessed via a web-based survey of $n = 1066$ players (91.9% male; 22.9 ± 5.9 years; body mass index (BMI): 24.6 ± 4.8 kg/m²) in Germany in 2018. The majority of respondents (95%) reported a good to excellent health status. Two thirds (66.9%) engaged in moderate to vigorous physical activity for more than 2.5 h/week. The average duration of sitting and sleep time was 7.7 ± 3.6 h/day and 7.1 ± 1.3 h/day, respectively. Mean fruit and vegetable consumption was 2.7 ± 1.8 portions/day. Video games were played for 24.4 ± 15.9 h/week on average. Partial Spearman correlations revealed poor positive associations of video game play time to sedentary behavior ($\rho = 0.15$; $p < 0.01$) and BMI ($\rho = 0.11$; $p < 0.01$), as well as a poor negative association to self-reported health status ($\rho = -0.14$; $p < 0.01$). These results indicate the good subjective health of this target group. Nevertheless, the high amount of video game play time and its poor negative association to health status indicate a need for specific health promotion strategies for this target group.

Keywords: eSports; gaming; video games; physical activity; sleep; nutrition; training; health promotion

1. Introduction

Video games and competitive gaming—what is known as eSports—in which two or more human players compete in video games with a defined set of rules [1], are becoming increasingly popular recreational activities with a growing popularity in society. Big eSports events like *The International* attract thousands of spectators on site and millions of viewers online from all over the world [2]. The number of eSports enthusiasts, i.e., people that play or watch eSports regularly, is estimated to be 198 million worldwide [3], the number of regular video game players is even higher [4].

While the social interest in gaming and eSports is steadily rising, academic research on those involved in the phenomenon is relatively new [5]. To date, most research pertains to the fields of informatics, media, business, and sociology [5]. Many studies focus, among other things, on whether eSports can be considered a sport [6–8], on the economic scope of gaming and eSports [9,10] as well as on the psychological effects of gaming on brain function [11–13] and character traits [14–16].

In this context, the focus on gaming addiction has increased [17–19], with the inclusion of internet gaming disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in 2015 [20] and gaming disorder in the International Classification of Diseases and Related Health Problems (ICD-11) in 2018 [21]. In addition, the first studies on eSports performance have emerged, focusing mainly on the cognitive skills and challenges eSports players face [22–24]. In terms of research on health and health behavior, however, further research is needed. Besides the demographics of this target group, additional information about health behavior would be useful to evaluate the need for specific health-promotion strategies.

Prolonged screen time, accompanied by long periods of sedentary behavior are recognized as risk factors for numerous chronic diseases [25–27] and all-cause mortality [26–29]. Since gaming and eSports, by their very nature, require long periods of sedentary screen time, it stands to reason that such players pose a high-risk group in exceptional need of health promotion. As envisioned in the German Prevention Act of 2015 [30], gaming itself could offer new ways of gaining access to and providing health promotion to the target group in their specific setting. For this purpose, however, data on the current situation of video game and eSports players in terms of health status and health behavior are necessary. Hence, the aim of the present study is an assessment of the demographics and health behavior of video game and eSports players. In addition, possible associations between video game play time and health behavior are examined.

2. Materials and Methods

2.1. Study Design and Setting

The present study was conducted as a cross-sectional online survey. The web-based questionnaire was distributed on the project website [31], social media (*Facebook, Discord, Instagram*), on different eSports and gaming forums, and in person at eSports events (*ESL One Cologne, Gamescom*). In addition, authors' personal contacts to eSports teams and organizations were used to further disseminate the study. Recruitment messages included the aim of the investigation as well as information on eligibility criteria and incentives to participate (chance to win one of three €50 *Amazon* gift cards). Data collection took place from July 5th to October 7th 2018.

The study was approved by the ethical committee of the German Sport University Cologne (reference: 053/2018).

2.2. Participants

Participants were eligible for the present study if they were currently living in Germany, understood German and engaged in eSports and/or gaming. Before starting the questionnaire, a participant information page was displayed online and consent was obtained. Additionally, a filter question regarding the country of residence was displayed. If a residence outside Germany was stated, the questionnaire ended and the participant was excluded.

