

Are Esports Players Inactive? A Systematic Review

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3



7



12



18



21



INTRODUCTION

INTRODUCTION

Growth of esports:
a **sedentary**
practice

(Besombes & Maillot, 2018)

Prevalence of
Physical
Inactivity in the
population

(Guthold et al., 2018;
Kohl et al., 2012)

Concerns of health
authorities,
But **potential to**
promote a
healthy lifestyle?

(Polman and al., 2018;
Wattanapisit and al., 2020)

Lack of data
about esports
athletes Physical
Activity (PA)

(Kelly & Leung, 2021)



INTRODUCTION

Lam and al., 2020

E-athletes' lifestyle behaviors, physical activity habits, and overall health and wellbeing: A systematic review

PREVIOUS REVIEWS

Chan and al., 2022

The impact of eSports and online video gaming on lifestyle behaviours in youth: A systematic review

Micallef and al., 2021

Where Do Online Games Fit into the Health Behaviour Ecology of Emerging Adults: A Scoping Review

OBJECTIVES

Research Questions



(1) What is the **Physical Activity level** of esports athletes?

(2) Is there any **data about the influence** of esports on the physical activity of esports athletes (level, intensity, engagement, kind of sport, etc.)?

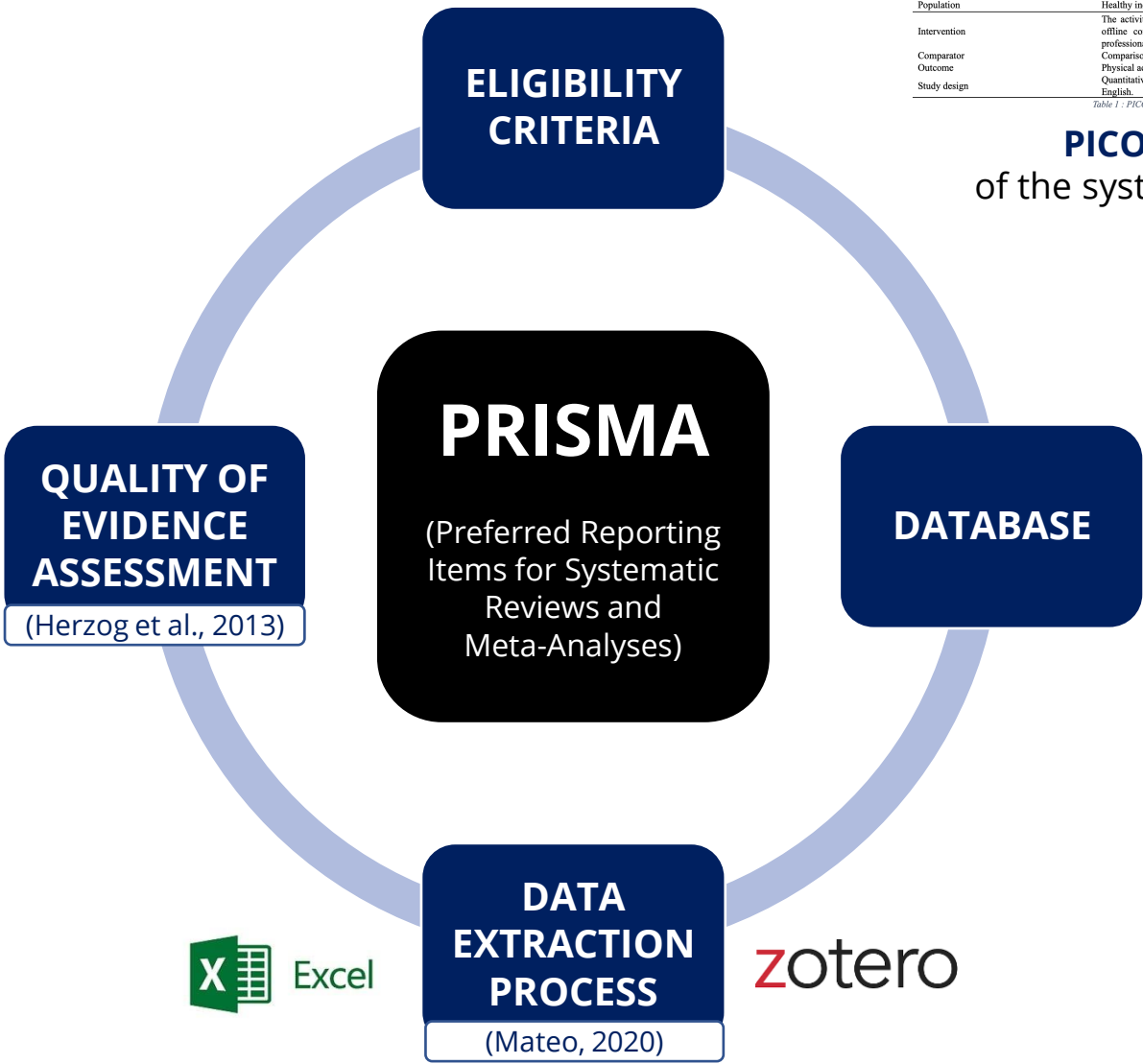
(3) What **future research questions** emerge from these results, and what **studies should be conducted** in the near future to fill the knowledge gap on this topic?



METHODOLOGY

METHODOLOGY

Newcastle-Ottawa Scale (NOS)
adapted for cross-sectional studies



| | |
|--------------|---|
| Population | Healthy individuals over 12 years of age |
| Intervention | The activity of playing competitive video games (in ranked games, clubs, online or offline competitions) at different levels of activity (e.g., duration, amateur or professional level). |
| Comparator | Comparison group was not required |
| Outcome | Physical activity/inactivity level, and/or influence on physical activity |
| Study design | Quantitative, qualitative or mixed studies that provide empirical data published in English. |

Table 1. PICOS model of the systematic review.

