

Cognitive Skills As A Mediator Between Coaching Climate And Self-Esteem: Perspectives From University Student-Athletes

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Abstract

This study explores the relationship between coaching climate, cognitive skills, and self-esteem among university athletes, focusing on how cognitive skills mediate the impact of coaching climate on athletes' psychological well-being. Using a descriptive survey design and a quantitative research approach, data were collected from 1,623 student-athletes who participated in various sports at universities across Punjab, Pakistan. The results showed a strong positive correlation¹ between cognitive skills and self-esteem, with a Pearson correlation coefficient of .886 ($p < .01$), indicating that higher cognitive skills are associated with higher self-esteem among athletes. Additionally, a significant positive correlation was found between coaching climate and cognitive skills ($r = .759, p < .01$). Regression analysis further demonstrated that coaching climate significantly predicted both cognitive skills and self-esteem, with cognitive skills partially mediating the relationship between coaching climate and self-esteem. These findings highlight the importance of a supportive coaching climate in enhancing athletes' cognitive skills, which in turn, contribute to their psychological well-being. The study provides valuable insights for coaches, sports psychologists, and educators, emphasizing the need for creating a positive coaching environment that fosters cognitive development and boosts self-esteem in university athletes.

Keywords: Coaching climate, cognitive skills, self-esteem, psychological wellbeing and student-athletes.

JUSTIFICATION

Coaching climate is a pivotal element in the athletic development process. A positive coaching climate, characterized by supportive communication, encouragement, and constructive feedback, creates an environment that is conducive to the development of an athlete's cognitive skills. These skills, which include critical thinking, decision-making, and problem-solving, are integral to an athlete's ability to navigate the complexities of their sport. The nurturing of

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cognitive skills within a positive coaching environment enables athletes to enhance their performance by making more informed and strategic decisions during competition (Horn, 2020).

The development of cognitive skills, in turn, plays a significant role in influencing the self-esteem. Self-esteem, which refers to an individual's overall sense of self-worth and confidence, is closely linked to their cognitive development. Athletes who are provided with a supportive coaching climate are more likely to experience growth in their cognitive abilities, which boosts their self-esteem. A strong sense of self-esteem is crucial for athletes, as it not only impacts their mental health but also their performance and resilience in the face of challenges (Smith & Smoll, 2019).

The interrelationship among these variables such as coaching climate, cognitive skills, and self-esteem—highlights the complex dynamics within the athlete development process. A positive coaching climate fosters the development of cognitive skills, which in turn enhances self-esteem. This cyclical relationship suggests that improvements in one area can lead to positive outcomes in the others, creating a reinforcing loop that benefits the athlete's overall development and performance.

Despite the established connections between coaching climate, cognitive skills, and self-esteem, there is a notable gap in the existing literature regarding the specific mechanisms through which these variables interact over time, particularly in different sports contexts. Additionally, while much research has focused on adult athletes, there is a need for more studies exploring these relationships among younger athletes, who may be more impressionable and whose developmental trajectories could differ (Côté & Gilbert, 2020). This study aims to address these gaps by examining the interrelationships among these variables in a youth sports context, providing insights that could inform more effective coaching practices.

LITERATURE REVIEW

Coaching Climate and Athlete Development

The concept of coaching climate has garnered significant attention in sports psychology due to its profound impact on athlete development. Coaching climate refers to the environment created by the coach through their behaviors, attitudes, and communication strategies. This environment can either be conducive to the athlete's development or detrimental, depending on how it is managed. A positive coaching climate, characterized by supportive, inclusive, and encouraging behaviors, has been shown to facilitate the development of both physical and psychological aspects of an athlete's performance. Research indicates that a positive coaching climate is linked to increased motivation, enhanced performance, and greater psychological well-being among athletes (Smith & Smoll, 2019). Coaches who provide constructive feedback, recognize effort, and create a mastery-oriented environment (where the focus is on personal improvement rather than competition) tend to foster greater self-efficacy and enjoyment in sports (Mageau & Vallerand, 2003). These factors are crucial as they contribute to the athlete's willingness to engage in challenging tasks, persist through difficulties, and ultimately improve their performance. However, the impact of coaching climate extends beyond immediate performance outcomes. It also plays a critical role in the development of cognitive skills, which are essential for both athletic success and personal growth. Cognitive skills, such as decision-making, problem-solving, and critical thinking, are developed over time and are influenced by the experiences an athlete has within their sports environment. A coaching climate that encourages autonomy, provides opportunities for learning, and supports mental engagement is particularly effective in developing these cognitive skills (Jowett & Shanmugam, 2016).