2.3. Measures

The questionnaire was administered via the online survey tool *Unipark* (*Questback GmbH, Cologne, Germany*). It was developed to address different aspects of demographics, health, health behavior (physical activity, sleep, nutrition) and video game usage as well as participants' personal opinion on the effects of nutrition, sleep, and physical fitness on eSports performance. Since filter questions were used, the number of questions ranged between 18 and 26.

The following demographic data were collected: participants' age, gender, level of education, and employment status. The wording and rating of these questions were designed in accordance with the standards of the German Federal Statistical Office [32].

Questions on health behavior comprised types of sports activities (semi-open-ended questions, multiple responses possible), duration of moderate to vigorous physical activity (4-point rating scale:

“less than 1 h per week”, “1–2.5 h per week”, “2.51–5 h per week”, “more than 5 h per week”), duration of sedentary behavior (hours per day), duration (hours per night) and quality of sleep (4-point rating scale: “very good”, “quite good”, “quite poor”, “very poor”), and daily fruit and vegetable consumption (portions per day). In addition, one item on subjective health status (5-point rating scale: “excellent”, “very good”, “good”, “not so good”, “poor”) was included. Body mass index (BMI) was calculated using self-reported body weight and height.

Data on video game usage comprised average play time (hours per week), prioritized game title (semi-open-ended question) and training practices. The latter included a filter question as to whether participants engage in regular eSports training that is conducted to improve specific skills. If the answer was yes, further questions on training organization were given (multiple choice: “training in a (regional) association with a coach”, “training in a (regional) association without a coach”, “training in a team with a coach”, “training in a team without a coach”, “training with friends”, “training alone and/or with random opponents/players”), along with training time (hours per week), percentage of training that takes place at the PC/console (percentage of overall training), and training content were given. For training content, a matrix table question with possible content was presented (“game mechanics” (learning about the strengths and weaknesses of the playable characters and how to control them), “tactics (rehearsing tactics)”, “game analysis (of own games)”, “game analysis (of competitors or role models)”, “team building (for team games only)”, “communication with team members (for team games only)”, “responsiveness”, “targeted training of fine motor skills/precision/mechanical skill”, “dealing with stressful situations (during the game)”, “physical fitness”, “relaxation/recovery”, “other”); possible responses were “always”, “often”, “sometimes”, “never”, “not applicable/no details given/don’t know”).

Moreover, participants were asked to classify themselves as professional players (regularly earning significant revenue from eSports (prize money, sponsors, salary from clubs)), amateurs (playing eSports but without earning a significant amount of money), regular players (playing video games or eSports more than once a week, but without taking part in official tournaments and leagues), occasional players (playing video games or eSports several times a month or less, and without taking part in official tournaments and leagues) or non-players. The latter were excluded from all analyses. Occasional players were excluded from all analyses regarding video game usage.

In the last part of the questionnaire, participants were asked for their personal opinion on how balanced nutrition, sufficient sleep, and good physical fitness affect eSports performance (5-point scale: “very positive”, “quite positive”, “neither”, “quite negative”, “very negative”).

After a pilot study, small changes regarding wording and rating scales were made and the resulting questionnaire was distributed.

2.4. Statistical Analyses

Descriptive statistics were performed on all questions. Numerical data were described by means and standard deviations, ordinal data by medians and frequencies, and nominal data by frequencies.

Differences between groups (player status) were examined by the Kruskal–Wallis test, ANCOVA and Fisher’s exact test.

To examine possible associations between health behavior and video game play time, partial Spearman correlations were calculated. The resulting coefficients were interpreted as no correlation ($\rho = 0-0.09$), poor ($\rho = 0.10-0.29$), fair ($\rho = 0.30-0.59$), moderately strong ($\rho = 0.6-0.79$), very strong ($\rho = 0.8-0.99$), and perfect correlation ($\rho = 1$) [33].

The significance level for all analyses was set at $p < 0.05$. All statistical analyses were conducted using IBM SPSS Statistics 25 (IBM Corp., Armonk, NY, USA).

3. Results

3.1. Participants

In total, 3488 people opened the first page of the online survey, 1272 (36.5%) proceeded to the next page, and 1112 (31.9%) completed the full questionnaire. We excluded 33 participants for not living in Germany, 10 for not engaging in eSports or gaming, and 13 for inconsistent data (e.g., age compared to employment status). The resulting sample of 1066 (30.6%) participants consisted of 14 current and 33 former professional players, 355 amateurs, 577 regular players and 87 occasional players (see Table 1).