PICOS model
of the systematic review



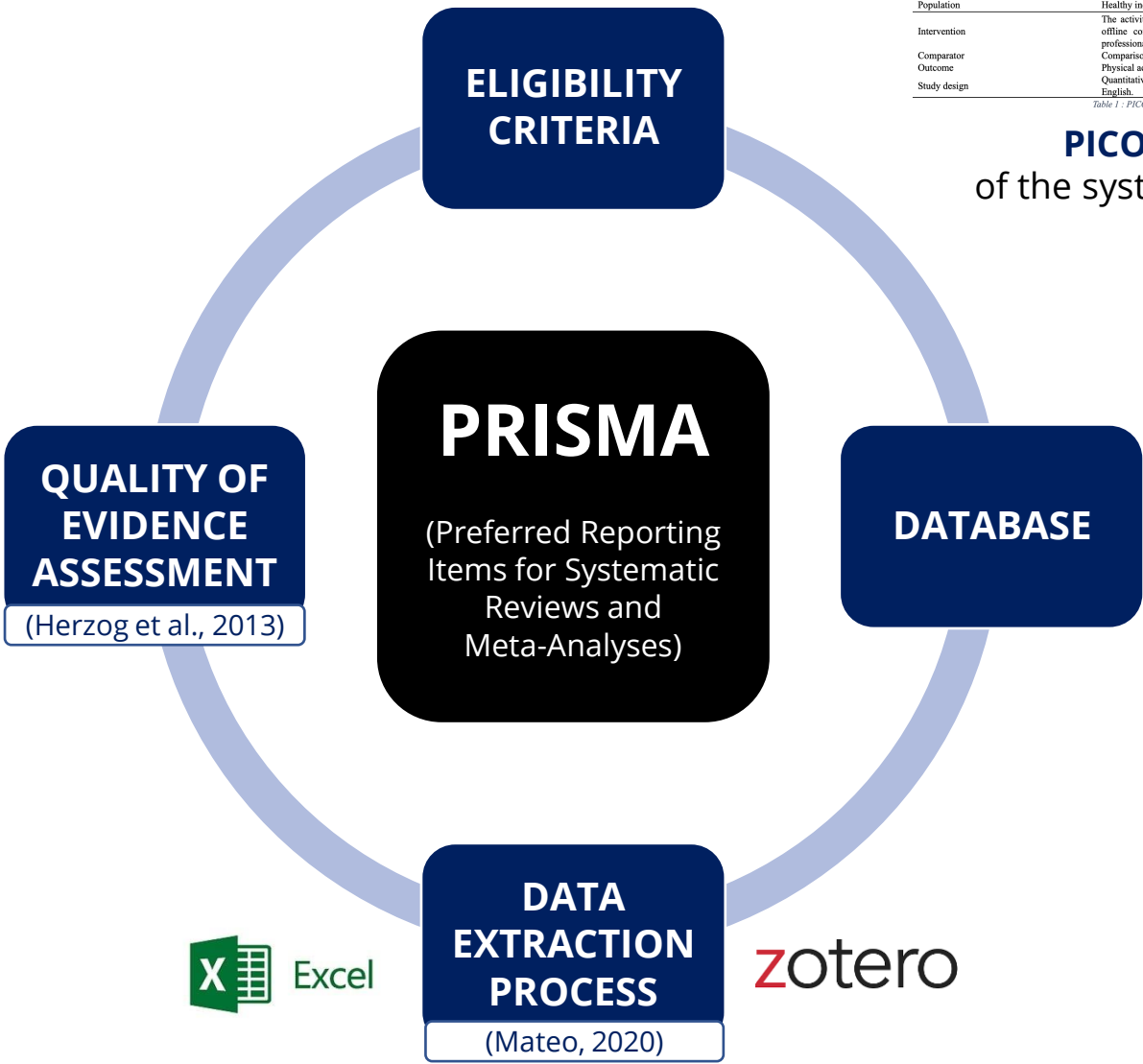
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STUDIES SELECTION

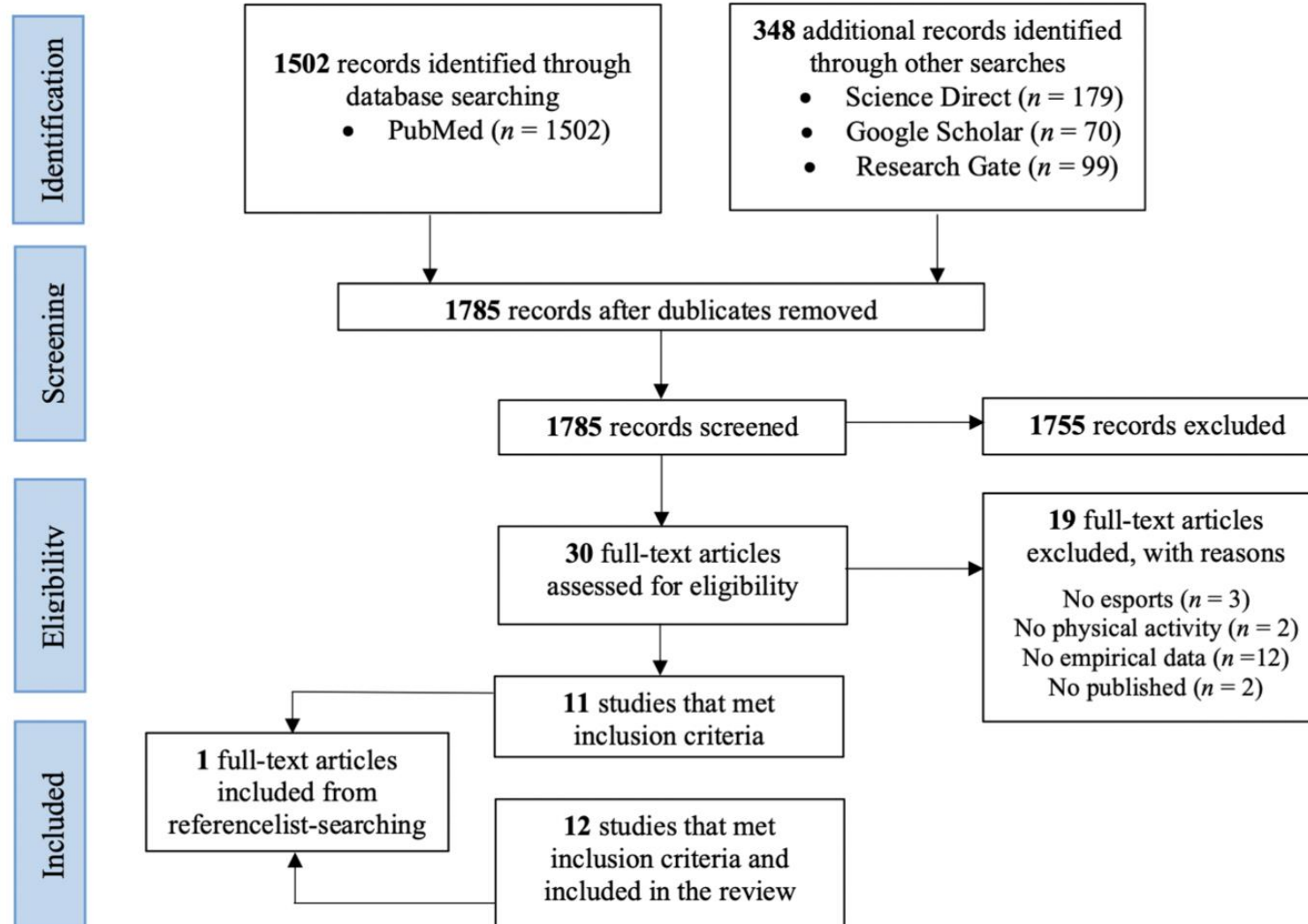
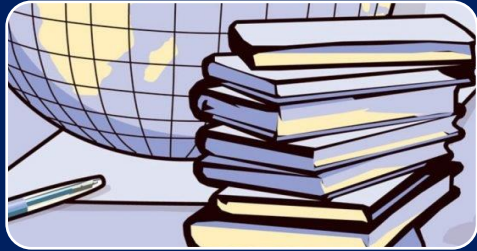


