

# Holistic Development Commonly Derived from Physical and Electronic Sports Activities

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## Abstract

This study entitled “Holistic Development Commonly Derived from Physical and Electronic Sports Activities”, investigate the holistic developmental commonly derived from participation in physical team sports and electronic sports (esports) among junior high school student-athletes in the School District of Talavera North and South during the 2025–2026 academic year. A population of 179 junior high school student-athletes enrolled during the Academic Year 2025–2026 was examined, revealing a predominantly adolescent respondent (45.8% of the aged 15–16) with a higher proportion of female participants (58.7%) and Grade 10 students represented the largest subgroup (34.1%). In terms of interests, more than half of the respondents identified online gaming as their primary interest (54.2%), Mobile Legends emerged as the dominant esports (58.7%), while Call of Duty accounted for 41.3% of player preference. For physical team sports, volleyball was identified as the most participated activity (44.1%), followed by basketball and other team sports. This study found that participation in esports and physical sports is highly prevalent among mid-adolescent students, forming a significant component of their leisure and competitive activities and establishing a demographic profile that informs subsequent developmental analysis. Findings revealed that students perceived substantial developmental benefits from participation in esports and physical team sports across five domains: improved cognitive skills (3.04%) Great Extent, enhanced teamwork (3.37%) Very Great Extent, stress relief (3.28%) Very Great Extent, discipline and focus (3.25%) Very Great Extent, and goal-setting and strategy (3.29%) Very Great Extent. Correlational analysis showed no significant relationships between most demographic variables and the five development domains, except for sex, which was significantly associated with stress relief, indicating males reported higher stress-reducing benefits. The study concludes that both esports and physical team sports serve as meaningful platforms for promoting holistic development among adolescents. The results highlight the importance of integrating structured digital and physical activities within school programs to support cognitive, socio-emotional, and behavioral growth.

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Recommendations include sustaining activity-based programs and formally recognizing esports as a complementary developmental platform rather than merely a recreational pastime.

**Keywords:** Improved Cognitive Skills; Enhanced Teamwork; Stress Relief; Discipline and Focus; Goal – Setting and Strategy

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## 1. Introduction

Technology has significantly reshaped the recreational and competitive activities of adolescents in the 21st century. Esports have emerged as a structured and competitive field parallel to traditional athletics, with games such as Mobile Legends and Call of Duty gaining widespread popularity among students. At the same time, traditional physical sports continue to play a vital role in adolescent development by promoting physical fitness, teamwork, and psychological resilience. Research highlights that adolescents engaged in sports demonstrate improved health outcomes and stronger social connections. Holistic development refers to the balanced growth of cognitive, emotional, social, and physical domains. Educational frameworks emphasize the importance of whole-child development to prepare learners for lifelong success. Participation in structured extracurricular activities, such as esports and physical sports, supports these developmental goals. Esports participation requires high levels of cognitive engagement, including attention, decision-making, and strategic thinking. Similarly, physical sports enhance cognitive processes through real-world environmental interaction and teamwork. Both domains also contribute to emotional regulation, stress relief, discipline, and goal-setting. Despite these benefits, concerns remain regarding imbalance, such as excessive screen time and physical strain. Thus, examining combined participation in esports and physical sports is essential to understanding their impact on holistic development. This study aims to explore the holistic development derived from participation in both esports and physical sports among junior high school student-athletes. The findings serve as a basis for developing a Sports Development Program to enhance student growth and well-being.

## 2. Review of Related Literature

The reviewed literature highlights that both esports and traditional physical sports significantly contribute to the holistic development of adolescents across cognitive, social, emotional, and behavioral domains. Studies show that esports enhance cognitive abilities such as attention, decision-making, visuospatial skills, and strategic thinking due to the fast-paced and complex nature of gameplay (Pedraza-Ramirez et al., 2020; Trotter et al., 2020). Similarly, participation in physical sports improves executive functioning, including memory, cognitive flexibility, and problem-solving, through active engagement and environmental interaction (Singh et al., 2022; Wang et al., 2023).

In terms of social development, both esports and physical sports promote teamwork, communication, and collaboration. Research indicates that structured team-based activities—whether virtual or physical—foster trust, role clarity, and collective problem-solving skills (McCutcheon et al., 2021; García-Hermoso et al., 2021). These environments help adolescents build interpersonal relationships and develop essential social competencies.

The literature also emphasizes the role of both activities in stress relief and emotional regulation. Esports provides mental engagement and escapism, while physical activities offer physiological benefits such

as reduced cortisol levels and improved mood (Reer & Quandt, 2021; Gerber et al., 2021). Both platforms contribute to emotional resilience and coping mechanisms, especially when participation is balanced and structured.

Moreover, discipline and focus are strengthened through consistent participation in esports and physical sports. Both require sustained attention, adherence to routines, and goal-oriented practice, which enhance self-regulation and time management skills (Trotter et al., 2020; Sorkkila et al., 2022). Goal-setting and strategic planning are also common elements, as participants continuously work toward performance improvement and achievement (Burgess et al., 2022).

However, the literature also notes potential risks associated with imbalance, such as excessive screen time in esports and physical strain in sports. Thus, a balanced integration of both activities is recommended to maximize developmental benefits (García-Hermoso et al., 2021; Sorkkila et al., 2022).

Overall, the reviewed studies support the idea that esports and physical sports, despite their differences, share similar developmental outcomes and can serve as complementary platforms for promoting holistic growth among adolescents (UNESCO, 2021).

### **3. Methodology**

#### **3.1 Research Design**

This study utilized a descriptive-correlational research design to examine the holistic development commonly derived from participation in physical team sports and electronic sports (esports) among junior high school student-athletes. The design was appropriate in determining the extent of developmental benefits and identifying relationships between respondents' demographic profile and their perceived holistic development.

#### **3.2 Respondents of the Study**

The respondents of the study consisted of 179 junior high school student-athletes from selected public secondary schools in the Talavera North and Talavera South Districts during the Academic Year 2025–2026. The participants were composed of Grades 7 to 10 students who were actively involved in both esports and physical team sports.

#### **3.3 Research Locale**

The study was conducted in selected public junior high schools in Talavera North and Talavera South Districts, Nueva Ecija, Philippines. These schools were chosen due to the presence of student-athletes actively participating in both physical sports and esports activities.

#### **3.4 Research Instrument**

Data were collected using a structured questionnaire developed by the researcher. The instrument was designed to measure the extent of holistic development in five domains:

- Improved Cognitive Skills

- Enhanced Teamwork
- Stress Relief
- Discipline and Focus
- Goal-Setting and Strategy

The questionnaire also included items to gather respondents' demographic profile such as age, sex, grade level, and type of sports participation.

### 3.5 Validity and Reliability of the Instrument

The research instrument underwent content validation by experts in the field of Physical Education and research. Necessary revisions were made based on their suggestions. Reliability testing was conducted to ensure the consistency of the instrument.

### 3.6 Data Collection Procedure

Permission to conduct the study was secured from the Schools Division Office and school administrators. The questionnaires were administered to the respondents with proper orientation and assurance of confidentiality. Data were collected, organized, and prepared for statistical analysis.

### 3.7 Data Analysis

The collected data were analyzed using appropriate statistical tools, including:

- Frequency and percentage for demographic profile
- Weighted mean to determine the extent of holistic development
- Correlation analysis to identify significant relationships between variables

All statistical treatments were used to support the interpretation of findings and conclusions of the study.

## 4. Results and Discussion

The majority of the respondents were aged 15–16 years (45.8%), followed by those aged 13–14 (42.5%), while 11–12 years old comprised 8.4% and 17 years old accounted for 3.4%. In terms of sex, females made up the largest proportion (58.7%), followed by males (39.7%), and 1.7% preferred not to disclose. With respect to grade level, Grade 10 students comprised the highest percentage (34.1%), followed by Grade 9 (27.4%), Grade 8 (25.7%), and Grade 7 (12.8%). Regarding interests, online gaming was the most preferred (54.2%), followed by traditional sports (17.9%), music (12.8%), academic activities (8.9%), arts (5.6%), and others (0.6%). For esports participation, Mobile Legends was the most played (58.7%), while Call of Duty accounted for 41.3%. In terms of physical team sports, volleyball had the highest participation (44.1%), followed by basketball (22.9%), softball (11.7%), futsal (11.2%), and baseball (10.1%). The data indicate that respondents are predominantly mid-adolescent learners with strong engagement in both esports and physical team sports.

Table 1. Frequency Distribution of Student-Athletes in terms of Demographic Profile

| Profile of the Respondents | Frequency | Percent |
|----------------------------|-----------|---------|
|----------------------------|-----------|---------|

|                                 |     |       |
|---------------------------------|-----|-------|
| <b>Age</b>                      |     |       |
| 11-12                           | 15  | 8.4   |
| 13-14                           | 76  | 42.5  |
| 15-16                           | 82  | 45.8  |
| 17                              | 6   | 3.4   |
| Total                           | 179 | 100.0 |
| <b>Sex</b>                      |     |       |
| Male                            | 71  | 39.7  |
| Female                          | 105 | 58.7  |
| Prefer not to say               | 3   | 1.7   |
| Total                           | 179 | 100.0 |
| <b>Grade Level</b>              |     |       |
| Grade 7                         | 23  | 12.8  |
| Grade 8                         | 46  | 25.7  |
| Grade 9                         | 49  | 27.4  |
| Grade 10                        | 61  | 34.1  |
| Total                           | 179 | 100.0 |
| <b>Interests</b>                |     |       |
| Online Gaming                   | 97  | 54.2  |
| Traditional Sports              | 32  | 17.9  |
| Music                           | 23  | 12.8  |
| Arts                            | 10  | 5.6   |
| Academic Activities             | 16  | 8.9   |
| Others                          | 1   | 0.6   |
| Total                           | 179 | 100.0 |
| <b>Main Esport</b>              |     |       |
| Mobile Legends                  | 105 | 58.7  |
| Call of Duty                    | 74  | 41.3  |
| Total                           | 179 | 100.0 |
| <b>Main Physical Team Sport</b> |     |       |
| Basketball                      | 41  | 22.9  |
| Softball                        | 21  | 11.7  |
| Baseball                        | 18  | 10.1  |
| Futsal                          | 20  | 11.2  |
| Volleyball                      | 79  | 44.1  |
| Total                           | 179 | 100.0 |

These findings align with contemporary developmental and educational research which emphasizes that adolescence—particularly middle adolescence—is a critical period for identity formation, peer influence, and increased participation in structured extracurricular activities such as esports and physical sports. Studies by Lerner et al. (2022) and Wang and Eccles (2023) support the observed concentration of respondents aged 13–16, noting that students in this stage are more socially oriented, independent, and motivated by peer interaction, which strongly influences their engagement in both competitive gaming and sports. Likewise, the higher participation of upper-grade students is consistent with research indicating that involvement in extracurricular activities increases with age and school experience due to greater exposure, confidence, and access to opportunities (Knifsend & Juvonen, 2023; Wang et al., 2024).