Cognitive Skills as a Developmental Experience

Cognitive skills are a central component of an athlete's overall development. These skills enable athletes to process information quickly, make strategic decisions, and adapt to changing situations during competition. The development of cognitive skills is influenced by various factors, including the quality of coaching, the nature of practice sessions, and the level of competition. Coaches who emphasize mental training alongside physical training help athletes develop the cognitive flexibility necessary to excel in their sport (Williams & Reilly, 2000). The relationship between cognitive skills and athletic performance is well-documented. Athletes who possess strong cognitive abilities are better equipped to anticipate opponents' moves, adjust their strategies on the fly, and make split-second decisions that can mean the difference between winning and losing (Voss et al., 2010). Furthermore, cognitive skills are not only important for performance but also for personal development. They contribute to an athlete's ability to cope with stress, set realistic goals, and maintain focus, all of which are essential for long-term success in sports. In addition to their direct impact on performance, cognitive skills also play a significant role in shaping an athlete's self-esteem. Self-esteem, or the overall sense of self-worth, is closely tied to an individual's cognitive perceptions of their abilities and achievements. Athletes who develop strong cognitive skills are more likely to have positive self-perceptions, which in turn boosts their self-esteem (Horn, 2020). This relationship highlights the importance of fostering cognitive development in sports, as it not only enhances performance but also contributes to the athlete's psychological well-being.

Self-Esteem and its Importance in Sports

Self-esteem is a critical psychological construct that influences an athlete's motivation, behavior, and overall mental health. High self-esteem is associated with greater resilience, better stress management, and a more positive outlook on challenges (Baumeister, Campbell, Krueger, & Vohs, 2003). In the context of sports, self-esteem plays a pivotal role in determining how athletes perceive their abilities, respond to feedback, and cope with failure. Research suggests that athletes with high self-esteem are more likely to take risks, set ambitious goals, and persist in the face of adversity (Vealey, 1986). These athletes tend to view challenges as opportunities for growth rather than threats, which fosters a more adaptive approach to competition. Conversely, athletes with low self-esteem may struggle with self-doubt, fear of failure, and performance anxiety, all of which can hinder their development and performance (Scanlan, Babkes, & Scanlan, 2005). The development of self-esteem in athletes is influenced by a variety of factors, including the quality of coaching, the athlete's experiences of success and failure, and the feedback they receive from others. A positive coaching climate, as previously discussed, is instrumental in fostering self-esteem by providing athletes with a supportive environment in which they feel valued and competent (Horn, 2020). Moreover, the development of cognitive skills further enhances self-esteem by enabling athletes to feel more confident in their decision-making and problem-solving abilities.