Figure 1 : PRISMA flowchart for the study selection process.

RESULTS

RESULTS

STUDIES DEMOGRAPHICS



STUDIES (n = 12)

- From **2016 to 2021**
- Total Participants (**n = 4986**)



YOUNG MALE PLAYERS LARGELY REPRESENTED

- **6** studies had **100% male** participants
- **Only 2** study with **more than 10% female** participants



DIFFERENT GEOGRAPHICAL AREAS

- **8** studies targeted **specific country** [USA (n=3), Portugal (n=2), Indonesia, Germany, Malaysia]
- **1** study compares **3 different countries** [Turkey, USA, South Korea]
- **3** studies included **all geographical areas**

RESULTS

ESPORTS ATHLETES CHARACTERISTICS

LEVEL

**HIGH
LEVEL**

(n = 7)

**DIFFERENT
LEVELS**

(n = 5)

ESPORTS PLAYED

**ONE TYPE
OF GAMES**

(n = 3)



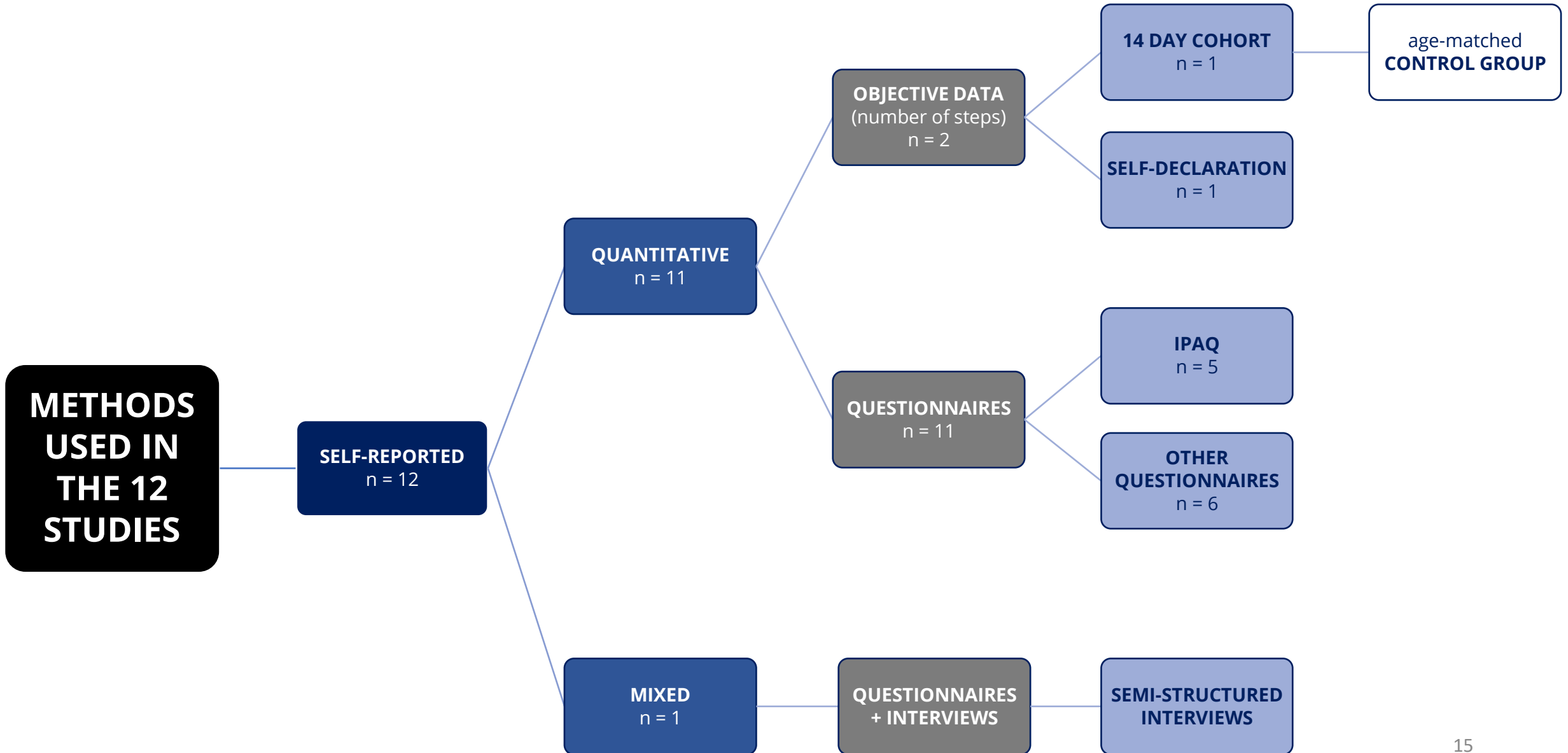
**NO
CROSS-SORTING**

(n = 5)