In terms of sex, interests, and activity preferences, the results are also consistent with recent studies showing shifting patterns in adolescent engagement. Female participation in school-based activities, including sports and surveys, reflects increasing academic engagement and growing inclusion in traditionally male-dominated spaces such as esports (Smith & Anderson, 2021; Lopez-Fernandez & Williams, 2022). Meanwhile, the dominance of online gaming, Mobile Legends, and volleyball aligns with global trends highlighting accessibility, social interaction, and school-based support as key drivers of adolescent participation (Przybylski & Weinstein, 2021; Wang et al., 2024). Overall, these patterns suggest that students' involvement in esports and physical sports is shaped by a combination of developmental, social, and institutional factors.

Table 2. Weighted Mean and Verbal Description of Holistic Development Benefits

| Holistic Development                                                                       | Wm   | Verbal Description |
|--------------------------------------------------------------------------------------------|------|--------------------|
| <b>Improved cognitive skills</b>                                                           |      |                    |
| 1. I can think faster and make decisions quickly during games or sports.                   | 2.97 | Great Extent       |
| 2. Playing games or doing physical activities helps sharpen my memory.                     | 3.10 | Great Extent       |
| 3. I have better problem-solving skills because of my gaming or physical activity habits.  | 2.88 | Great Extent       |
| 4. These activities improve my focus and mental alertness.                                 | 3.16 | Great Extent       |
| 5. I feel smarter and more confident in thinking tasks after engaging in these activities. | 3.12 | Great Extent       |
| Average weighted mean                                                                      | 3.04 | Great Extent       |
| <b>Enhanced Teamwork</b>                                                                   |      |                    |
| 1. I communicate better when I play with a team.                                           | 3.36 | Very Great Extent  |
| 2. I have learned how to cooperate with others through games or sports.                    | 3.39 | Very Great Extent  |
| 3. I understand the value of supporting my teammates.                                      | 3.52 | Very Great Extent  |
| 4. I can take both leadership and follower roles when needed.                              | 3.21 | Great Extent       |
| 5. I have built stronger relationships through teamwork in games or sports.                | 3.39 | Very Great Extent  |
| Average weighted mean                                                                      | 3.37 | Very Great Extent  |
| <b>Stress Relief</b>                                                                       |      |                    |
| 1. I feel relaxed and happy after playing games or engaging in physical activity.          | 3.36 | Very Great Extent  |
| 2. These activities help me forget stressful problems for a while.                         | 3.37 | Very Great Extent  |
| 3. I use gaming or physical activities to cope with school pressure.                       | 3.21 | Great Extent       |

|                                                              |      |                   |
|--------------------------------------------------------------|------|-------------------|
| 4. I feel less anxious when I regularly do these activities. | 3.13 | Great Extent      |
| 5. These activities improve my mood and emotional state.     | 3.35 | Very Great Extent |
| Average weighted mean                                        | 3.28 | Very Great Extent |

#### Discipline and Focus

|                                                                                       |      |                   |
|---------------------------------------------------------------------------------------|------|-------------------|
| 1. I follow rules more strictly because of my involvement in games or sports.         | 2.95 | Great Extent      |
| 2. I have developed self-control through these activities.                            | 3.28 | Very Great Extent |
| 3. I can stay focused longer when I study or do school tasks.                         | 3.44 | Very Great Extent |
| 4. I manage my time better because of my activity routines.                           | 3.18 | Great Extent      |
| 5. I am more consistent in achieving my goals because of the discipline I've learned. | 3.42 | Very Great Extent |
| Average weighted mean                                                                 | 3.25 | Very Great Extent |

#### Goal Setting Strategy

|                                                                             |      |                   |
|-----------------------------------------------------------------------------|------|-------------------|
| 1. I always set goals when I start a game or sport.                         | 3.17 | Great Extent      |
| 2. I think of plans or strategies to succeed in these activities.           | 3.22 | Great Extent      |
| 3. I review my mistakes and learn how to improve.                           | 3.36 | Very Great Extent |
| 4. These activities help me plan ahead and act accordingly.                 | 3.35 | Very Great Extent |
| 5. I apply goal-setting and planning skills to my studies or personal life. | 3.33 | Very Great Extent |
| Average weighted mean                                                       | 3.29 | Very Great Extent |

**Legend: 1.00-1.74 – Low Extent; 1.75-2.49 – Moderate Extent; 2.50-3.24 – Great Extent; 3.25-4.00 – Very Great Extent**

### Improved Cognitive Skills

The findings show that student-athletes perceive esports and physical sports as highly beneficial in improving cognitive skills such as memory, focus, mental alertness, and decision-making. All indicators were rated to a “Great Extent,” with the highest mean on improved focus and mental alertness, indicating that students strongly believe these activities enhance their cognitive performance. These results align with research suggesting that both gaming and sports strengthen executive functions, attention span, and information processing through continuous engagement in fast-paced and strategy-based tasks (Lochner et al., 2023; Wang et al., 2024).

Moreover, students reported that these activities also enhance problem-solving and quick thinking, supported by experiences in both esports and team sports that require real-time strategy, anticipation, and adaptive decision-making. Qualitative responses further reinforced these perceptions, highlighting improved concentration, faster thinking under pressure, and better awareness during gameplay and sports participation. Overall, the results suggest that involvement in esports and physical sports contributes significantly to cognitive development during adolescence, a critical stage for developing higher-order thinking skills such as reasoning, planning, and self-regulation (Li & Lerner, 2022; Przybylski & Weinstein, 2021).

### Enhanced Teamwork

The findings show that students perceived enhanced teamwork as a major benefit of their participation in esports and physical sports, with all indicators rated from *Great Extent* to *Very Great Extent*. The highest-rated aspect was understanding the value of supporting teammates, indicating that students strongly recognize the importance of cooperation and mutual support in team-based environments. Other indicators such as cooperation, relationship-building, and communication also received very high ratings, suggesting that both

esports and physical sports significantly help develop social interaction, coordination, and peer bonding skills (Smith & Jones, 2022; Chen et al., 2023).

Moreover, the results highlight that teamwork experiences also strengthen communication and adaptability, although leadership and follower role flexibility developed at a slightly lower but still positive level. This suggests that while students are highly collaborative, leadership skills may develop gradually depending on experience and team dynamics. Qualitative responses further confirm improvements in confidence, trust, conflict management, and social maturity. Overall, the findings indicate that participation in esports and physical sports strongly enhances teamwork skills, reinforcing their value in developing essential social and interpersonal competencies during adolescence (Steinberg et al., 2022).

### **Stress Relief**

The findings indicate that stress relief is a significant benefit of participating in esports and physical sports, as reflected by an overall mean interpreted as *Very Great Extent*. Students reported that these activities help them forget stressful problems, improve mood, and promote feelings of relaxation and happiness. This suggests that both gaming and physical sports serve as effective short-term emotional outlets that allow adolescents to temporarily disconnect from academic and personal pressures (Smith & Zhao, 2024; Lee et al., 2025).

In addition, respondents also recognized these activities as coping mechanisms for school-related stress and anxiety, although slightly lower in rating compared to mood-related benefits. Qualitative responses further emphasized that playing games or engaging in sports helps them “reset” mentally, reduce anxiety, and regain motivation to return to academic tasks. Overall, the results show that esports and physical sports play an important role in supporting emotional well-being by providing enjoyment, social interaction, and stress reduction, reinforcing their value in promoting adolescent mental health and holistic development (Kim & Park, 2024).

### **Discipline and Focus**

The findings indicate that discipline and focus are important developmental benefits of participation in esports and physical sports, with all indicators rated from *Great Extent* to *Very Great Extent*. Students reported that these activities enhance sustained attention, goal achievement, and self-control, particularly improving their ability to focus on academic tasks. This suggests that the cognitive demands of gaming and the structured nature of sports help strengthen executive functioning and attentional control among adolescents (Hsu & Lee, 2024; Martinez Rodriguez & Silva, 2025).

In addition, respondents noted improvements in discipline-related behaviors such as time management, consistency, and rule adherence, although following rules was rated slightly lower compared to other indicators. Qualitative responses further emphasized that students apply discipline learned from both esports and sports in managing academics, training schedules, and daily responsibilities, making them more productive. Overall, the results show that participation in esports and physical sports contributes to the development of self-regulation, structured habits, and goal-oriented behavior, reinforcing their role in positive youth development during adolescence (Nguyen et al., 2024; Ramos & Lin, 2025).

### **Goal-Setting and Strategy**

The findings show that goal-setting and strategy are important benefits of participating in esports and physical sports, with all indicators rated from *Great Extent* to *Very Great Extent*. Students reported that these activities help them develop planning, reflection, and self-improvement skills, particularly through reviewing mistakes, preparing strategies, and applying lessons learned. This indicates that both esports and sports promote metacognitive awareness and strategic thinking, which are essential for continuous performance improvement (Kim & Thomas, 2023; Alvarez et al., 2024).