Table 1. Sample characteristics.

Group	Age ¹ [years] Mean (SD)	Gender ² [“male”] n (%)	BMI ³ [kg/m ²] Mean (SD)	Education ² [“higher education entrance qualification or higher”] n (%)	Employment ² [“full-time employment”] n (%)
Total sample (n = 1066)	22.9 (5.9)	980 (91.9)	24.6 (4.8)	556 (52.5)	348 (32.6)
Professional players (n = 14)	22.9 (5.0)	12 (85.7)	23.1 (4.9)	5 (35.7)	1 (7.1) ^{F,R,O}
Former professional players (n = 33)	26.1 (5.8) ^{A,R}	33 (100.0) ^O	26.0 (5.2)	16 (48.5)	17 (51.5) ^{P,A,R}
Amateurs (n = 355)	22.1 (5.0) ^{F,O}	342 (96.3) ^{R,O}	25.0 (5.1)	162 (51.3)	106 (29.9) ^{F,O}
Regular players (n = 577)	22.8 (6.1) ^F	521 (90.3) ^{A,O}	24.4 (4.6)	307 (53.2)	188 (32.6) ^{P,F}
Occasional players (n = 87)	25.0 (7.6) ^A	72 (82.8) ^{F,A,R}	24.6 (4.2)	46 (52.8)	36 (41.4) ^{P,A}
Sig.	< 0.01	< 0.01	0.08	0.07	< 0.01

¹: Kruskal–Wallis test; ²: Fisher’s exact test; ³: ANCOVA (controlling for age and gender). Superscript letters indicate statistically significant differences ($p < 0.05$) to other groups in the same column: ^P—professional players; ^F—Former professional players; ^A—Amateurs; ^R—Regular players; ^O—Occasional players.

3.2. Demographic Data

Table 1 displays the characteristics of the total sample and all player status groups. The predominantly male ($n = 980$; 91.9%) sample is, on average, between 20 and 30 years old and well-educated. While more than half of the sample consists of apprentices ($n = 158$; 14.8%), pupils ($n = 162$; 15.2%) and university students ($n = 292$; 27.4%), about a third of all respondents is working full-time ($n = 348$; 32.6%). Regarding the BMI, about half ($n = 550$; 51.3%) of the sample can be classified as normal weight ($n = 112$ (10.5%) participants did not provide data on height or weight).

While education and BMI are similar across all groups, some statistically significant differences between groups are present regarding age, gender distribution and employment (see Table 1; effect sizes for all significant differences can be found in Supplementary File 1).

3.3. Health Behavior

The vast majority of the sample has an excellent ($n = 194$; 18.2%), very good ($n = 407$; 38.2%) or good ($n = 412$; 38.6%) self-reported health status. Only 4.8% ($n = 51$) report a poor and 0.2% ($n = 2$), a very poor health status.

Regarding physical activity, the sample is engaged in a variety of sports activities (see Figure 1). This goes in line with participant responses regarding the duration of moderate to vigorous physical activity: Two thirds ($n = 713$; 66.9%) of the sample engage in moderate to vigorous physical activity of more than 2.5 h a week. The average amount of sedentary behavior is 7.7 ± 3.6 h a day.

Across all player status groups, the median sleep quality is “quite good” (“very good”: $n = 227$; 21.3%, “quite good”: $n = 642$; 60.2%, “quite bad”: $n = 181$; 17.0%, “very bad”: $n = 16$; 1.5%). The average sleep duration is 7.1 ± 1.3 h per night.

Mean fruit and vegetable consumption is 2.7 ± 1.8 portions/day and the recommendation of five portions a day is fulfilled by 11% ($n = 117$) of the total sample.

No statistically significant differences between player status groups regarding the mentioned parameters of health behavior were found, except for the difference that professional players ($7.8 \pm$

1.3 h/night) sleep significantly longer than former professional players (6.7 ± 1.4 h/night; $p = 0.04$; see Table 2).