Interrelationship among Variables

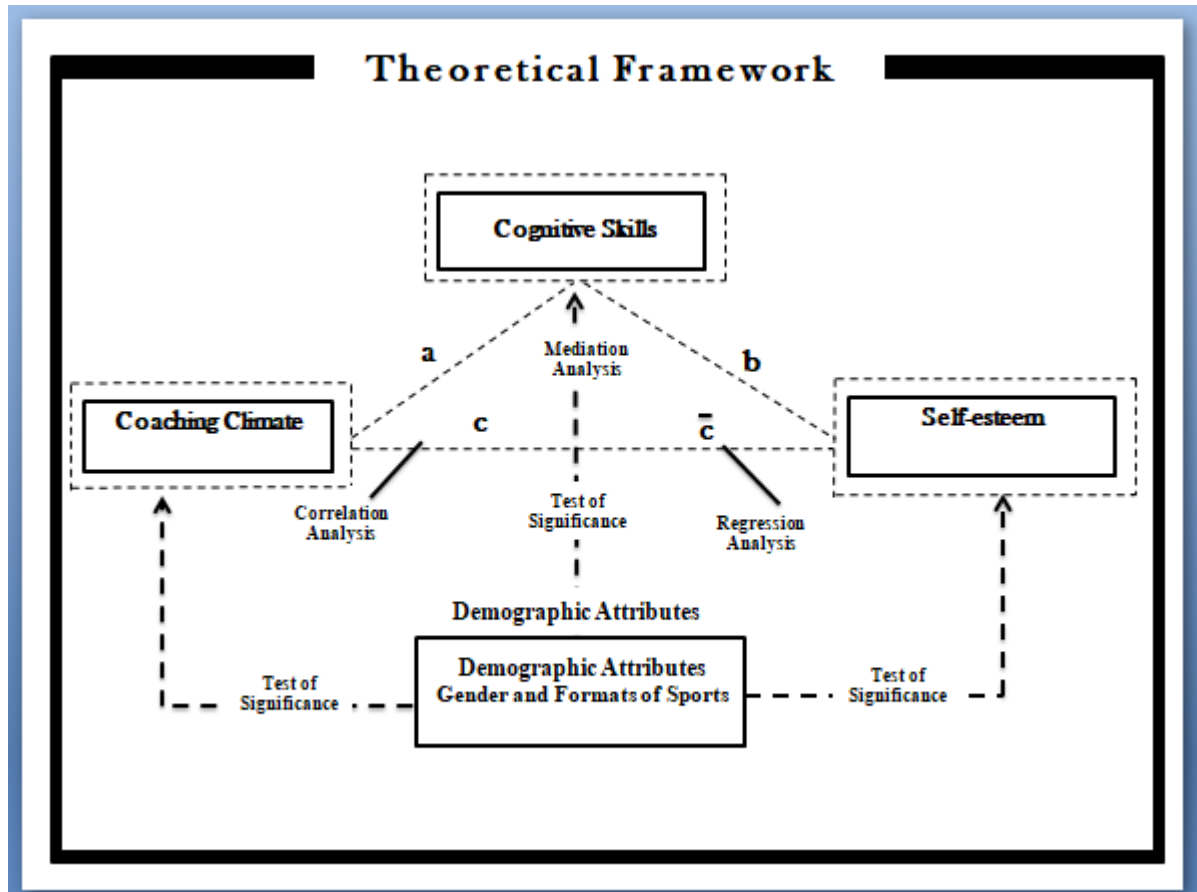
The interrelationship among coaching climate, cognitive skills, and self-esteem is complex and multifaceted. A positive coaching climate fosters the development of cognitive skills, which in turn enhances self-esteem. This suggests that these variables are not isolated but rather interact in ways that can significantly impact an athlete's development and performance. For instance, a supportive coaching climate that encourages mental engagement and strategic thinking can help athletes develop the cognitive skills necessary for success. As these skills improve, athletes gain greater confidence in their abilities, leading to higher self-esteem. In turn, higher self-esteem can reinforce positive behaviors and attitudes, further enhancing the athlete's performance and overall development (Smith & Smoll, 2019). This interrelationship highlights the importance of a holistic approach to athlete development. By understanding and addressing the connections between coaching climate, cognitive skills, and self-esteem, coaches can create

environments that not only enhance performance but also support the overall well-being of their athletes.

Research Gap

Despite the significant progress in understanding the relationships between coaching climate, cognitive skills, and self-esteem, there remains a notable gap in the literature. Specifically, there is limited research on how these variables interact over time and across different sports contexts. Much of the existing research has focused on adult athletes, leaving a gap in our understanding of how these relationships manifest in younger athletes, who may experience different developmental trajectories (Côté & Gilbert, 2020). Additionally, the mechanism through which coaching climate influences cognitive skills and self-esteem are not fully understood, particularly in terms of the long-term impacts on athlete development. This study aims to address these gaps by exploring the interrelationships among coaching climate, cognitive skills, and self-esteem in a youth sports context. By doing so, it seeks to provide insights that can inform more effective coaching practices and contribute to the development of well-rounded athletes who are not only successful in their sport but also possess the cognitive and psychological tools necessary for long-term success.

Theoretical Framework



DEVELOPMENT OF RESEARCH HYPOTHESES

H1: There is a positive correlation between athletes' developmental experience (Cognitive Skills) and their Self-esteem as a psychological well-being.

H2: Athletes' perceptions of coaching climate, specifically coach autonomy support, are positively correlated with their developmental experience (cognitive skills).