**NO
INFORMATION**

(n = 4)

RESULTS



RESULTS

PHYSICAL ACTIVITY LEVELS (1)

ESPORTS ATHLETES
ARE **INACTIVE**

(n = 4)

Bayrakdar and al., 2020
DiFrancisco-Donoghue and al., 2019
DiFrancisco-Donoghue and al., 2020
Trotter and al., 2020

ESPORTS ATHLETES
ARE **ACTIVE**

(n = 8)

Kari & Karhulahti, 2016 Kari and al., 2019
Pereira and al., 2021 Paramitha and al., 2021
Roncone and al., 2020 Pereira and al., 2019
Rudolf and al., 2020 Seng and al., 2021

The *highest level players* seem to be **MORE ACTIVE** than *lower level players*

RESULTS

PHYSICAL ACTIVITY LEVELS (2)

INFORMATION ABOUT
THE **KIND OF**
PHYSICAL ACTIVITY

(n = 3)

Esports players in
**INDONESIA, PORTUGAL,
GERMANY, MALAYSIA,**
and on **VIRTUAL SOCCER**
= **ACTIVE**

Esports players in
UNITED STATES
= **INACTIVE**



However, we **lack data** to conclude on these relationships

RESULTS

ESPORTS INFLUENCE ON PA

STUDIES PROVIDING
DATA ON ESPORTS
INFLUENCE ON PA
(n = 0)

STUDIES PROVIDING
DATA ON MOTIVATIONS
TO ENGAGE IN PA
(n = 6)

Kari & Karhulathti, 2016
Kari et al., 2019
Pereira et al., 2019

Pereira et al., 2021
Rudolf et al., 2020
Roncone et al., 2020





DISCUSSION

DISCUSSION

**WHY ARE THERE DIFFERENCES
FOR THE SAME LEVEL OF PRACTICE?**



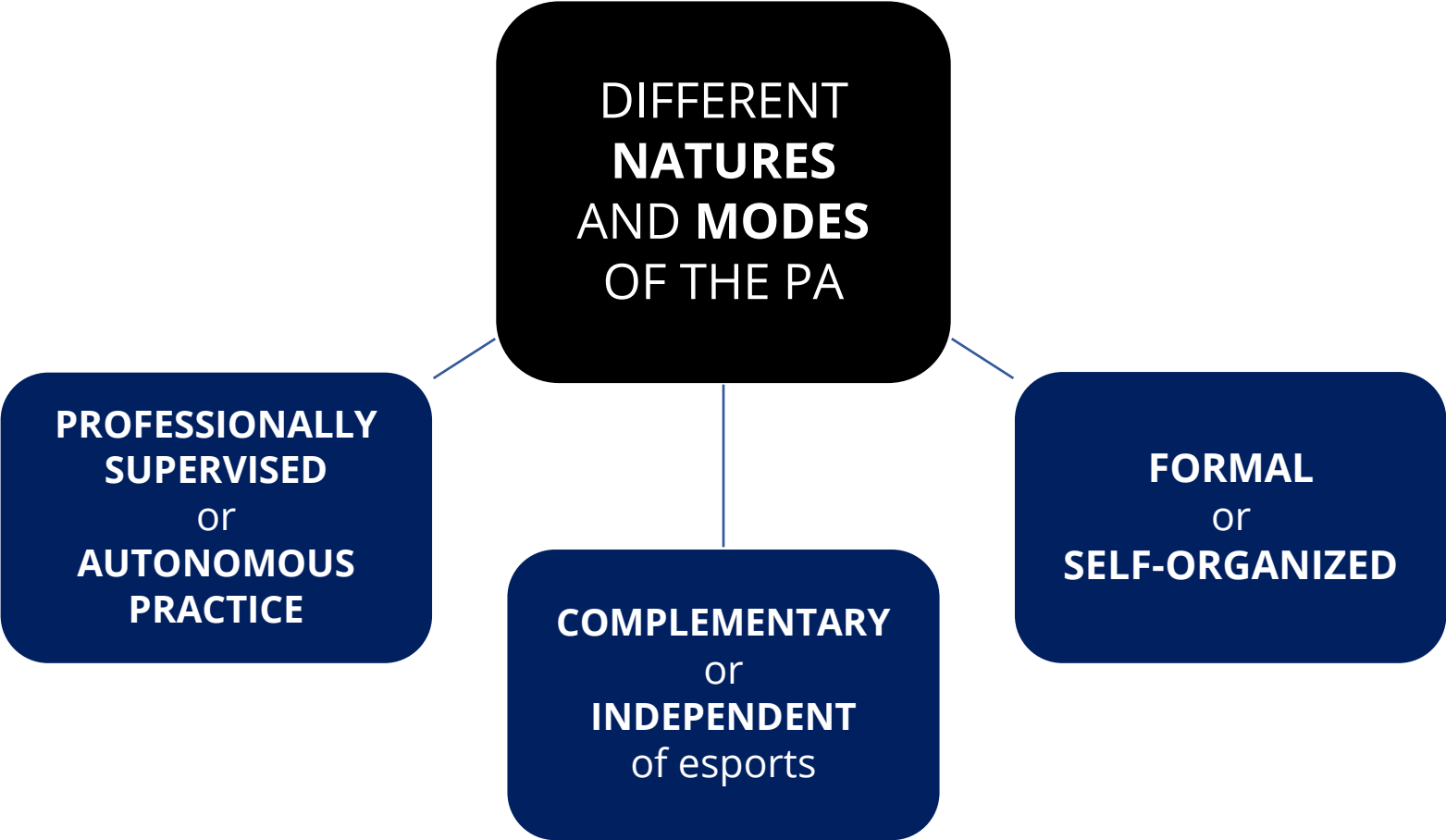
**INFLUENCE OF THE
METHODOLOGICAL TOOLS?**