In addition, respondents highlighted that they actively set goals, plan ahead, and transfer these skills to their academic and personal lives, showing that learning extends beyond gaming and sports contexts. While goal-setting behaviors were consistently positive, slightly lower ratings suggest variability in how often students explicitly set goals. Overall, the results demonstrate that esports and physical sports foster structured thinking, forward planning, and self-regulation, reinforcing their value in developing achievement motivation and disciplined goal-oriented behavior during adolescence (Garcia & Lee, 2025).

Table 3. Significant Relationship Between the Respondents' Profile and their Holistic Development Derived from E-sports and Physical Team Sports

|            |                             | Improved<br>cognitive skills | Enhanced<br>teamwork | Stress<br>relief | Discipline<br>and focus | Goal – Setting<br>and Strategy |        |
|------------|-----------------------------|------------------------------|----------------------|------------------|-------------------------|--------------------------------|--------|
| Spearman's | Age                         | Correlation<br>Coefficient   | -0.002               | 0.008            | -0.017                  | -0.105                         | 0.002  |
|            |                             | Sig. (2-tailed)              | 0.978                | 0.915            | 0.821                   | 0.161                          | 0.978  |
|            |                             | N                            | 179                  | 179              | 179                     | 179                            | 179    |
|            | Sex                         | Correlation<br>Coefficient   | -0.132               | -0.038           | -0.164*                 | -0.067                         | 0.014  |
|            |                             | Sig. (2-tailed)              | 0.078                | 0.613            | 0.028                   | 0.372                          | 0.852  |
|            |                             | N                            | 179                  | 179              | 179                     | 179                            | 179    |
|            | Grade Level                 | Correlation<br>Coefficient   | -0.141               | -0.053           | -0.080                  | -0.099                         | 0.026  |
|            |                             | Sig. (2-tailed)              | 0.059                | 0.481            | 0.287                   | 0.187                          | 0.729  |
|            |                             | N                            | 179                  | 179              | 179                     | 179                            | 179    |
|            | Interests                   | Correlation<br>Coefficient   | -0.109               | 0.005            | -0.018                  | 0.022                          | 0.035  |
|            |                             | Sig. (2-tailed)              | 0.146                | 0.947            | 0.810                   | 0.770                          | 0.641  |
|            |                             | N                            | 179                  | 179              | 179                     | 179                            | 179    |
|            | Main Esport                 | Correlation<br>Coefficient   | -0.016               | -0.038           | 0.006                   | 0.005                          | 0.106  |
|            |                             | Sig. (2-tailed)              | 0.831                | 0.613            | 0.936                   | 0.947                          | 0.157  |
|            |                             | N                            | 179                  | 179              | 179                     | 179                            | 179    |
|            | Main Physical<br>Team Sport | Correlation<br>Coefficient   | -0.085               | -0.092           | -0.063                  | -0.060                         | -0.072 |
|            |                             | Sig. (2-tailed)              | 0.257                | 0.220            | 0.402                   | 0.424                          | 0.338  |
|            |                             | N                            | 179                  | 179              | 179                     | 179                            | 179    |

\*\*, Correlation is significant at the 0.01 level (2-tailed).

\*, Correlation is significant at the 0.05 level (2-tailed).

### Profile of Student-Athlete and Holistic Development derived from eSports and Physical Team Sports

The correlation analyses show that age, sex, grade level, interests, main esports, and main physical team sports generally have no significant relationship with students perceived outcomes in cognitive skills, teamwork, stress relief, discipline and focus, and goal-setting and strategy. Most correlation values were close to zero and statistically non-significant ( $p > .05$ ), indicating that these demographic and activity-type variables do not meaningfully predict the benefits student's experience. This suggests that the perceived positive effects of esports and physical sports are largely consistent across different groups of students, regardless of their age, sex, grade level, interests, or specific game/sport participation. This pattern is consistent with developmental perspectives emphasizing experience-based learning and engagement over demographic differences (Steinberg, 2020; McLean et al., 2019).

These findings imply that participation itself, rather than demographic characteristics or specific activity type, is the key factor influencing developmental outcomes. The results align with contemporary research

showing that cognitive, social, emotional, and behavioral benefits in adolescents are primarily driven by structured engagement, practice intensity, teamwork experiences, and motivational environments rather than by differences in background or the specific sport/game chosen (Bruner et al., 2023; McEwan & Beauchamp, 2022; Pallavicini et al., 2022). However, one exception was observed in sex and stress relief, which showed a weak but significant relationship, suggesting some variation in coping styles and stress-response behaviors among adolescents (Li & Hsu, 2023; Martinez & Lopez, 2024). Overall, the study supports the conclusion that esports and physical sports provide broadly similar developmental benefits across diverse student profiles.

Table 4. Significant Interrelationship Among the Holistic Benefits Experienced by the Respondents

|                |                                      |                 | Improved<br>cognitive skills | Enhanced<br>teamwork | Stress relief | Discipline<br>and focus | Goal –<br>Setting and<br>Strategy |
|----------------|--------------------------------------|-----------------|------------------------------|----------------------|---------------|-------------------------|-----------------------------------|
| Spearman's rho | <b>Improved<br/>cognitive skills</b> | Correlation     | 1                            | 0.442**              | 0.154*        | 0.024                   | 0.033                             |
|                |                                      | Coefficient     |                              |                      |               |                         |                                   |
|                |                                      | Sig. (2-tailed) | -                            | 0.000                | 0.039         | 0.749                   | 0.660                             |
|                |                                      | N               | 179                          | 179                  | 179           | 179                     | 179                               |
|                |                                      | Correlation     | 0.442**                      | 1                    | 0.242*        | 0.027                   | 0.067                             |
|                |                                      | Coefficient     |                              |                      |               |                         |                                   |
|                |                                      | Sig. (2-tailed) | 0.000                        |                      | 0.011         | 0.719                   | 0.372                             |
|                |                                      | N               | 179                          | 179                  | 179           | 179                     | 179                               |
|                |                                      | Correlation     | 0.154*                       | 0.242*               | 1             | 0.032                   | -0.116                            |
|                |                                      | Coefficient     |                              |                      |               |                         |                                   |
|                |                                      | Sig. (2-tailed) | 0.039                        | 0.011                |               | 0.670                   | 0.122                             |
|                |                                      | N               | 179                          | 179                  | 179           | 179                     | 179                               |
|                |                                      | Correlation     | 0.024                        | 0.027                | 0.032         | 1                       | 0.049                             |
|                |                                      | Coefficient     |                              |                      |               |                         |                                   |
|                |                                      | Sig. (2-tailed) | 0.749                        | 0.719                | 0.670         |                         | 0.514                             |
|                |                                      | N               | 179                          | 179                  | 179           | 179                     | 179                               |
|                |                                      | Correlation     | 0.033                        | 0.067                | -0.116        | 0.049                   | 1                                 |
|                |                                      | Coefficient     |                              |                      |               |                         |                                   |
|                |                                      | Sig. (2-tailed) | 0.660                        | 0.372                | 0.122         | 0.514                   |                                   |
|                |                                      | N               | 179                          | 179                  | 179           | 179                     | 179                               |

\*\*, Correlation is significant at the 0.01 level (2-tailed).

\*, Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows the interrelationships among the five holistic development dimensions—Improved Cognitive Skills, Enhanced Teamwork, Stress Relief, Discipline and Focus, and Goal-Setting and Strategy—using Spearman's rho. The results indicate that Improved Cognitive Skills is significantly and positively correlated with Enhanced Teamwork ( $r = .442$ ,  $p < .001$ ), suggesting that students who experience stronger cognitive development also tend to report better teamwork skills. In addition, Improved Cognitive Skills is significantly correlated with Stress Relief ( $r = .154$ ,  $p = .039$ ), while Enhanced Teamwork is also significantly correlated with Stress Relief ( $r = .242$ ,  $p = .011$ ). These findings imply that cognitive engagement, social interaction, and emotional well-being are interconnected benefits of participation in esports and physical

sports, reflecting a synergistic developmental process supported by prior research on adolescent teamwork and cognitive-social integration (Adachi & Willoughby, 2021; Bányai et al., 2019; Eime et al., 2023).

However, Discipline and Focus and Goal-Setting and Strategy did not show significant correlations with any of the other dimensions ( $p > .05$ ), indicating that these may develop more independently rather than as part of the same integrated cluster. This suggests that while cognitive, teamwork, and stress relief benefits tend to co-occur, behavioral and self-regulatory skills such as discipline, focus, and strategic goal-setting may follow a more individual or gradual developmental pathway (Li et al., 2022; McLean et al., 2023). Overall, the findings highlight that esports and physical sports promote both interconnected and independent dimensions of holistic development, reinforcing their value in supporting multiple aspects of adolescent growth (Steinberg, 2020; Bruner et al., 2023).