H3: Cognitive skills mediate the relationship between coaching climate and athletes' self-esteem as a parameter of physiological well-being.

H4: Female athletes may have reported higher mean scores on cognitive skills, coaching climate perceptions, and psychological well-being (self-esteem) compared to male athletes.

H5: Athletes in team sports may have exhibited greater developmental experiences, positive coaching climate perceptions, and psychological well-being compared to individual sport athletes.

RESEARCH METHODOLOGY

Research Design

The term "research design" refers to the overarching plan and analytical technique you have selected to logically and cogently combine the many study components and guarantee a full investigation of the research problem. To conduct this study, a descriptive survey method was used. The purpose of descriptive research design is to identify the true state of affairs by collecting data on present situations.

Research Approach

The procedure selected by the researcher for the collection, analysis, and then interpretation of the collected data is said to be a research approach. Three commonly research approaches such as, quantitative, qualitative, and mixed methods are used. This study was supported with the help of a quantitative research approach as it allows the researcher for the numerical analysis of quantitative data.

Population and Sampling

The population of the current study comprised of the student-athletes representing their respective university in Intervarsity and All Pakistan Intervarsity Sports Championships from within the Vicinity of Punjab, Pakistan. It is important to mention that the student-athletes those participating in Cricket, Football, Volleyball, Badminton, and Athletics included in the study. The researcher is of the opinion that these games/events are commonly played among both genders, therefore; the data collected from student-athletes provided base for recommendations and betterment in the sports arena.

The province of Punjab was divided into three regions namely, Central, Southern, and Northern. Student-athletes of each university from the abovementioned games/events were then selected with the help of convenient sampling. A detailed description of the regions, universities, and sample has been shown in table 1.

Table 1Detail of Regions, Districts, Universities, and Athletes

| No | Region | Number of Districts | Number of Universities | Number of Male Athletes | Number of Female Athletes |
|--------------|-----------------|----------------------------|-------------------------------|--------------------------------|----------------------------------|
| 1 | Southern Region | 11 | 15 | 1050 | 1050 |
| 2 | Central Region | 21 | 58 | 4060 | 4060 |
| 3 | Northern | 04 | 19 | 1330 | 1330 |
| Total | 03 | 36 | 92 | 6440 | 6440 |

The provided total population size (6440) to calculate the sample size for each region using the formula $n_i = (n_i/N) * n$, where n_i is the number of individuals in that region, N is the total population size of that region, and n is the desired total sample size (100 in this case).

Table 3.2 Detail of Regions, Districts, Universities, Athletes, and Sample Size

| S. No | Region | Number of Male Athletes | Sample Size | Number of Female Athletes | Sample Size |
|--------------|-----------------|-------------------------|-------------|---------------------------|-------------|
| 1 | Southern Region | 1050 | 267 | 1050 | 267 |
| 2 | Central Region | 4060 | 273 | 4060 | 273 |
| 3 | Northern | 1330 | 271 | 1330 | 271 |
| Total | 03 | 6440 | 820 | 6440 | 820 |

Data Collection Instruments

Research instrument has pivotal role in a useful conduct of any research problem. The problem understudy has in need of the collection of required data on the following variables.

- i. Coaching Climate
- ii. Developmental Experiences
- iii. Psychological Wellbeing

The following standardized tools were used for the collection of required data from student-athletes of different universities of Punjab, Pakistan.

RESULTS AND DISCUSSION

Section A Demographic Attributes

Table 3Demographic attributes of the Participants (n= 1623)

| Demographic Attributes | | | | | |
|------------------------|-------------------|-----------|---------|---------------|--------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Gender | Male | 815 | 50.2 | 50.2 | 50.2 |
| | Female | 808 | 49.8 | 49.8 | 100.0 |
| | Total | 1623 | 100.0 | 100.0 | |
| Types of Sport | Individual Sports | 851 | 52.4 | 52.4 | 52.4 |
| | Team Sports | 772 | 47.6 | 47.6 | 100.0 |
| | Total | 1623 | 100.0 | 100.0 | |

The demographic data presents a well-balanced and diverse sample of 1623 participants in terms of gender and type of sports.