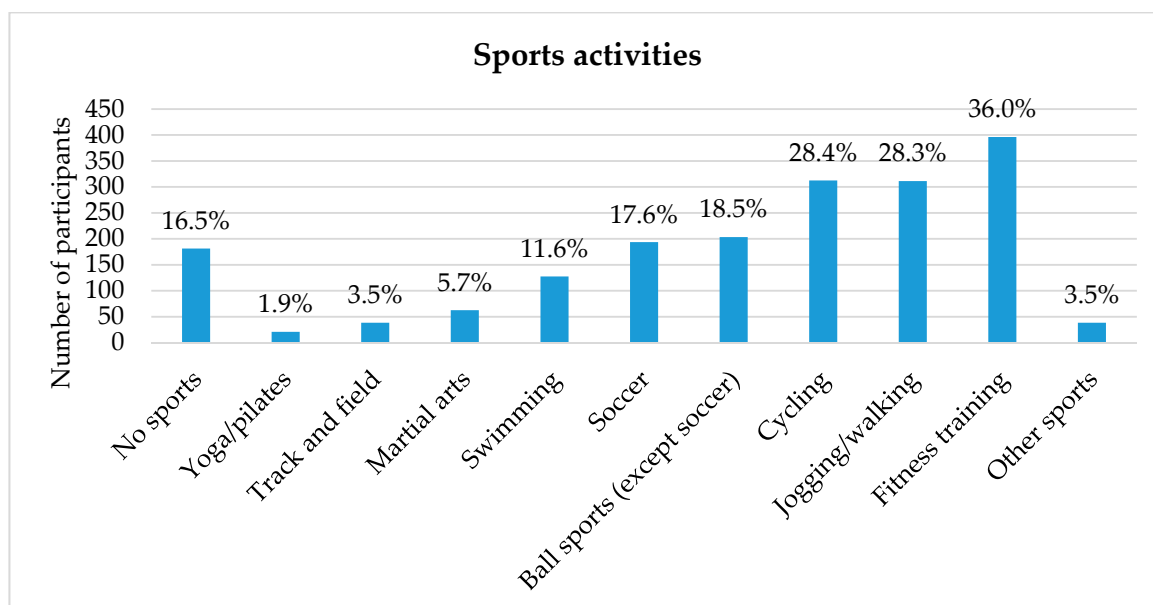


Figure 1. Sports activities of sample participants. Multiple responses were possible ($n = 1100$).

Table 2. Data on health behavior of the sample.

Group	Health Status [mode] <i>n</i> (%)	Physical Activity [mode] <i>n</i> (%)	Sedentary Behavior [hours/day] Mean (SD)	Sleep Time [hours/night] Mean (SD)	Sleep Quality [mode] <i>n</i> (%)	Fruit and Vegetable Consumption [portions/day] Mean (SD)
Total sample (<i>n</i> = 1066)	“good” 412 (38.6)	“2.51–5 h per week” 357 (33.5)	7.7 (3.6)	7.1 (1.3)	“quite good” 642 (60.2)	2.7 (1.8)
Professional players (<i>n</i> = 14)	“good” 6 (42.9)	“more than 5 h per week” 7 (50.0)	7.3 (3.3)	7.8 (1.3) ^F	“quite good” 7 (50.0)	3.5 (2.2)
Former professional players (<i>n</i> = 33)	“very good” 13 (39.4)	“2.51–5 h per week” 10 (30.3)	7.6 (3.9)	6.7 (1.4) ^P	“quite good” 15 (45.5)	3.0 (2.2)
Amateurs (<i>n</i> = 355)	“good” 146 (41.1)	“2.51–5 h per week” 126 (35.5)	8.0 (3.7)	7.2 (1.3)	“quite good” 208 (58.6)	2.6 (1.7)
Regular players (<i>n</i> = 577)	“very good” 228 (39.5)	“2.51–5 h per week” 191 (33.1)	7.7 (3.6)	7.0 (1.3)	“quite good” 361 (62.6)	2.7 (1.8)
Occasional players (<i>n</i> = 87)	“very good” 39 (44.8)	“more than 5 h per week” 29 (33.3)	7.0 (3.1)	7.2 (1.1)	“quite good” 51 (58.6)	2.8 (1.4)
Sig.	0.90	0.84	0.34	0.04	0.02*	0.46

Kruskal–Wallis test. Superscript letters indicate statistically significant differences ($p < 0.05$) to other groups in the same column: ^P—professional players; ^F—Former professional players. * no statistically significant post-hoc difference after adjusting for multiple testing.