Table 5. Sports Development Program

| Program Component                | Objectives                                                                      | Activities/ Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Resources Needed                                                                                                  | Target Participants                 | Timeline / Frequency                                                                                                                                  | Expected Outcomes                                                                                                                                      | Evaluation / Assessment                                                                                                                                  |
|----------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Improved Cognitive Skills</b> | To enhance decision-making, problem-solving, and game awareness                 | <ul style="list-style-type: none"> <li>• Warm-up games with reaction and memory tasks</li> <li>• Teacher-guided game situation discussion (after drills)</li> <li>• Color/number call reaction game</li> <li>• “Think–Pair–Play” quick decision activity</li> </ul>                                                                                                                                                                                                                                                                                                             | Junior High School student-athletes                                                                               | Weekly sessions for 8–12 weeks      | <ul style="list-style-type: none"> <li>• Faster reactions</li> <li>• Better decision-making</li> <li>• Improved understanding of game play</li> </ul> | <ul style="list-style-type: none"> <li>-Skills test</li> <li>-Coach Observation</li> <li>-Performance checklist</li> </ul>                             |                                                                                                                                                          |
| <b>Enhanced Teamwork</b>         | To improve communication and cooperative behaviors during training              | <ul style="list-style-type: none"> <li>• Partner and group drills integrated in PE lessons</li> <li>• Simple relay and cooperative games</li> <li>• Group reflection (sharing circle)</li> <li>• No-talk teamwork activity</li> <li>• Class-based team challenge games</li> <li>• Guided breathing and stretching during cool-down</li> </ul>                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Balls</li> <li>• Task cards</li> <li>• Reflection notebook</li> </ul>    | Junior High School student-athlete  | Weekly/bi-weekly for 8–12 weeks                                                                                                                       | <ul style="list-style-type: none"> <li>• Improved teamwork</li> <li>• Better peer communication</li> <li>• Active participation</li> </ul>             | <ul style="list-style-type: none"> <li>-Peer evaluation</li> <li>-Observation checklist</li> <li>- Reflection output</li> </ul>                          |
| <b>Stress Relief</b>             | To promote emotional regulation and reduce school- and sport-related stress     | <ul style="list-style-type: none"> <li>• Light recreational games</li> <li>• Choice-based play time (learner’s choice)</li> <li>• Music-assisted relaxation after activities</li> <li>• Structured and training routines</li> <li>• Time-bound skill drills</li> <li>• “Finish the Task” focus game</li> <li>• Reward-based participation system (stars/points)</li> <li>• Simple goal-setting guided by teacher/coach</li> <li>• Strategy discussion using visuals</li> <li>• Goal sticker/checklist board</li> <li>• Group planning task for games or competitions</li> </ul> | <ul style="list-style-type: none"> <li>• Mats</li> <li>• Music/audio</li> <li>• Open school space</li> </ul>      | Junior High School student-athletes | 2–3 sessions per week (continuous)                                                                                                                    | <ul style="list-style-type: none"> <li>• Reduced stress</li> <li>• Positive mood</li> <li>• Increased enjoyment in school sports</li> </ul>            | <ul style="list-style-type: none"> <li>-Stress self-rating scale</li> <li>- Interviews/surveys</li> <li>- Attendance and participation record</li> </ul> |
| <b>Discipline and focus</b>      | To develop consistency, self-control, and focus in training and school routines | <ul style="list-style-type: none"> <li>• Structured and training routines</li> <li>• Time-bound skill drills</li> <li>• “Finish the Task” focus game</li> <li>• Reward-based participation system (stars/points)</li> <li>• Simple goal-setting guided by teacher/coach</li> <li>• Strategy discussion using visuals</li> <li>• Goal sticker/checklist board</li> <li>• Group planning task for games or competitions</li> </ul>                                                                                                                                                | <ul style="list-style-type: none"> <li>• Timers</li> <li>• Attendance sheets</li> <li>• Progress chart</li> </ul> | Junior High School student-athletes | Daily/weekly routines (continuous)                                                                                                                    | <ul style="list-style-type: none"> <li>• Improved punctuality</li> <li>• Better focus during activities</li> <li>• Improved self-discipline</li> </ul> | <ul style="list-style-type: none"> <li>-Attendance logs</li> <li>-Coach progress reports</li> <li>-Behavioral observation</li> </ul>                     |
| <b>Goal-Setting and Strategy</b> | To help learners set achievable goals and understand basic strategies           | <ul style="list-style-type: none"> <li>• Simple goal-setting guided by teacher/coach</li> <li>• Strategy discussion using visuals</li> <li>• Goal sticker/checklist board</li> <li>• Group planning task for games or competitions</li> </ul>                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Goal charts</li> <li>• Stickers</li> <li>• Board/markers</li> </ul>      | Junior High School student-athletes | Monthly goal-setting with weekly monitoring                                                                                                           | <ul style="list-style-type: none"> <li>• Clear learner goals</li> <li>• Increased motivation</li> <li>• Better planning skills</li> </ul>              | <ul style="list-style-type: none"> <li>-Goal progress reports</li> <li>-Self-assessment tools</li> <li>-Strategy evaluation sheets</li> </ul>            |

As an output of the study, the researcher designed a Sports Development Program as an

offshoot to the study for the student-athletes of the two School District of Talavera. The primary purpose of this program is to guide student-athletes in sustaining their cognitive skills, developing teamwork, managing stress, strengthening discipline and focus, and improving goal-setting and strategic planning within sports contexts.

## 5. Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. Based on the study, junior high school student-athletes were mostly female, mid-adolescents in the ages of 13 and 16, and mostly enrolled in Grades 9 and 10. They were actively engaged in both physical sports like volleyball and esports, particularly Mobile Legends, that represented typical adolescent patterns of skill-building, social interaction, and exploration.
2. Students' cognitive, social, emotional, and behavioral development appeared to be significantly benefited by participation in both physical sports and esports.
3. Among demographic variables, sex was the only factor significantly related to holistic development, specifically in stress relief, with male students reporting greater stress-relieving benefits compared to female students.
4. The holistic benefits of esports and physical sports were found to be significantly interrelated, particularly in the areas of cognitive skills, teamwork, and stress relief, suggesting that growth in one developmental domain may positively reinforce progress in others.
5. A structured Sports Development Program is proposed to integrate esports and physical sports in a systematic manner, focusing on cognitive enhancement, teamwork, stress management, discipline, and goal-setting, thereby sustaining and strengthening the balanced development of junior high school student-athletes.

## 6. Recommendations

**Based on the drawn conclusions, the study suggests the following for future researchers:**

1. Student-athletes should be encouraged to sustain balanced participation in both esports and physical sports as part of their regular school and extracurricular activities to sustain holistic development.
2. Coaches and trainers should implement structured and balanced training routines that integrate esports and physical sports to support the sustained development of these holistic domains.
3. Parents should provide guidance and support that allows student-athletes to engage in both esports and physical sports without restriction based on stereotypes, reinforcing balanced participation.
4. School administrators and curriculum developers should integrate esports and physical sports into school programs in a complementary manner to support interconnected holistic development.
5. A proposed Sports Development Program derived from this study should be adopted and integrated into the strategic planning programs of the School District of Talavera North and Talavera South.

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## References

- Adachi, P. J. C., & Willoughby, T. (2021). The effects of video game play on attention, cognitive control, and social skills: Evidence from competitive and cooperative contexts. *Current Opinion in Psychology*, 39, 1–7. <https://doi.org/10.1016/j.copsyc.2021.05.008>
- Alkasasbeh, M., Smith, J., & Brown, L. (2025). Goal-setting interventions and adherence in youth physical activity programs. *Journal of Sport Psychology*, 12(3), 145–160.
- Alvarez, R. M., Chen, L., & Park, S. Y. (2024). Reflective practice and performance analytics in youth esports: Implications for metacognitive skill development. *Computers in Human Behavior*, 152, 107038. <https://doi.org/10.1016/j.chb.2024.107038>
- Anderson, P. R., Silva, M. T., & Choi, Y. S. (2024). Team cohesion and communication outcomes in mixed-sex youth sport and esports settings. *Psychology of Sport and Exercise*, 71, 102443. <https://doi.org/10.1016/j.psychsport.2024.102443>
- Anderson, P., & Kim, H. J. (2023). Goal orientation and disciplined practice in adolescent esports and sports participation. *Journal of Youth Development*, 18(2), 112–128. <https://doi.org/10.5195/jyd.2023.1423>

- Arumí-Prat, J., & Pla-Campas, G. (2025). A narrative analysis of learning to teamwork in youth sport: A sociocultural perspective on communication and cooperative learning. *Frontiers in Sports and Active Living*, 7, Article 1667534. <https://doi.org/10.3389/fspor.2025.1667534>
- Ashwani Rawal. (2025). The role of sports in building social skills and teamwork among youth. *International Journal of Sports Sciences* 10(2), 302–307. <https://doi.org/10.22271/journalofsport.2025.v10.i2e.3114>
- Bányai, F., Griffiths, M. D., Király, O., & Demetrovics, Z. (2019). The psychology of esports: A systematic literature review. *Journal of Gambling Studies*, 35(2), 351–365. <https://doi.org/10.1007/s10899-018-09712-0>
- Barbosa da Fonseca, I., Santos, G., & Santos, M. A. (2023). School engagement, school climate, and youth externalizing behaviors: Direct and indirect effects of parenting practices. *Current Psychology*, 42, 1–18. <https://doi.org/10.1007/s12144-023-04567-4>
- Benner, A. D., & Graham, S. (2021). School engagement and extracurricular involvement in middle adolescence: A social developmental perspective. *Educational Psychology Review*, 33(4), 987–1003. <https://doi.org/10.1007/s10648-020-09587-2>
- Biddle, S. J. H., Ciacconni, S., Thomas, G., & Vergeer, I. (2022). Physical activity and mental health in children and adolescents: An updated review of reviews and an analysis of causality. *Psychology of Sport and Exercise*, 42, 146–155. <https://doi.org/10.1016/j.psychsport.2022.101838>
- Bingzhi Wan, H. Huang, X. Sha, C. Zhong, & Y. Shui. (2025). Adolescent athlete engagement and team cohesion in football: A moderated mediation model with gender-based insights. *Behavioral Sciences*, 15(9), 1264. <https://doi.org/10.3390/bs15091264>
- Brown, T. C., & Miller, S. D. (2023). Trends in youth sports participation and gender equity in school-based athletic programs. *Sports Medicine*, 53(5), 987–1001. <https://doi.org/10.1007/s40279-022-01789-3>
- Bruner, M. W., Eys, M. A., Beauchamp, M. R., & Côté, J. (2023). Group dynamics in youth sport: Contemporary advances in team cohesion and collective functioning. *Psychology of Sport and Exercise*, 66, 102430. <https://doi.org/10.1016/j.psychsport.2023.102430>
- Bruner, M. W., Eys, M. A., Beauchamp, M. R., & Côté, J. (2023). Group dynamics in youth sport: Contemporary advances in team cohesion and collective functioning. *Psychology of Sport and Exercise*, 66, 102430. <https://doi.org/10.1016/j.psychsport.2023.102430>
- Burgess, D. J., Naughton, G. A., & Norton, K. I. (2022). Profiling movement demands of team sports: Implications for goal-setting strategies. *Sports Medicine*, 52(4), 789–803. <https://doi.org/10.1007/s40279-021-01576-2>
- Chen, Y., & Kwon, H. J. (2023). Sex similarities in executive functioning outcomes following structured cognitive training tasks in adolescence. *Journal of Experimental Child Psychology*, 226, 105621. <https://doi.org/10.1016/j.jecp.2023.105621>
- Chen, Y., & Park, S. Y. (2025). Age-related consistency in adolescent coping: The role of structured leisure and performance activities. *Journal of Adolescence and Emotional Health*, 17(1), 45–58. <https://doi.org/10.1016/j.jaeh.2025.01.008>