**SPECIFICITY OF EACH
COLLEGIATE STRUCTURE?**

**IMPRECISION OF THE
ESPORTS ATHLETES LEVELS?**

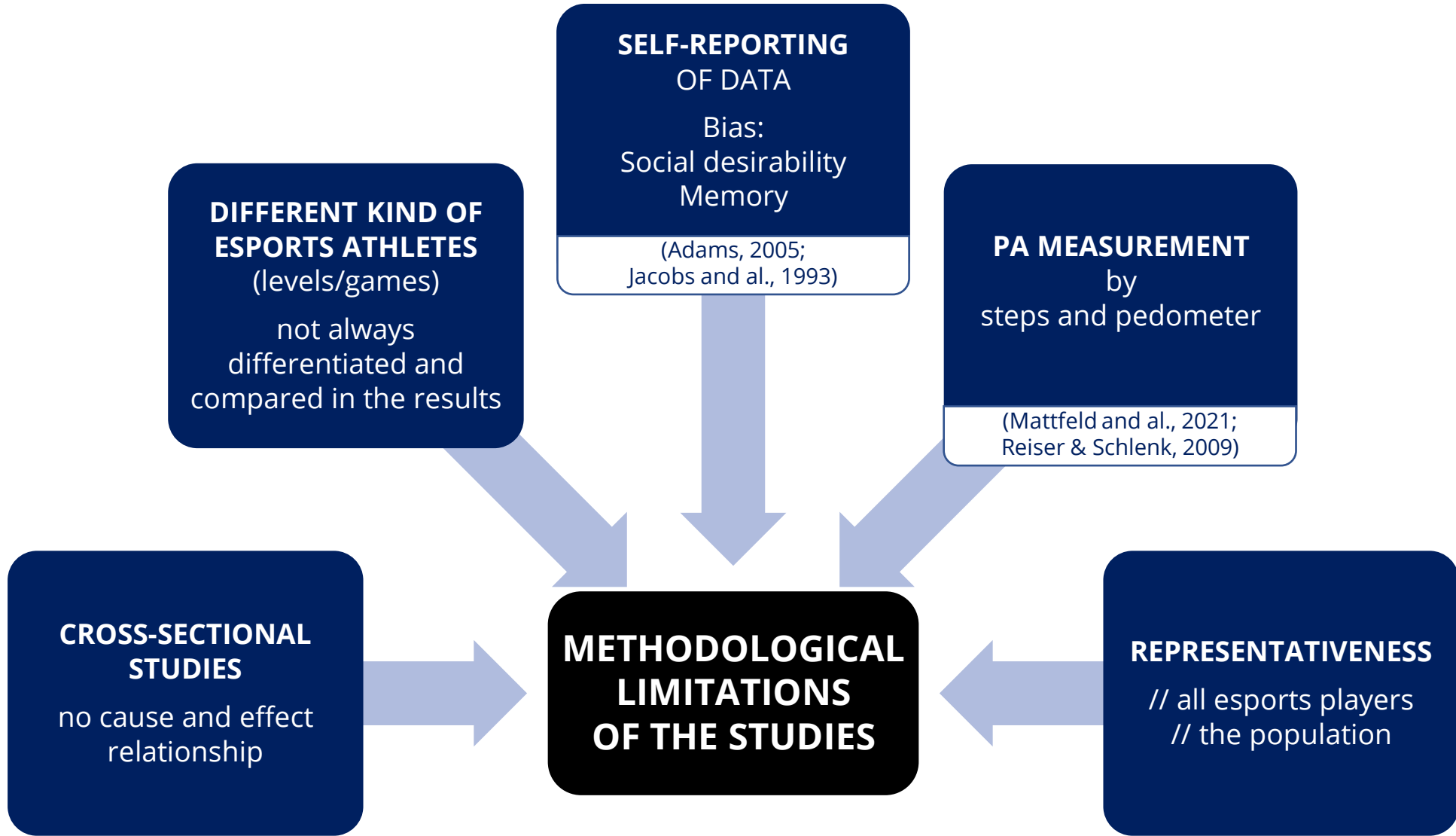
**INFLUENCE OF THE
GEOGRAPHICAL REGION?**

DISCUSSION



Different **NATURES/MODES** for **DIFFERENT POPULATIONS** of esports-athlete (level/games) ?

DISCUSSION





CONCLUSION

CONCLUSION

If motivations to engage in a physical activity are highlighted, there is no data on the esports influence on the PA engagement

HOW TO MEASURE THIS INFLUENCE?