3.4. Video Game Usage

The prioritized game titles of the sample are displayed in Table 3. The most popular games are tactical shooters (e.g., *Counter-Strike: Global Offensive*, *PlayerUnknown’s Battlegrounds*) and multiplayer online battle arenas (MOBAs; e.g., *League of Legends*, *Dota 2*).

Table 4 displays the average play time and training characteristics of the sample (occasional players excluded). Focusing on players who participate in official tournaments or leagues, more than half ($n = 231$; 57.5%) engage in structured training and 67 of these (29.0%) have a coach. The average training time of those who engage in structured training is 15.4 ± 6.5 h/week for professional players,

18.6 ± 13.8 h/week for former professional players, 12.1 ± 10.2 h/week for amateurs, and 7.8 ± 8.7 h/week for regular players.

Table 3. Prioritized game titles of the sample (n = 1066).

Game Title	Frequency n (%)
<i>Counter-Strike: Global Offensive</i>	522 (49.0)
<i>League of Legends</i>	157 (14.7)
<i>PlayerUnknown's Battlegrounds</i>	51 (4.8)
<i>Fortnite—Battle Royale</i>	50 (4.7)
<i>FIFA Series</i>	45 (4.2)
<i>Dota 2</i>	43 (4.0)
<i>Overwatch</i>	24 (2.3)
<i>Rainbow Six Siege</i>	21 (2.0)
<i>Rocket League</i>	19 (1.8)
<i>World of Warcraft</i>	12 (1.1)
Other games *	122 (11.5)

* Games with less than 10 nominations were summed up as “other games”.

The content that is “always” or “often” implemented in the structured training sessions is displayed in Figure 2.

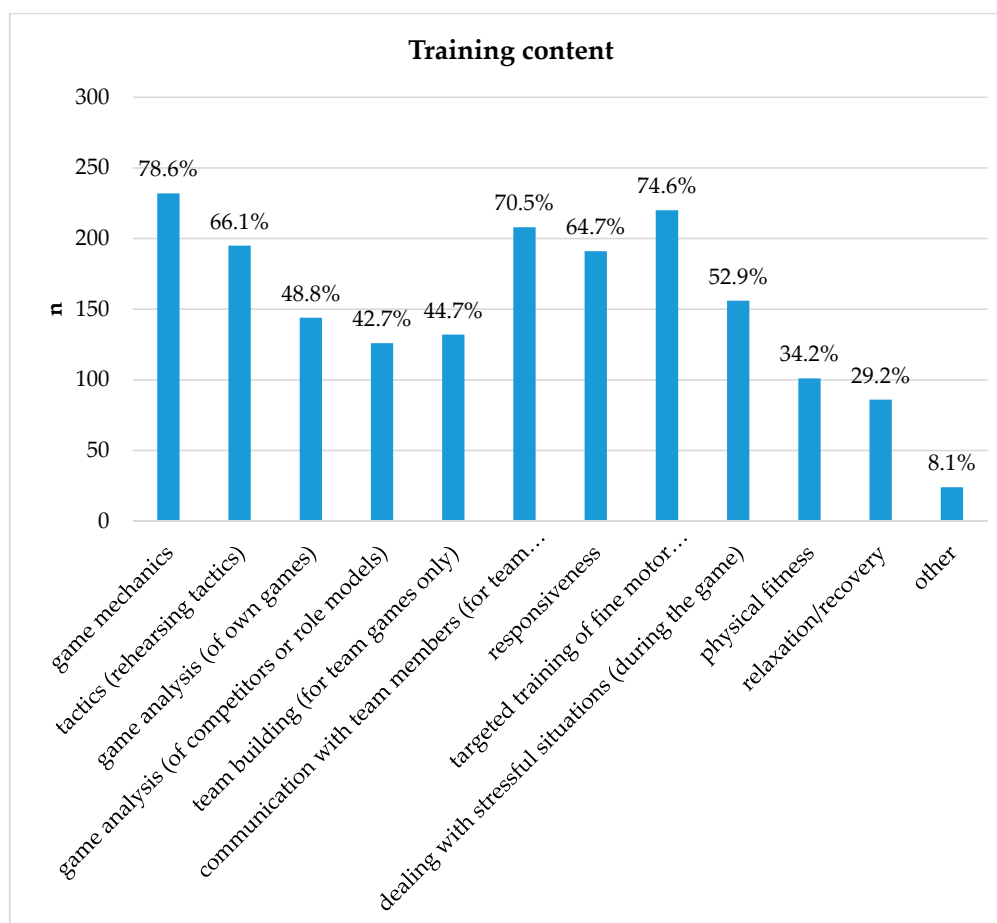


Figure 2. Content of players’ structured trainings (n = 295). Values represent respondents who stated that they always train or often train for that aspect in their training sessions.