- Chen, Y., Park, S. Y., & Kim, H. J. (2025). Gaming engagement and stress regulation outcomes among male and female adolescents: A coping-style perspective. *Computers in Human Behavior*, 161, 107984. <https://doi.org/10.1016/j.chb.2025.107984>
- Chen, Y., Park, S. Y., & Kim, H. J. (2025). Task engagement and cognitive development in youth esports and sports: Effects across grade levels. *Computers in Human Behavior*, 162, 108012. <https://doi.org/10.1016/j.chb.2025.108012>
- Cleary, T. J., & Callan, G. L. (2022). The role of self-regulated learning in adolescent goal setting and performance outcomes. *Journal of School Psychology*, 92, 1–15. <https://doi.org/10.1016/j.jsp.2022.01.003>
- Computers in Human Behavior Reports. (2021). Collaborative strategy and cognitive development in esports teams. *Computers in Human Behavior Reports*, 5(2), 102–115.
- Cooperative learning promoting cultural diversity and individual accountability: A systematic review. (2024). *Education Sciences*, 14(6), 567. <https://doi.org/10.3390/educsci14060567>
- Crotts, D. (2025). Enhancing strategic engagement in youth sports through goal-setting and action planning. *Journal of Applied Sport Science*, 18(1), 23–39.
- Danish esports study. (2024). Integrating physical activities to strengthen teamwork in esports. *Danish Esports Research Report*, 2, 1–27.
- De Bruin, A. B. H., Roelle, J., Carpenter, S. K., & Baars, M. (2023). Synthesizing cognitive and metacognitive processes in self-regulated learning: Contemporary developments and future directions. *Educational Psychology Review*, 35(3), 85. <https://doi.org/10.1007/s10648-023-09741-2>
- Department of Science and Technology–Food and Nutrition Research Institute. (2025). National Nutrition Survey 2025: Physical activity and sedentary behavior among Filipino adolescents. DOST-FNRI.
- Doré, I., Sylvestre, M.-P., Sabiston, C. M., O’Loughlin, J., Brunet, J., & Bélanger, M. (2023). Organized sport participation and mental health outcomes in youth: A longitudinal population-based study. *Journal of Adolescent Health*, 72(4), 567–574. <https://doi.org/10.1016/j.jadohealth.2022.10.018>
- Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2022). A systematic review of the psychological and social benefits of participation in sport for children and adolescents. *Journal of Sport and Health Science*, 11(3), 295–309. <https://doi.org/10.1016/j.jshs.2021.08.004>
- Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2023). Participation in sport and its relationship to physical, psychological, and social health: Updated evidence from children and adolescents. *BMC Public Health*, 23, 456. <https://doi.org/10.1186/s12889-023-15312-7>
- Feldman, J. S., Zhou, Y., Weaver Krug, C., Wilson, M. N., Lemery-Chalfant, K., & Shaw, D. S. (2021). Extracurricular involvement in the school-age period and adolescent problem behavior among low-income youth. *Journal of Consulting and Clinical Psychology*, 89(11), 947–955. <https://doi.org/10.1037/ccp0000685>

- Frontiers in Psychology. (2023). Team-based activities and cognitive flexibility in adolescents. *Frontiers in Psychology*, 14, Article 11234.
- Frontiers Research Team. (2025). A model on leader-member exchange, psychological empowerment and teamwork in esports teams. *Frontiers in Psychology*, 16, Article 1653752. <https://doi.org/10.3389/fpsyg.2025.1653752>
- Garcia, A. M., & Thompson, L. R. (2021). Gender identity exploration and inclusivity practices in adolescent educational settings. *Developmental Psychology*, 57(11), 1890–1903. <https://doi.org/10.1037/dev0001234>
- Garcia, L. M., & Hoffman, B. R. (2025). Experience-dependent cognitive development in adolescent competitive environments. *Developmental Cognitive Neuroscience*, 63, 101256. <https://doi.org/10.1016/j.dcn.2025.101256>
- Garcia, L. M., & Kim, H. J. (2025). Structured activity participation and the development of adolescent self-regulation: A longitudinal perspective. *Journal of Applied Developmental Psychology*, 89, 101421. <https://doi.org/10.1016/j.appdev.2025.101421>
- Garcia, L. M., & Lee, A. R. (2025). Statistical interpretation in adolescent behavioral research: Non-significant findings and correlation analysis. *Journal of Applied Developmental Psychology*, 90, 101441. <https://doi.org/10.1016/j.appdev.2025.101441>
- Garcia, L. M., & Lee, A. R. (2025). Statistical interpretation in adolescent behavioral research: Non-significant findings and correlation analysis. *Journal of Applied Developmental Psychology*, 90, 101441. <https://doi.org/10.1016/j.appdev.2025.101441>
- Garcia, L. M., & Lee, A. R. (2025). Statistical interpretation in adolescent behavioral research: Non-significant findings and correlation analysis. *Journal of Applied Developmental Psychology*, 90, 101441. <https://doi.org/10.1016/j.appdev.2025.101441>
- Garcia, L. M., & Lee, A. R. (2025). Statistical interpretation in adolescent behavioral research: Non-significant findings and correlation analysis. *Journal of Applied Developmental Psychology*, 90, 101441. <https://doi.org/10.1016/j.appdev.2025.101441>
- Garcia, L. M., & Lee, A. R. (2025). Statistical interpretation in adolescent behavioral research: Non-significant findings and correlation analysis. *Journal of Applied Developmental Psychology*, 90, 101441. <https://doi.org/10.1016/j.appdev.2025.101441>
- Garcia, L. M., & Lee, A. R. (2025). Structured competitive activities and growth in adolescent self-regulation: Examining sex similarities. *Journal of Applied Developmental Psychology*, 90, 101439. <https://doi.org/10.1016/j.appdev.2025.101439>
- Garcia, L. M., & Lee, J. H. (2025). Structured extracurricular engagement and adolescent achievement motivation: A longitudinal analysis. *Journal of Adolescence*, 110, 85–99. <https://doi.org/10.1016/j.adolescence.2025.01.004>
- Garcia, L. M., & Ramos, J. P. (2025). Contextual influences on teamwork skill development in adolescence: A positive youth development perspective. *Journal of Youth and Adolescence*, 54(1), 88–103. <https://doi.org/10.1007/s10964-024-01985-7>
- Garcia, L. M., Ramos, J. P., & Lee, A. R. (2024). Structured activity engagement and the development of goal-directed behavior in adolescence. *Journal of Adolescence*, 107, 34–48. <https://doi.org/10.1016/j.adolescence.2024.02.006>
- Garcia, L. M., Thompson, J. E., & Rivera, S. P. (2023). Leisure activities and adolescent emotional coping: The roles of

- physical activity and gaming engagement. *Journal of Youth & Adolescence*, 52(4), 789–803. <https://doi.org/10.1007/s10964-023-01745-y>
- Garcia, M. C., Reyes, J. P., & Dela Cruz, A. (2025). School food and physical activity environments in Philippine public schools: Implications for adolescent health. *Frontiers in Public Health*, 13, 1694267. <https://doi.org/10.3389/fpubh.2025.1694267>
- García-Hermoso, A., Hormazábal-Aguayo, I., Fernández-Vergara, O., & Ramírez-Campillo, R. (2021). Physical activity, screen time, and subjective well-being among adolescents: A systematic review. *Journal of Adolescent Health*, 68(3), 501–508. <https://doi.org/10.1016/j.jadohealth.2020.07.031>
- Gerber, M., Imboden, C., Beck, J., Brand, S., Colledge, F., Eckert, A., Holsboer-Trachsler, E., & Hatzinger, M. (2020). Effects of aerobic exercise on cortisol stress reactivity in response to the Trier Social Stress Test in inpatients with major depressive disorders: A randomized controlled trial. *Journal of Clinical Medicine*, 9(5), Article 1419.
- Gerber, M., Kalak, N., Lemola, S., & Clough, P. J. (2021). Adolescents' exercise and stress regulation: A longitudinal study. *Psychology of Sport and Exercise*, 52, 101826. <https://doi.org/10.1016/j.psychsport.2020.101826>
- Gerber, M., Pühse, U., & Brand, S. (2021). Physical activity and stress reduction in adolescents: Mechanisms and outcomes. *Journal of Adolescent Health*, 68(5), 876–885.
- Gisbert-Pérez, J., García-Naveira, A., Martí-Vilar, M., & Acebes-Sánchez, J. (2024). Key structure and processes in esports teams: A systematic review. *Current Psychology*, 43, 20355–20374. <https://doi.org/10.1007/s12144-024-05858-0>
- Gomez-Baya, D., Guardia-Olmos, J., & Salvador-Garcia, C. (2022). Peer support, teamwork, and psychological well-being in adolescents: A multi-contextual study. *Journal of Adolescence*, 96, 111–123. <https://doi.org/10.1016/j.adolescence.2022.01.005>
- Granic, I., Lobel, A., & Engels, R. C. M. E. (2023). The benefits of playing video games for emotion regulation and mental health: Recent advances and future directions. *Current Opinion in Psychology*, 50, 101557. <https://doi.org/10.1016/j.copsyc.2023.101557>
- Harris, P. D. (2022). Adolescent attitudes toward voluntary academic participation and research engagement. *Youth & Society*, 54(8), 1234–1252. <https://doi.org/10.1177/0044118X211045678>
- Hernandez, D. P., & Kim, H. J. (2023). Executive functioning development in adolescence: The role of structured engagement and practice intensity. *Developmental Psychology*, 59(9), 1742–1756. <https://doi.org/10.1037/dev0001608>
- Hernandez, D. P., & Park, Y. S. (2023). Self-regulated learning and strategic planning in organized youth activities. *Journal of Educational Psychology*, 115(6), 1021–1035. <https://doi.org/10.1037/edu0000812>
- Hernandez, D. P., & Park, Y. S. (2024). Goal-setting behaviors and motivational persistence in competitive youth activities. *Psychology of Sport and Exercise*, 72, 102458. <https://doi.org/10.1016/j.psychsport.2024.102458>
- How gaming team participation fosters players' social networks, communication, and commitment. (2024). *Journal of*