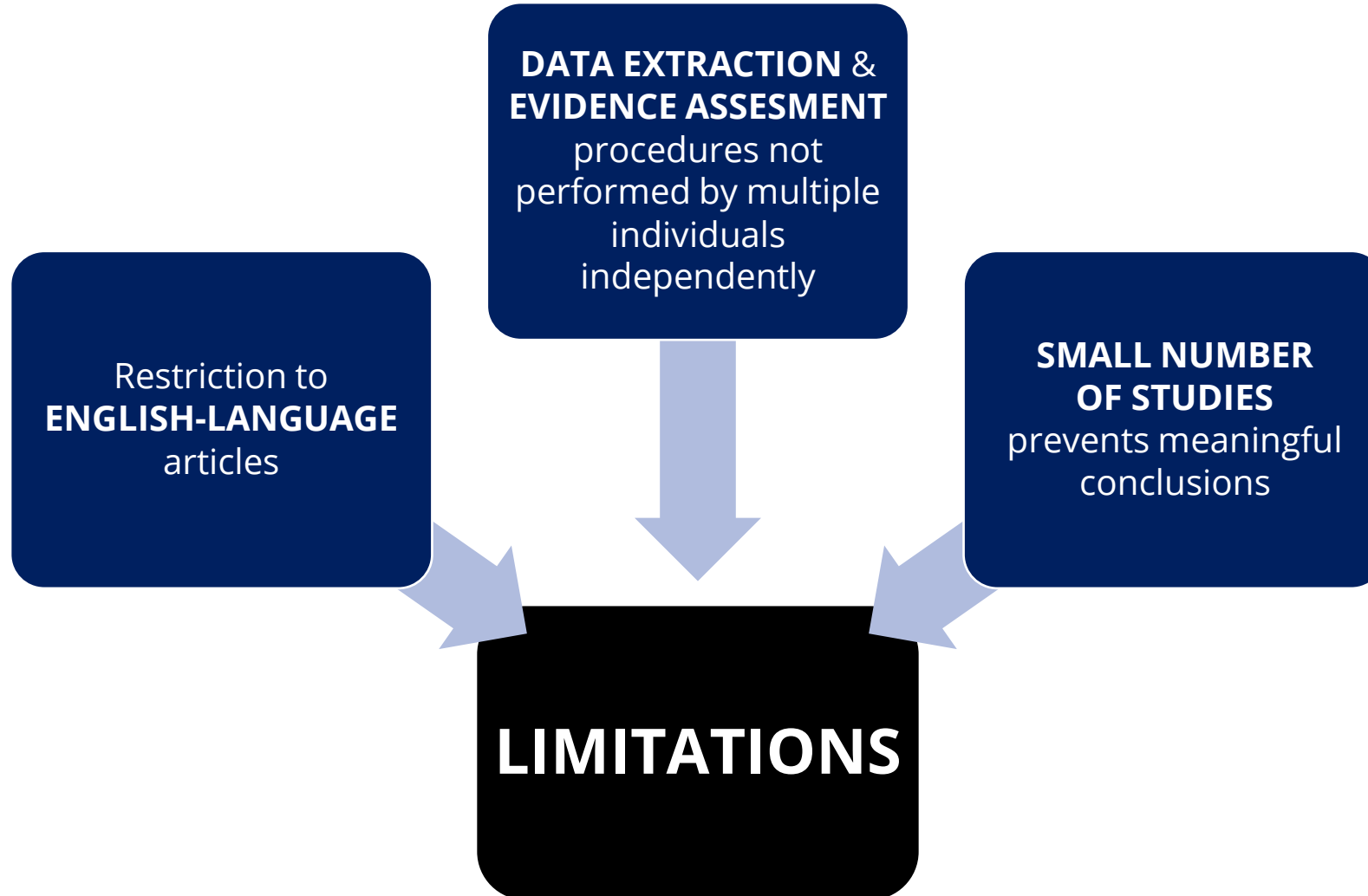


SOCIAL SCIENCES

- **ECOLOGICAL MODEL** (Micallef and al., 2021; Spence & Lee, 2003)
- **LEISURE CONSTRAINTS MODEL** (Crane & Temple, 2015)
- **RETROSPECTIVE OR LONG TERM METHODS** (Bidart, 2013)
- **COMPREHENSIVE APPROACH** (Gatouillat and al., 2020)

QUANTITATIVE QUESTIONNAIRES & QUALITATIVE INTERVIEWS

CONCLUSION



CONCLUSION

PERSPECTIVES

New **QUANTITATIVE** research
with different populations
of esports athletes

Clearly state the **LEVEL OF PLAY**
and the **ESPORTS GAME PLAYED**

Data on the **NATURE**
and the **KIND OF PA**

**OBJECTIVE
MEASUREMENT TOOLS:**
accelerometers
+ heart rate

IDEAL STUDY

MIXED METHODOLOGY (quantitative & qualitative data)
INTERVIEWS focus on esports influence on
PA engagement, re-engagement, retention or withdrawal.

Are Esports Players Inactive? A Systematic Review

THANKS FOR YOUR ATTENTION!

VOISIN Nicolas¹, BESOMBES Nicolas², LAFFAGE-COSNIER Sébastien¹



Results

Quality of evidence assessment

| Study | Overall rating for each Study | | | | | Rating for each item | | | | | | |
|------------------------------------|-------------------------------|-------|-----------|---------------|---------|----------------------|----|----|----|----|----|----|
| | Percentage score | | | | | S1 | S2 | S3 | S4 | C1 | O1 | O2 |
| | NOS SCORE | Total | Selection | Comparability | Outcome | | | | | | | |
| Bayrakdar and al., 2020 | 5 | 50% | 40% | 50% | 67% | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| DiFrancisco-Donoghue and al., 2019 | 1 | 10% | 0% | 0% | 33% | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| DiFrancisco-Donoghue and al., 2020 | 6 | 60% | 40% | 50% | 100% | 0 | 1 | 0 | 1 | 1 | 2 | 1 |
| Kari & Karhulahti, 2016 | 7 | 70% | 60% | 100% | 67% | 1 | 0 | 1 | 1 | 2 | 1 | 1 |
| Paramitha and al., 2021 | 6 | 60% | 80% | 50% | 67% | 1 | 0 | 1 | 2 | 1 | 1 | 1 |
| Pereira and al., 2019 | 4 | 40% | 60% | 0% | 33% | 1 | 0 | 0 | 2 | 0 | 1 | 0 |
| Pereira and al., 2021 | 6 | 60% | 60% | 50% | 67% | 1 | 0 | 0 | 2 | 1 | 1 | 1 |
| Ronccone and al., 2020 | 6 | 60% | 60% | 50% | 67% | 0 | 0 | 1 | 2 | 1 | 1 | 1 |
| Rudolf and al., 2020 | 6 | 60% | 40% | 100% | 67% | 1 | 0 | 0 | 1 | 2 | 1 | 1 |
| Seng and al., 2021 | 3 | 30% | 40% | 0% | 33% | 0 | 0 | 0 | 2 | 0 | 1 | 0 |
| Trotter and al., 2020 | 5 | 50% | 40% | 50% | 67% | 1 | 0 | 0 | 1 | 1 | 1 | 1 |