Table 4. Data on video game play time and training characteristics.

Group	Play Time ¹ [hours/week] Mean (SD)	Structured Training ² ["yes"] n (%)	Form of Training [mode] n (%)	% of Overall Training Time that Takes Place at the PC/console ³ Mean (SD)
Total sample (n = 978) *	24.4 (15.9)	295 (30.2)	"training with friends" 133 (45.1)	90 (16.8)
Professional players (n = 14)	28.6 (12.0)	8 (57.1) ^R	"training alone and/or with random opponents/players" 4 (50.0)	91.0 (11.1)
Former professional players (n = 33)	25.3 (20.1)	17 (51.5) ^R	"training in a team without a coach" 7 (41.2)	84.2 (21.6)
Amateurs (n = 355)	28.4 (16.6) ^R	206 (58.4) ^R	"training in a team without a coach" 97 (47.1)	89.4 (13.8)
Regular players (n = 576)	21.7 (14.7) ^A	64 (11.1) ^{P,EA}	"training with friends" 47 (73.4)	80.7 (22.4)
Sig.	<0.01	<0.01	-	0.12

"Form of training" (multiple responses possible) and "Percentage of overall training time that takes place at the PC/console" were only answered by players participating in structured training. * Occasional players (n = 87) did not answer questions regarding video game usage, one missing data set; ¹: ANCOVA (controlling for age, gender and BMI); ²: Fisher's exact test; ³: Kruskal–Wallis test; Superscript letters indicate statistically significant differences ($p < 0.05$) to other groups in the same column: ^P—professional players; ^F—Former professional players; ^A—Amateurs; ^R—Regular players.

3.5. Respondents' Opinion on Influencing Factors of eSports Performance

The majority of respondents believe good physical fitness brings very positive (n = 343; 32.2%) or quite positive (n = 513; 48.1%) effects to eSports performance. The results are similar regarding balanced nutrition ("very positive": n = 231; 21.7%; "quite positive": n = 521; 48.9%) and sufficient sleep ("very positive": n = 756; 70.9%; "quite positive": n = 227; 21.3%).

3.6. Associations between Health Behavior and Video Game Play Time

Controlling for age, gender, and education, partial Spearman correlations reveal poor positive associations between video game play time and sedentary behavior ($\rho = 0.15$; $p < 0.01$) and BMI ($\rho = 0.11$; $p < 0.01$). In addition, controlling for age, gender, education and BMI, a poor negative association can be observed between video game play time and self-reported health status ($\rho = -0.14$; $p < 0.01$). This association is still present after additionally controlling for sedentary behavior ($\rho = -0.12$; $p < 0.01$).

No statistically significant or relevant ($\rho < 0.10$) associations are found between video game play time and sleep parameters, physical activity, and fruit and vegetable consumption.

4. Discussion

4.1. Key Results

The aim of the present study was to examine the demographic and gaming characteristics of video game and eSports players, as well as their health-related behaviors. In total, data of more than 1000 predominantly young, male, and well-educated video game and eSports players were collected and analyzed. The results show the self-reported health status of the target group is mostly very good, but in terms of health behavior, some room for improvement remains.

In contrast to non-competitive gaming, where the gender distribution is almost equal [34,35], the present study confirms other research which shows that the vast majority of eSports players is male [10,36]. This may be due to the more competitive character of eSports in comparison to regular gaming. Prior research has shown that eSports' so-called "core-genres" (such as tactical shooters, fighting games, or sport games) are more strongly favored by men [37]. The eSports scene

in terms of community and game design is strongly influenced by men and a male perspective, respectively [37,38]. This may tend to predominantly attract male players and, in this way, lead to a vicious circle. Additionally, sexism, offensive language and online harassment are reoccurring problems in some eSports titles [38–41] that might further deter female players.