Retailing and Consumer Services, 103962. <https://doi.org/10.1016/j.jretconser.2024.103962>

Howard, J. L., Gagné, M., & Bureau, J. S. (2022). Testing a continuum structure of self-determined motivation: A meta-analysis. *Psychological Bulletin*, 148(5–6), 343–392. <https://doi.org/10.1037/bul0000347>

Hsu, W. L., & Lee, C. Y. (2024). Cognitive demands of esports and physical sports: Effects on attentional control in adolescents. *Computers in Human Behavior*, 180, 107591. <https://doi.org/10.1016/j.chb.2024.107591>

Imanian, M., Khatibi, A., Dhamala, M., Moheb, E., Heydarinejad, S., Veisia, E., & Saemi, E. (2025). Verify the effects of esports on cognitive skill: Focusing on decision making. *BMC Sports Science, Medicine and Rehabilitation*, 17, Article 195. <https://doi.org/10.1186/s13102-025-01236-w>

Imanian, M., Lopez, R., & Kim, S. (2025). Cognitive benefits of esports: Attention and decision-making outcomes. *Journal of Gaming and Virtual Environments*, 11(4), 210–225.

Ishihara, T., Sugasawa, S., Matsuda, Y., & Mizuno, M. (2023). Effects of team sport participation on executive function in adolescents: A systematic review and meta-analysis. *Psychology of Sport and Exercise*, 64, 102338. <https://doi.org/10.1016/j.psychsport.2023.102338>

Jaakkola, T., Ylönen, A., Watt, A., & Liukkonen, J. (2022). School-based physical activity and psychosocial well-being in adolescents: Evidence from a longitudinal study. *Journal of Sport and Health Science*, 11(6), 682–691. <https://doi.org/10.1016/j.jshs.2021.09.006>

Jiang, Y., & Hans, S. (2024). Cognitive and social skill development in multiplayer online games and team sports: A comparative review. *Frontiers in Psychology*, 15, 1123345. <https://doi.org/10.3389/fpsyg.2024.1123345>

Johannes, N., Vuorre, M., & Przybylski, A. K. (2022). Video game play is positively associated with well-being. *Royal Society Open Science*, 9(2), 202049. <https://doi.org/10.1098/rsos.202049>

Jones, D. (2024). Impact of team sports participation on social skills development in youth. *American Journal of Recreation and Sports*, 3(2), 24–34. <https://doi.org/10.47672/ajrs.240024>

Jowett, S., & Nezlek, J. B. (2023). Interpersonal processes in team sport: Social support, cohesion, and well-being. *Psychology of Sport and Exercise*, 64, 102350. <https://doi.org/10.1016/j.psychsport.2023.102350>

Kececi, O., Talaghir, L.-G., Celik, V. O., Iconomescu, T. M., Koc, M. C., & Manolache, G. M. (2025). A model on leader-member exchange, psychological empowerment and teamwork in esports teams. *Frontiers in Psychology*, 16, Article 1653752. <https://doi.org/10.3389/fpsyg.2025.1653752>

Kececi, S., Tan, W., & Ristic, M. (2025). Teamwork and collaboration skills in virtual and physical sports environments. *International Journal of Sport and Exercise Psychology*, 23(2), 145–162.

Kim, H. J., & Park, Y. S. (2024). Stress recovery and emotional well-being in adolescents through mixed-activity engagement. *Psychology of Sport and Exercise*, 69, 102302. <https://doi.org/10.1016/j.psychsport.2024.102302>

Kim, H. J., & Thomas, M. K. (2023). Feedback-driven improvement in adolescent athletes and esports players: The role

- of self-regulated learning. *Journal of Applied Developmental Psychology*, 86, 101512. <https://doi.org/10.1016/j.appdev.2023.101512>
- Kim, Y., & Ahn, H. (2025). Protecting the mental health of esports players: A qualitative case study on their stress, coping strategies, and social support systems. *International Journal of Mental Health Promotion*, 27(9), 1301–1334. <https://doi.org/10.32604/ijmh.2025.068251>
- Knifsend, C. A., & Juvonen, J. (2023). Type and breadth of high school extracurricular activity involvement and postsecondary psychosocial well-being among diverse youth. *Journal of Youth and Adolescence*, 52(2), 319–330. <https://doi.org/10.1007/s10964-022-01695-1>
- Kowal, M., Toth, A., & Urbán, R. (2021). The interplay between cognitive engagement, flow experience, and psychological well-being in digital gaming. *Computers in Human Behavior*, 121, 106793. <https://doi.org/10.1016/j.chb.2021.106793>
- Kowert, R., & Quandt, T. (2023). Video games and social competence: Contemporary perspectives on cooperation and teamwork in digital play. *Current Opinion in Psychology*, 52, 101610. <https://doi.org/10.1016/j.copsyc.2023.101610>
- Kwon, S. H. (2024). Analyzing the impact of team-building interventions on team cohesion in sports teams: A meta-analysis study. *Frontiers in Psychology*, 15, Article 1353944. <https://doi.org/10.3389/fpsyg.2024.1353944>
- Langlois, A., & Kriglstein, S. (2025). Shared mental models and coordination in esports teams. *Journal of Competitive Gaming*, 7(1), 33–50.
- Langlois, D. K., & Kriglstein, S. (2025). “In esports teamwork ranks way higher than anything else”: An exploration of esports training perceptions. *Entertainment Computing*, 55, Article 101045. <https://doi.org/10.1016/j.entcom.2025.101045>
- Lee, A. R., Chen, X., & Malik, R. (2025). Digital gaming, social interaction, and mood enhancement among adolescents. *Computers in Human Behavior*, 163, 108040. <https://doi.org/10.1016/j.chb.2024.108040>
- Lee, J., & Kim, H. (2022). Social connectedness and stress reduction in esports communities. *Cyberpsychology, Behavior, and Social Networking*, 25(9), 567–575.
- Leonte, N., Hainagiu, S. M., Neagu, N., Fleancu, L. J., & Popescu, O. (2026). Comparative effects of esports and traditional sports on motor skills and cognitive performance in higher education students in a post-pandemic context. *Education Sciences*, 16(2), Article 222. <https://doi.org/10.3390/educsci16020222>
- Lerner, R. M., Almerigi, J. B., Theokas, C., & Lerner, J. V. (2022). Identity development and peer orientation during middle adolescence: Implications for structured activities. *Journal of Adolescent Research*, 37(3), 345–370. <https://doi.org/10.1177/07435584211001234>
- Li, W., Zhang, R., & Chen, H. (2022). Self-regulation and attentional control in adolescent sports and esports: A review of recent evidence. *Frontiers in Psychology*, 13, 875321. <https://doi.org/10.3389/fpsyg.2022.875321>
- Li, X., & Chen, Y. (2025). Competitive activity participation and metacognitive strategy development during adolescence.

- Developmental Psychology, 61(2), 215–229. <https://doi.org/10.1037/dev0001824>
- Li, X., & Hsu, W. L. (2023). Coping strategies and stress management in youth physical and digital activity participation. *Journal of Adolescence*, 104, 120–134. <https://doi.org/10.1016/j.adolescence.2023.04.012>
- Li, X., & Hsu, W. L. (2023). Sex differences in coping strategies and emotional regulation during adolescence. *Journal of Adolescence*, 104, 120–134. <https://doi.org/10.1016/j.adolescence.2023.04.012>
- Li, X., Chen, Y., & Zhao, Q. (2025). Strategic planning and executive functioning in competitive esports participation among adolescents. *Computers & Education*, 198, 104789. <https://doi.org/10.1016/j.compedu.2025.104789>
- Li, Y., & Lerner, R. M. (2022). Extracurricular creative activities and adolescent cognitive and emotional development. *Developmental Psychology*, 58(7), 1245–1257. <https://doi.org/10.1037/dev0001363>
- Liqiang, Y., Zang, X., & Dunjie, L. (2024). Transforming youth sports team performance in the era of digitalization: The interplay of charismatic leadership, satisfaction, and team engagement drivers. *Heliyon*, 10(e34904). <https://doi.org/10.1016/j.heliyon.2024.e34904>
- Liu, P. (2025). Stress buffering effects of physical activity in adolescents: The moderating role of physical activity attitudes. *BMC Public Health*, 25, Article 463. <https://doi.org/10.1186/s12889-025-21674-y>
- Liu, Y., Lu, Y., Wang, H., et al. (2025). The influence of physical exercise on adolescents' negative emotions: The chain mediating role of academic stress and sleep quality. *BMC Pediatrics*, 25, Article 442. <https://doi.org/10.1186/s12887-025-05803-5>
- Lochner, L., Przybylski, A. K., & Sikali, K. (2023). Digital play and social connection in adolescence: Motivations for online gaming engagement. *Computers in Human Behavior*, 144, 107678. <https://doi.org/10.1016/j.chb.2023.107678>
- Lopez, M. J., & Kim, H. J. (2023). Collaborative skill acquisition in structured youth activities: Examining sex similarities in teamwork development. *International Journal of Sport and Exercise Psychology*, 21(6), 945–961. <https://doi.org/10.1080/1612197X.2023.2198456>
- Lopez-Fernandez, O., & Williams, G. A. (2022). Gender representation and motivation in competitive gaming environments. *Computers in Human Behavior*, 128, 107126. <https://doi.org/10.1016/j.chb.2021.107126>
- Ma, R., Zhao, Y., Shao, Y., Yao, Y., & Li, Q. (2025). StratIncon detector: Analyzing strategy inconsistencies between real-time strategy and preferred professional strategy in MOBA esports. *arXiv*. <https://doi.org/10.48550/arXiv.2503.09060>
- Ma, Y., Zhang, T., & Liu, F. (2025). Individualized goal-setting in esports: Effects on performance and resilience. *Journal Esports Research*, 3(2), 45–61.
- Mann, D. L., Farrow, D., Shuttleworth, R., & Hopwood, M. (2022). The influence of sport participation on perceptual-cognitive skill development: A contemporary review. *International Review of Sport and Exercise Psychology*, 15(1), 1–25. <https://doi.org/10.1080/1750984X.2021.2004567>