Newcastle-Ottawa Scale (NOS) adapted for cross-sectional studies

Results

| Study | Location year of data collection | Study aims/research questions | Sample size (% males) | Socio-demographic characteristics | Level of practice/Esports practiced | Study design/Method overview | Results | Inactive?; Findings | nos |
|-----------------------------------|---|--|---|--|---|--|---|--|-----|
| Bayrakdar et al., 2020 | Turkey, South Korea, USA; nr | To determine the effect of esports on physical activity level and body composition | 137 (100%) | age (year) = 19.92±2.21; height (m) = 1.73±0.04 ; weight (kg) = 78.35±6.52 ; country Country: Turkey (n=27), USA (n=63), nr South Korea (n=47) | Licensed in a club and representing his in international competitions; | Cross-sectional; self-reported data (on the number of physical activity steps and daily esports activity time) requested and received by email from esports clubs where players are licensed | BMI = 26.03±1.85; Step count = 6646±3400; daily esports (h) = 9.34±1.12; difference according to country (at p>0.5) : Turkey physical activity step = 7909±2982, daily esports (h) = 9.29±.82 - South Korea physical activity step = 7785±3018 daily esports (h) = 8.97±1.09 - USA physical activity step = 5255±3350, daily esports (h) = 9.63±1.19 | 'Low-active'; as play time increases, BMI and physical activity steps decrease. Esports has negative effects on physical health | 5 |
| DiFrancisco-Donoghue et al., 2019 | USA, Canada; nr | To determine 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 (year) = 18-22; from eight different universities in the USA (various geographic areas, including the Northeast, West Coast, Southeast and Midwest) | Collegiate players on university teams; | Cross-sectional; self-reported electronic questionnaire sent to college players at 9 universities | 40% did not participate in any form of physical activity; daily esports (h) = between 3 and 10; time spent sitting in front of a computer varied between 5.5 and 10 hours per day; complaints reported: eye strain (56%), neck and back pain (42%), wrist pain (36%) and hand pain (32%) | Inactive | 1 |
| DiFrancisco-Donoghue et al., 2020 | USA; nr | To examine activity levels, body mass index (BMI), and body composition of college esports players compared with age-matched controls | 24 (100%); esports players (n=13) & age-matched controls (n=11) | age (year) = 20.2 ± 1.7 for esports, 19.2 ±1.3 for controls; height (cm) = 172.7 ± 6.4 vs 174.5 ± 6.9 ; weight (kg) = 71.1 ± 7.7 vs 77.4 ± 10.8 ; BMI 23.7 ± 3.3 vs 24.9 ± 2.1 | Collegiate players on university teams, member of the American Collegiate East Coast Esports League; MOBA and FPS. High platinum/low diamond ranked team in Overwatch and Platinum1/Diamond4 for MOBAs | Cohort; Fitbit Charge activity (heart rate, steps, and sleep) tracker worn on the wrist 24 hours a day for 14 days + self-reported questionnaire | Step count 6040.2 ± 3028.6 vs 12843.8 ± 5661.1 ; Exercise (days/week) 1.7 ± 1.9 vs 4.8 ± 1.2 ; Exercise (min/session) 39.5 ± 40.4 vs 56.7 ± 26.8; esports daily (h) = 4.6 ± 2.6; Computer recreational/school use daily (h) 4.3 ± 1.9 | 'Low-active'; collegiate esports players are significantly less active than non-esports players. Body mass index is not an accurate measure of health in esports players. Esports players have significantly lower lean body mass, higher body fat percentage and lower bone mineral content than non-athletes | 6 |
| Kai & Karhulahti, 2016 | Europe, North America and others; 2015-2016 | To study on the training habits of elite e-athletes, with a particular focus on the exercise habits | 115 (97,39%) | age (year) = -19 (n=50), 20-24 (n=49), 25-29 (n=12), 30- (n=4); European (n=63), North American (n=35), Other (n=11) | Professional players (n=31), high-level players (n=84) ranked in the best of their games; individual games (P vs. P) (n=31) team games (Team vs. Team) (n=78), N/A (=n6); Counter Strike (n=51), StarcraftIII (n=15), DOTA 2 (n=14), LoL (n=12), other (n=23) | Cross-sectional; self-reported questionnaire | On average 5.28±2.57 hours of overall training per day, including 1.08±0.83 hours of daily physical exercise. The means were 5.90±3.07 hours and 0.89±0.70 hours for PROs and 5.05±2.33 hours and 1.15±0.86 hours for HLs. A total of 11.3% reported not doing any physical exercise. 88.7% of the pro and HL e-athletes do physical exercise. 81.7% reported having a physical exercise program. 70.4% plan their own physical exercises. 55.6% think that integrating physical exercise into their training programs has a positive effect on esports performance. 47% exercise primarily to maintain their health. 8.7% consider that the main purpose of their exercise is to be more successful in esports | Active; elite e-athletes aged 18 and older engage in more than three times the World Health Organization's daily activity recommendation of 21 minutes. No significant differences found between groups | 7 |

Results

| Study | Location year of data collection | Study aims/research questions | Sample size (% males) | Socio-demographic characteristics | Level of practice/ Esports practiced | Study design/Method overview | Results | Inactive?; Findings | NOS/C ASP |
|------------------------|----------------------------------|--|-----------------------|---|--|---|--|--|-----------|
| Kari et al., 2019 | USA, Europe; 2018-2019 | Extensively revise the authors' previous study (2016) on the training routines of professional and high-level esports players, with an additional focus on their physical exercise | 7 (100%) | age (year) = 18-25; North American (n=2), European (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 | Exercise about 1h per day. From 4h to more than 8h of training per day. A part of the training is dedicated to other activities related to the game (observation replays, theory...). Different types of physical activity: running, soccer, weight training, walking. Only 1 stretches his wrists to prevent injuries. The others are more concerned with passive preventive measures (game chair...) | Active; difference in training between Hearthstone player and others. Players believe in the benefits of exercise but coaches and their teams sometimes give little importance to it. Furthermore, if they believe in the benefits of exercise for improving their performance, the physical exercise they actually do seems to be largely unstructured and unsystematic | 7 |
| Paramitha et al., 2021 | Indonesia; 2019 | To determine the physical activity level of Indonesian professional athletes, to be preliminary data in providing recommendations to major esports organizations or sports policy makers in future esports development efforts | 50 (100%) | age (year) = 21.5 (± 1.01), height (cm) 171.1 (± 6.1), weight (kg) 65.5 (± 11.1), BMI = 22.4; Indonesian (n=50) | Players qualified for the final round (top 50) of the national competition the Esports Presidential Cup 2019; MOBA | Cross-sectional; International Physical Questionnaire (IPAQ) (self-reported) | Physical Activity (METs min/week) = 3120.2 (±24.3); Game play activity time (min/day) = 183.9 (± 7.1); Average screen time (min/day) = 183 | Active; athletes included in the high physical activity level category | 6 |
| Pereira et al., 2019 | Portugal; nr | To assess physical activity and sedentary behavior levels of e-athletes participating in FPF esports competitions | 721 (99%) | age (year) = 24 (± 6) | Players participating in FPF (Federation Portuguese Football) esports competitions; Virtual Football | Cross-sectional; International Physical Questionnaire (IPAQ) (self-reported) and a set of questions regarding the habits of physical training | Physical Activity (METs min/week) = 4332 (IQR = 4673); Game play time (min/day) = 120 (IQR = 180); screen time (min/day) = 120 (IQR = 160); sitting (min/day) = 270 (IQR = 420) | Active; 73%; included in the category of high physical activity level, 15% moderate level, 12% did not meet the WHO recommendations. The majority had regular physical training that focused primarily on promoting health and improving physical abilities rather than improving athletic performance | 4 |
| Pereira et al., 2021 | Portugal; nr | To conduct a preliminary assessment of physical activity levels, sedentary behaviour and physical training habits of adult virtual soccer players in Portugal | 926 (98%) | age (year) = 22 (IQR = 8) | Players participating in FPF (Federation Portuguese Football) esports competitions, from recreational to professional without distinction; Virtual Football | Cross-sectional; International Physical Questionnaire (IPAQ) (self-reported) and a set of questions regarding the habits of physical training | Physical Activities median (min/week) = 1,080 (Q1, Q3 = 720, 1,680) (equivalent to an average of 154 min/day); energy expenditure with physical activities (METs min/week) = 5625 (self-reported) and a set of 2,880 MET-min-week with vigorous activities; 1,080 MET-min-week-moderate activities and 1,155 MET-min-week walking); physical training. Notably, many resorted to virtual football practise (min/day) = 150 (120, 220); an exercise professional for their physical training. Improving overall health, rather than physical health was a primary reason for training physically; 66.7% of training. Improving overall health, rather than physical health was a primary reason for training physically; 6.05% responded that they were active to improve performance in virtual soccer | Active; 84.53% included in the high level of physical activity category; 87.07% met the WHO recommendations. Most of the virtual football players were responsible for their own training. Notably, many resorted to virtual football practise (min/day) = 150 (120, 220); an exercise professional for their physical training. Improving overall health, rather than physical health was a primary reason for training physically; 66.7% of training. Improving overall health, rather than physical health was a primary reason for training physically; 6.05% responded that they were active to improve performance in virtual soccer | 6 |