The results show that the composition of the target group is different from the general population: In line with results from previous studies on gaming and eSports [42,43], the present sample includes predominantly young and well-educated participants. While about half of the sample is still in some kind of educational process, e.g., school or university students, the other half is working part-time or full-time. The question may arise as to whether time spent participating in eSports just exacerbates people's sedentary behaviour at school, university or the office. However, it should also be considered that eSports, or gaming in general, may offer a possibility to get access to a target group—adolescents and young adults—that is too often overlooked by traditional health campaigns [44]. For example, promoting the implementation of trained coaches could be a possible approach to integrate holistic and health-promoting training concepts into the daily routines of eSports players. Although research identifying the essential skills for success in eSports is limited, it may be assumed that fitness training and training content from traditional sports may also benefit skills that are necessary for good eSports performance like, e.g., sustained attention [45] or reaction time [46,47]. Right now, about half of the respondents, and predominantly those who compete in official tournaments and leagues, complete structured training but most of it takes place without a coach and almost solely in the digital environment. Bringing these digital skills into the real world by means of practicing specific physical exercises could reduce sedentary behaviour and bring real health benefits [48–50]. In this respect, it can be seen as a very positive result that classical strength and endurance exercises are quite frequently represented in this target group. However, only one-third of the sample associates fitness training with the content of a structured eSports training. It seems that the respondents do engage in fitness training but not for the purpose of improving their eSports performance.

Only a minority of eSports players does not participate in any sport activity at all, and almost two-thirds of the present sample achieve the WHO's global recommendation on physical activity for adults [51]. This is a far bigger portion than in the average German population where only 42.6% (females) and 48.0% (males) meet the same recommendation [52]. Nevertheless, there is much room for future improvement, particularly when one considers the young age of the sample group and how physical activity tends to inevitably decline over the average human life span [53,54].

The average play time (of more than 20 h per week) in all player status groups shows the importance of gaming in each respondents' life. After long hours at work, school or university, three to four hours of additional gaming result in high amounts of sedentary behavior, which is known to be a risk factor for non-communicable diseases [25–29]. The observed very weak inverse associations of video game play time and self-reported health status, BMI and sedentary behavior are at least pointing in the same direction. However, due to the cross-sectional design of the study, the direction of causality remains unclear.

In terms of sleep duration and quality, it is notable that the average sleep duration is lower than that of a comparable group of healthy adults [55] and one in six respondents reports that they do not sleep well. This raises questions about the reason for these results. A possible explanation may be connected to the use of screen media, which is known to have adverse effects on sleep duration [56,57] and sleep quality [56,58]. Although no general association of video game play time and sleep quality was found in the data, more specific associations between media use and sleep cannot be generally ruled out by the present data. Previous studies indicated that the use of light-emitting devices before bedtime is connected to increased sleep disturbances [59–62]. Similar associations may also apply to video game usage if, for example, a too short period between media use and bedtime exists. Since we did not collect data on these parameters, a more detailed analysis was not possible. Hence, further research on this topic within the target group of video game and eSports players is needed.

While the overall self-reported health status of the sample is very good, the BMI reveals that only half of the sample can be classified as being of normal weight. The percentage is similar to that of the average German population (45.3%, [63]) but lower than that of people of similar age (18–30 years: 72.3–59.9% classified as normal weight [63]). Even though the BMI does not provide information on body composition, it might hint at another area in which health promotion is needed: diet. With only 11% of the sample fulfilling the recommendation of the German Nutrition Society of five portions of fruit or vegetables a day [64], the nutrition of eSports and video game players seems as equally unbalanced as in the average German population [65]. The low fruit and vegetable intake in the present sample might be connected to the previously mentioned long video game playing time and is in line with results from Shang et al. [66] that observed lower fruit and vegetable consumption in people with high screen time. Since more information on the consumed food and drinks was not collected in this study, it stands to reason that the lack of fruit and vegetables may be compensated by other (less healthy) food or dietary supplements. Further research in this area is needed to obtain a comprehensive picture of video game and eSports players' specific dietary behavior, and to identify possible potential for improvement—not only in regard to health but also in relation to performance.