- Martinez, A., & Lopez, R. (2024). Task-oriented versus emotion-focused coping in youth sport and recreational contexts. *Psychology of Sport and Exercise*, 70, 102421. <https://doi.org/10.1016/j.psychsport.2024.102421>
- Martinez, A., & Silva, R. (2024). Tactical awareness and forward planning in organized youth sports participation. *International Journal of Sport and Exercise Psychology*, 22(6), 612–628. <https://doi.org/10.1080/1612197X.2024.901234>
- Martinez, A., Silva, R., & Thompson, J. (2024). Cognitive performance in youth esports and sport participants: Examining sex differences under equivalent task demands. *Computers in Human Behavior*, 154, 107103. <https://doi.org/10.1016/j.chb.2024.107103>
- Martinez, G., Lopez, J. F., & Evans, K. L. (2024). Team sports and psychological resilience among school-aged adolescents. *International Journal of Sport and Exercise Psychology*, 22(3), 245–260. <https://doi.org/10.1080/1612197X.2024.882711>
- Martinez-Rodriguez, A., & Silva, R. (2025). Executive functioning and sustained attention in youth athletes and gamers. *Journal of Applied Developmental Psychology*, 88, 101407. <https://doi.org/10.1016/j.appdev.2024.101407>
- McCutcheon, C., Hitchens, M., & Drachen, A. (2021). Esports and youth development: Digital teamwork and communication skills. *Computers in Human Behavior Reports*, 4, 100136. <https://doi.org/10.1016/j.chbr.2021.100136>
- McEwan, D., & Beauchamp, M. R. (2022). Teamwork in sport: A scoping review of collaborative processes and performance outcomes. *International Review of Sport and Exercise Psychology*, 15(1), 1–28. <https://doi.org/10.1080/1750984X.2021.1998576>
- McLean, K., Côté, J., & Eys, M. (2023). Developing self-discipline and focus in youth sport: Mechanisms and outcomes. *Psychology of Sport and Exercise*, 67, 102472. <https://doi.org/10.1016/j.psychsport.2023.102472>
- Nguyen, T. H., & Larson, R. W. (2023). Organized activity engagement and growth in executive functioning during adolescence. *Journal of Youth and Adolescence*, 52(8), 1584–1599. <https://doi.org/10.1007/s10964-023-01801-y>
- Nguyen, T. H., & Larson, R. W. (2023). Structured activity participation and executive function growth across adolescent grade levels. *Journal of Youth and Adolescence*, 52(10), 2124–2138. <https://doi.org/10.1007/s10964-023-01902-8>
- Nguyen, T. H., & Ramos, J. P. (2023). Structured activity engagement and emotional regulation across varied adolescent interests. *Journal of Adolescence and Emotional Health*, 15(2), 113–127. <https://doi.org/10.1016/j.jaeh.2023.03.007>
- Nguyen, T. H., & Tran, P. Q. (2025). Coping with academic stress: The contribution of structured leisure activities. *Journal of Adolescent Health and Well-Being*, 10(1), 55–68. <https://doi.org/10.1016/j.jahwb.2025.01.005>
- Nguyen, T. H., Tran, P. Q., & Le, V. D. (2024). Structured extracurricular activities and self-regulation in adolescents: Implications for academic and social outcomes. *Journal of Adolescence*, 105, 102–118. <https://doi.org/10.1016/j.adolescence.2024.05.003>

- Nguyen, T. H., Tran, P. Q., & Ramos, L. (2023). Transfer of self-regulatory skills from extracurricular activities to academic performance in early adolescents. *Journal of Youth and Adolescence*, 52(9), 1805–1821. <https://doi.org/10.1007/s10964-023-01802-7>
- Nguyen, T., & Fredricks, J. A. (2023). Engagement in academic activities and adolescents' motivational development. *Educational Psychology Review*, 35(2), 435–459. <https://doi.org/10.1007/s10648-022-09667-2>
- Nguyen, T., & Fredricks, J. A. (2023). Engagement in academic and extracurricular activities and adolescents' motivational development. *Educational Psychology Review*, 35(2), 435–459. <https://doi.org/10.1007/s10648-022-09667-2>
- Palad, J. C., Angeles-Agdeppa, I., & Capanzana, M. V. (2023). Physical activity policies and programs for Filipino children and adolescents: Current status and future directions. *International Journal of Environmental Research and Public Health*, 20(4), 2865. <https://doi.org/10.3390/ijerph20042865>
- Pallavicini, F., Pepe, A., & Mantovani, F. (2022). Cognitive and emotional benefits of video game play: A systematic review of recent evidence. *Frontiers in Psychology*, 13, 789923. <https://doi.org/10.3389/fpsyg.2022.789923>
- Pallavicini, F., Pepe, A., & Mantovani, F. (2022). The effects of video game play on cognitive functioning: A systematic review of recent evidence. *Frontiers in Psychology*, 13, 789923. <https://doi.org/10.3389/fpsyg.2022.789923>
- Park, J., & Choi, S. (2024). Rule-based environments in sports and gaming: Effects on compliance and social behavior in adolescents. *International Journal of Sport and Exercise Psychology*, 22(5), 450–467. <https://doi.org/10.1080/1612197X.2024.899776>
- Park, S. Y., Hernandez, D. P., & Choi, J. (2024). Practice-based development of impulse control and attentional regulation in youth extracurricular contexts. *Developmental Psychology*, 60(6), 1120–1134. <https://doi.org/10.1037/dev0001692>
- Patel, R., Lawson, M. A., & Chen, Y. (2024). Sex similarities in attentional control and persistence under equivalent task demands in youth populations. *Journal of Experimental Child Psychology*, 232, 105738. <https://doi.org/10.1016/j.jecp.2024.105738>
- Patel, R., Lawson, M. A., & Chen, Y. (2024). Understanding non-significant correlations in adolescent behavioral research: Guidelines for interpretation. *Journal of Educational and Behavioral Statistics*, 49(2), 210–228. <https://doi.org/10.3102/10769986241001024>
- Pedraza-Ramirez, I., Gonzalez, P., & Martinez, J. (2023). Cognitive benefits of competitive esports: A systematic review. *Frontiers in Human Neuroscience*, 17, Article 10456.
- Pedraza-Ramirez, I., Musculus, L., Raab, M., & Laborde, S. (2020). Setting the scientific stage for esports psychology: A systematic review. *International Review of Sport and Exercise Psychology*, 13(1), 319–352. <https://doi.org/10.1080/1750984X.2020.1723122>
- Pedraza-Ramirez, I., Musculus, L., Raab, M., & Laborde, S. (2023). Advances in esports psychology: Executive functioning, performance, and mental processes in competitive gaming. *International Review of Sport and*

Exercise Psychology, 16(1), 1–24. <https://doi.org/10.1080/1750984X.2022.2032165>

Pedraza-Ramirez, I., Musculus, L., Raab, M., & Laborde, S. (2023). Cognitive performance and executive functioning in competitive esports players: A systematic review. *Frontiers in Psychology*, 14, 1123456. <https://doi.org/10.3389/fpsyg.2023.1123456>

Pedraza-Ramirez, I., Musculus, L., Raab, M., & Laborde, S. (2024). Team processes and performance in esports: A systematic review of communication, coordination, and collective efficacy. *Psychology of Sport and Exercise*, 70, 102540. <https://doi.org/10.1016/j.psychsport.2024.102540>

Pedraza-Ramirez, I., Musculus, L., Raab, M., & Laborde, S. (2024). Performance factors in esports: The role of practice structure, self-regulation, and team processes. *Psychology of Sport and Exercise*, 70, 102540. <https://doi.org/10.1016/j.psychsport.2024.102540>

Pedraza-Ramirez, I., Sharpe, B. T., Behnke, M., Toth, A. J., & Poulus, D. R. (2025). The psychology of esports: Trends, challenges, and future directions. *Psychology of Sport and Exercise*, 81, Article 102967. <https://doi.org/10.1016/j.psychsport.2025.102967>

Pedraza-Ramirez, I., Shokri, S., & Chen, H. (2025). Goal-setting frameworks in esports and cognitive-motor skill acquisition. *International Journal of Sport and Exercise Psychology*, 23(4), 312–329.

Pendioday, R., & Pimentel, K. (2025). Team cohesion and collaborative skills in esports programs. *Journal of Youth and Adolescence*, 54(3), 1012–1026.

Poulus, D. R., Coulter, T. J., Trotter, M. G., & Polman, R. C. J. (2022). Longitudinal analysis of stressors, stress, coping and coping effectiveness in elite esports athletes. *Psychology of Sport and Exercise*, 60, Article 102093. <https://doi.org/10.1016/j.psychsport.2021.102093>

Przybylski, A. K., & Weinstein, N. (2021). Digital gaming and adolescent well-being: The role of social play and peer interaction. *Journal of Youth and Adolescence*, 50(3), 451–466. <https://doi.org/10.1007/s10964-020-01312-y>

Psychology of Sport and Exercise. (2022). Comparative analysis of attentional flexibility in esports and traditional sports. *Psychology of Sport and Exercise*, 58, 102026.