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| Ronccone et al., 2020 | USA; nr | To analyze the relationship between physical activity and mental toughness of esports athletes | 34 (100%) | age (year) = (M = 20.02, SD = 1.46) ; Caucasian (n=31), Asian (n=2), African-American (n=1) | varsity collegiate esports student-athletes from one large major NCAA Division I public university | Cross-sectional; International Physical Activity Questionnaire (IPAQ), Sports Mental Toughness Questionnaire (SMTQ) and Demographic self-reported questionnaire | Vigorous Physical Activity (min/day) = 73,24 ; Moderate Physical Activity (min/day) = 69,17 ; Moderate Physical Activity (days/week) = 5,85 ; Vigorous Physical Activity (days/week) = 3,06 ; Moderate Physical Activity (min/day) Walking = 82,5 ; WHO recommendations Sitting (min/day) = 467,24 | Active; 97% engage in vigorous physical activity between at least two days and up to seven days per week. 88% meet CDC and | 6 |
| Rudolf et al, 2020 | Germany; 2019 | To assess the demographic characteristics and health behavior of video game and esports players. In addition, possible associations between video game time and health behavior are examined. | 1066 (91,9%) | age (year) = 22,9 ± 5,9 ; BMI = 24,6 ± 4,8 | Professional players (=14), former professionals players (=33), amateurs (n=355), regular players (n=577), occasional players (n=87); Counter Strike (n=522), League of Legends (n=157), PUBG (n=51), Fortnite (n=50), FIFA (n=45), Dota 2 (n=43), Overwatch (n=24), R6 (n=21), Rocket League (n=19), WoW (n=12), other (n=122) | Cross-sectional; self-reported electronic questionnaire | 66.9% engaged in moderate to vigorous physical activity for more than 2.5 h/week; 95% reported good to excellent health; Sitting (h/day) = 7.7±3.6; Video games played (h/week) = 24.4 ± 15.9; 57.5% of players who participate in official tournaments and leagues engage in structured training and 29% have a coach; 32.2% believe that good physical fitness has very positive effects and 48.1% have positive effects on in-game performance | Active; poor positive associations between video game time and sedentary behavior and BMI (rho = 0.15; p < 0.01), poor negative association between video game time and self-reported health status (rho = -0.14; p < 0.01); No statistically significant or relevant association (rho < 0.10) found between video game time and sleep parameters, physical activity, and fruit and vegetable consumption | 6 |
| Seng and al., 2021 | Malaysia; nr | To study the common health issues among esports players. | 69 (86%) | Individuals born, living and staying in Malaysia (n=69); age (year) = 18 to 21 (n=9); > 21 (n=60) | Ladder/ranking players (n=37 ,53,6%), players participating in national tournaments (n=26 ,37,7%), players participating in world tournaments (n=6 ,8,7%); nr | Cross-sectional; International Physical Activity Questionnaire (IPAQ) and the Nordic Questionnaire, Epworth Sleepiness Scale, and Depression Anxiety Stress Scale (DASS-21). | Players included in the high physical activity category (n=42, 60.9%); players included in the low or moderate physical activity category (n=27, 39.1%)Playing time (hours/day) = < 3 (n=24, 34.8%), > 3 (n=45, 65.2); Playing time (hours/week) = < 20 (n=30, 43.5%), 21 < 40 hours (n=28, 40.6), > 41 (11, 15.9) | Active; 60,9% (n=42) included in the high level of physical activity category; no association between stress, physical activity and duration of play, nor between musculoskeletal pain, sleep, physical activity and duration of play (p>0.05). | 3 |
| Trotter et al., 2020 | 65 countries; nr | To investigate the association between obesity, self-reported physical activity, smoking, alcohol consumption, and perceived health in esports players, and the influence of player rank in the game | 1772 (87,2%) | Participants in this study lived in 65 countries (n = 843); the five largest groups included the United States of America (34.4%, n = 290), Australia (21.4%, n = 180), Canada (8.9%, n = 75), Germany (4.9%, n = 41), and the United Kingdom (3.1%, n = 26). | top 10% in game rank, 80-89% top in game rank, 70-79% top in game rank, 0-69% top in game rank; 5 esports | Cross-sectional; self-reported electronic questionnaire (SF-1 for general health) | As a group 80.3% did not meet the WHO guidelines. Esports players were less compliant with international physical activity guidelines than the general population. Players ranked in the top 10% were significantly more active than the remaining 90% | Inactive; Player rank in the game was moderately and positively associated with esports frequency, and weakly associated with perceived PA level and inversely correlated with BMI. E-sports frequency was associated with higher levels of perceived PA and overall health | 5 |