A good sign for the possible improvement of the health situation and health behavior is the result indicating that the vast majority of video game and eSports players support the statements that fitness, sleep and nutrition have positive effects on their eSports performance. As mentioned above, supporting these beliefs by further research and the development of specific concepts may help to get access to, and implement and maintain, healthy and holistic lifestyles in this target group.

4.2. Limitations

Although the present study provides a useful insight into the characteristics and health behaviors of video game and eSports players, it also has inherent limitations. First, for the purpose of providing information on a wide range of different health behaviors, most topics could only be addressed through a small number of questions, some of them created for the specific purpose of this study (e.g., the classification of player status). Complete versions of validated questionnaires would have allowed more detailed analyses and comparisons to previous research. However, the aim was to obtain a comprehensive overview of the target sample but still keep the questionnaire short and feasible. In the future, further studies with emphases on certain behaviors are needed to build upon this initial, mostly descriptive, data.

Second, since the targeted sample belongs to a special population, recruiting took place in areas where we believed video game and eSports players are best represented. By collecting data on eSports events, players of the respective games that were shown there might be overrepresented in the present sample. To attenuate this bias, the online survey was posted on a variety of gaming websites and forums. However, about half of the sample still represents players of just one game—*Counter Strike: Global Offensive*—although the share of this game regarding overall players is lower [67]. Moreover, the number of players in each player status group differs extensively. Although this might limit the power of the statistical analyses, we decided to keep the professional players in the analyses to provide insight on this very specific and hard to reach subgroup of eSports players.

Third, the present study solely relies on self-reported data. Hence, the results might be affected by social desirability [68] as well as by over- or under-estimation of certain behaviors like physical activity [69,70]. To minimize these effects, we excluded inconsistent data and checked the data for extreme values to prevent distortion through (deliberately) false information (“trolling”). All cases with inconsistent data were discussed between the authors before a decision about exclusion was made. In addition, the online survey was programmed so that individual health behaviors exceeding 24 h per day were not possible. However, effects of social desirability and inaccurate reporting cannot generally be excluded. Future studies should consider integrating social desirability scales [71] or using objective data to control for such effects.

Lastly, the results show that the current sample does not represent the average population in terms of demographic characteristics (e.g., age or gender distribution). Hence, the comparisons must be treated with caution.

5. Conclusions

Overall, the results of this research project indicate that the health and lifestyle needs of video game and eSports players are not unique to this target group. They face the same challenges regarding a healthy lifestyle as the average population does. Nevertheless, against the backdrop of the (weak but relevant) detrimental associations between video game playing time and health outcomes, the importance of providing new ways of health promotion to this target group is indisputable. Even more so, considering the rising popularity of eSports as well as the increasing digitalization of society, inevitably bringing even more sedentary lifestyles. Changing the form of game training (which up to now, has been predominantly digital) and embedding it in the real world, might be a possible way to integrate physical activity and other health-related behaviors into the training routines of video game and eSports players.

Supplementary Materials: The following are available online at <http://www.mdpi.com/1660-4601/17/6/1870/s1>, Table S1: Effect sizes of the statistically significant differences regarding demographics and health behavior.

Author Contributions: Conceptualization, K.R., I.F. and C.G.; Data curation, K.R., P.B., C.T. and K.W.; Formal analysis, K.R. and K.W.; Funding acquisition, I.F. and C.G.; Investigation, K.R., P.B., I.F., C.T., K.W. and C.G.; Methodology, K.R. and C.G.; Project administration, I.F. and C.G.; Resources, I.F.; Supervision, I.F. and C.G.; Validation, K.R., P.B., C.T., K.W. and C.G.; Visualization, K.R., I.F. and C.T.; Writing—original draft, K.R.; Writing—review & editing, K.R., P.B., I.F., C.T., K.W. and C.G. All authors have read and agreed to the published version of the manuscript.

Funding: The present study is part of the *esportwissen.de*-project, which is financially supported by the AOK Rhineland/Hamburg.

Acknowledgments: The authors thank all participants for taking part in the study.

Conflicts of Interest: The authors declare no conflict of interest. The present study is part of the *esportwissen.de*-project, which is financially supported by the AOK Rhineland/Hamburg. The funders had no influence on the design of the study; in the collection, analyses or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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