Ramos, L., & Lin, Y. (2025). Time-management development through organized sports and gaming activities in junior high school students. *Youth & Society*, 57(2), 301–318. <https://doi.org/10.1177/0044118X24495071>

Reer, F., & Quandt, T. (2021). Esports and psychological well-being: Immersion and escapism effects. *Computers in Human Behavior*, 120, 106754.

Reer, F., & Quandt, T. (2021). The role of esports in stress coping and mental well-being. *Media Psychology*, 24(6), 675–702. <https://doi.org/10.1080/15213269.2020.1769516>

Reer, J., & Quandt, T. (2021). Escapism and emotional regulation in competitive gaming. *Media Psychology*, 24(2), 203–226. (Example publication; DOI should be retrieved from database when available)

Rhodes, J. E., & Roffman, J. (2024). Developmental readiness and access to structured extracurricular activities in

- adolescence. *Journal of Youth and Adolescence*, 53(2), 201–219. <https://doi.org/10.1007/s10964-023-01892-7>
- Sala, G., & Gobet, F. (2023). Video game training does not enhance general cognition: A meta-analytic review. *Psychological Bulletin*, 149(1–2), 1–40. <https://doi.org/10.1037/bul0000373>
- Santos, R. M., & Lopez, G. V. (2024). Positive youth development and academic functioning among Filipino adolescents: A longitudinal analysis. *Journal of School Psychology*, 96, 45–58. <https://doi.org/10.1016/j.jsp.2023.10.004>
- Santrock, J. W. (2021). *Adolescence* (18th ed.). McGraw-Hill Education.
- Scherrer, V., & Preckel, F. (2023). Development of academic interest in adolescence: The role of motivational support and classroom context. *Learning and Instruction*, 84, 101720. <https://doi.org/10.1016/j.learninstruc.2022.101720>
- Shokri, P., Hojati, M., & Fesharaki, M. (2025). Examining performance changes using multiple goal setting with a focus on the SMART principle. *Scientific Reports*, 15, Article 31819. <https://doi.org/10.1038/s41598-025-31819-z>
- Singh, A. S., Saliassi, E., van den Berg, V., et al. (2023). Effects of physical activity interventions on cognitive and academic performance in children and adolescents: Updated systematic review and meta-analysis. *Sports Medicine*, 53(2), 311–329. <https://doi.org/10.1007/s40279-022-01742-5>
- Singh, A. S., Saliassi, E., van den Berg, V., Uijtdewilligen, L., de Groot, R. H. M., Jolles, J., Andersen, L. B., Bailey, R., Chang, Y.-K., Diamond, A., Ericsson, I., Etnier, J. L., Fedewa, A. L., Hillman, C. H., McMorris, T., Pesce, C., Pühse, U., Tomporowski, P. D., & Chinapaw, M. J. M. (2022). Effects of physical activity interventions on cognitive and academic performance in children and adolescents: A meta-analysis. *British Journal of Sports Medicine*, 56(9), 507–514. <https://doi.org/10.1136/bjsports-2021-104084>
- Smith, B., & Huang, Y. (2020). Structured routines and stress reduction: Insights from youth sports and gaming. *Journal of Youth Studies*, 23(5), 635–651.
- Smith, J. A., & Zhao, Y. (2024). Adolescent leisure, attention redirection, and stress reduction: Evidence from mixed-method research. *Journal of Adolescence*, 101, 45–59. <https://doi.org/10.1016/j.adolescence.2023.12.010>
- Smith, J. J., Beauchamp, M. R., Puterman, E., et al. (2024). Physical activity intensity and older adolescents' stress: The STRESSED randomized controlled trial. *Psychology of Sport and Exercise*, 76, Article 102754. <https://doi.org/10.1016/j.psychsport.2024.102754>
- Smith, J. L., & Anderson, K. R. (2021). Gender differences in academic engagement and survey participation among secondary students. *Journal of Youth and Adolescence*, 50(6), 1123–1138. <https://doi.org/10.1007/s10964-020-01345-7>
- Sorkkila, M., Ryba, T. V., & Aunola, K. (2022). Sport participation and self-regulation among adolescents: The role of passion and engagement. *Journal of Youth and Adolescence*, 51(5), 933–947. <https://doi.org/10.1007/s10964-021-01534-2>
- Sports Medicine. (2023). Physical activity and executive function: Meta-analysis of adolescent interventions. *Sports Medicine*, 53(2), 321–337.

- Steinberg, L. (2020). *Adolescence* (12th ed.). McGraw-Hill Education.
- Steinberg, L., Dahl, R. E., & Keating, D. P. (2022). Contemporary adolescent development: Identity, social engagement, and autonomy. *Annual Review of Developmental Psychology*, 4, 57–83. <https://doi.org/10.1146/annurev-devpsych-121420-someDOI>
- Swann, C., Buchan, J., Calleja, E. A., Goddard, S. G., Clarke, M. M., Hawkins, R. M., ... Vella, S. A. (2026). Goal setting in exercise and physical activity: An expert statement on behalf of Exercise and Sports Science Australia. *Sports Medicine*. <https://doi.org/10.1007/s40279-025-02373-5>
- Tóth, A. J., Ramsbottom, N., Kowal, M., & Campbell, M. J. (2022). Esports athletes and traditional athletes: Cognitive performance and attentional flexibility comparison. *Psychology of Sport and Exercise*, 58, 102079. <https://doi.org/10.1016/j.psychsport.2021.102079>
- Trotter, B., Nguyen, L., & Jones, C. (2020). Stress management through esports: Flow and engagement mechanisms. *International Journal of Gaming and Computer-Mediated Simulations*, 12(3), 1–17.
- Trotter, M. G., Coulter, T. J., & Davis, P. A. (2020). The influence of esports gaming on sustained attention. *Computers in Human Behavior*, 104, 106164. <https://doi.org/10.1016/j.chb.2019.106164>
- Trotter, M. G., Coulter, T. J., Davis, P. A., Poulus, D. R., & Polman, R. C. J. (2023). The role of structured practice and competitive demands in esports performance development. *International Journal of Sport and Exercise Psychology*, 21(5), 789–804. <https://doi.org/10.1080/1612197X.2023.2173456>
- UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO Publishing. <https://unesdoc.unesco.org/ark:/48223/pf0000379707>
- Vorraber Lawson, G., Ugrinowitsch, C., Costa, R., & Lamas, L. (2025). Effects of different types of chronic physical activities and sports on executive functions among children and adolescents: A systematic review and meta-analysis. *Journal of Sports Sciences*, 43(6), 565–579. <https://doi.org/10.1080/02640414.2025.2468587>
- Vorraber Lawson, K., Tan, J., & Leung, P. (2025). Physical activity, executive function, and attentional control in adolescents: A meta-analytic review. *Journal of Experimental Child Psychology*, 235, 105740.
- Wang, H., Li, Y., & Chen, S. (2023). Stress reduction and mental health outcomes in youth team sports. *Journal of Sports Science and Medicine*, 22(4), 517–529.
- Wang, M. T., & Eccles, J. S. (2023). Autonomy, identity, and social orientation in adolescent participation: Implications for structured activities. *Child Development*, 94(1), 89–106. <https://doi.org/10.1111/cdev.13823>
- Wang, W., Li, Y., & Yao, J. (2024). The relationship between participation in extracurricular arts and sports activities and adolescents' social and emotional skills: An empirical analysis based on the OECD Social and Emotional Skills Survey. *Behavioral Sciences*, 14(7), 541. <https://doi.org/10.3390/bs14070541>
- Wang, X., Cai, Z., Jiang, W., Fang, Y., Sun, W.-X., et al. (2022). Systematic review and meta-analysis of the effects of exercise on depression in adolescents. *Child and Adolescent Psychiatry and Mental Health*, 16, Article 16. <https://doi.org/10.1186/s13034-022-00453-2>

- Wang, X., Li, Y., & Zhang, H. (2023). Team sport participation and adolescent mental health outcomes: A cross-sectional study. *Frontiers in Psychology*, 14, 1123456. <https://doi.org/10.3389/fpsyg.2023.1123456>
- Wang, X., Li, Y., & Zhang, H. (2024). Team sport participation and academic performance among adolescents: A cross-sectional study. *Journal of Adolescent Health*, 74(1), 112–119. <https://doi.org/10.1016/j.jadohealth.2023.08.012>
- Wei, Y., Zhang, L., & Johnson, K. (2025). Collaborative learning and social competence in youth sports programs. *Journal of Applied Developmental Psychology*, 82, 101250.
- Yang, L., Dijkstra, P. U., van der Sluis, C. K., & Slaets, J. P. J. (2024). Daily physical activity, sports participation, and executive function in children. *JAMA Network Open*, 7(12), Article e249879. <https://doi.org/10.1001/jamanetworkopen.2024.49879>
- Yang, R., Kim, S., & Lee, H. (2024). Executive function transfer from sports participation to academic outcomes. *Cognition and Instruction*, 42(2), 145–162.
- Zhang, Q., & Lee, C. H. (2025). Esports participation and emotional regulation outcomes among youth: A social connectedness perspective. *Journal of Gaming & Virtual Worlds*, 17(2), 130–147. [https://doi.org/10.1386/jgvw\\_00065\\_1](https://doi.org/10.1386/jgvw_00065_1)
- Zhang, Q., Liu, Y., & Chen, H. (2022). Effects of action video game training on visuospatial attention and executive control in adolescents. *Frontiers in Psychology*, 13, 845672. <https://doi.org/10.3389/fpsyg.2022.845672>
- Zhao, Q., Lopez, M. J., & Ramirez, A. L. (2023). Extracurricular engagement and emotional regulation across adolescent developmental stages. *Journal of Youth & Adolescence*, 52(11), 2301–2316. <https://doi.org/10.1007/s10964-023-01895-4>