Section B Reliability Statistics

Table 4Reliability Statistics of Coaching Climate

| Variable | No of Items | Cronbach's Alpha Reliability |
|----------|-------------|------------------------------|
| | | |

| | | |
|------------------|----|------|
| Coaching Climate | 15 | .887 |
| Cognitive Skills | 4 | .899 |
| Self-esteem | 40 | .835 |

Section C Normality Statistics

Table 5 Results of Normality Test for Coaching Climate

| | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|---------------------------------------|---------------------------------|------|------|--------------|------|------|
| | Statistic | Df | Sig. | Statistic | df | Sig. |
| Coaching Climate | .036 | 1623 | .321 | .997 | 1623 | .347 |
| Cognitive Skills | .129 | 1623 | .398 | .963 | 1623 | .219 |
| Self Esteem | .047 | 1623 | .412 | .996 | 1623 | .363 |
| a. Lilliefors Significance Correction | | | | | | |

Overall, both the Kolmogorov-Smirnov and Shapiro-Wilk tests indicate that the distributions of coaching climate, cognitive skills and self-esteem do not significantly deviate from normality. This means the assumption of normality is satisfied for all the variables.

Section D Testing of Hypotheses

Correlation Analysis

H1: There is a positive correlation between athletes' developmental experience (Cognitive Skills) and their Self-esteem as a psychological well-being.

Table 6 Results of Pearson Correlation Coefficient

| Variables | | Cognitive Skills | Self-esteem |
|------------------|---------------------|------------------|-------------|
| Cognitive Skills | Pearson Correlation | 1 | .886** |
| | Sig. (2-tailed) | | .000 |
| | N | 1623 | 1623 |
| Self-esteem | Pearson Correlation | .886** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 1623 | 1623 |

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

Given the Pearson correlation coefficient of .886 and a significance level of .000, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. Therefore, it can be concluded that there is a significant and strong positive correlation between cognitive skills and self-esteem among the participants. The results indicate that as cognitive skills increase, self-esteem also tends to increase significantly. This strong positive correlation suggests that enhancing cognitive skills as developmental experiences may lead to improved psychological parameter of self-esteem in the student-athletes.

H2: Athletes' perceptions of coaching climate, specifically coach autonomy support, are positively correlated with their developmental experience (cognitive skills).

Table 7 Results of Pearson Correlation Coefficient

| Variables | | Coaching Climate | Cognitive Skills |
|------------------|---------------------|------------------|------------------|
| Coaching Climate | Pearson Correlation | 1 | .759** |
| | Sig. (2-tailed) | | .000 |
| | N | 1623 | 1623 |
| Cognitive Skills | Pearson Correlation | .759** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 1623 | 1623 |

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

According to the above table, the correlation coefficient between Coaching Climate and cognitive skills is .759. In the same table, the significance level (Sig.) is .000, indicating that the correlation is significant at the 0.01 level (2-tailed). Given the correlation coefficient of .759 and a significance level of .000, it can be concluded that there is a significant positive correlation between coaching climate and cognitive skills.

H3: Cognitive skills mediate the relationship between coaching climate and athletes' self-esteem as a parameter of physiological well-being.

Step 1

X  Y

Table 8 Results of Linear Regression (Model Summary, ANOVA, and Coefficient)

| Model Summary | | | | |
|---------------|-------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .747a | .557 | .557 | .13669 |

a. Predictors: (Constant), Coaching Climate

| ANOVA ^a | | | | | | |
|--------------------|------------|----------------|------|-------------|----------|-------------------|
| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
| 1 | Regression | 38.138 | 1 | 38.138 | 2041.263 | .000 ^b |
| | Residual | 30.286 | 1621 | .019 | | |
| | Total | 68.424 | 1622 | | | |

a. Dependent Variable: Psychological Well Being (Self-esteem)

b. Predictors: (Constant), Coaching Climate

| Coefficients ^a | | | | | | |
|---------------------------|------------------|-----------------------------|------------|---------------------------|--------|------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | | Sig. |
| | | B | Std. Error | Beta | t | |
| 1 | (Constant) | 2.029 | .049 | | 41.549 | .000 |
| | Coaching Climate | .431 | .010 | .747 | 45.180 | .000 |

a. Dependent Variable: Psychological Well Being (Self-esteem)

The model's R Square value indicates the proportion of variance in the dependent variable (Self-esteem) that can be explained by the predictor variable (Coaching Climate).

The ANOVA table assesses the overall significance of the regression model. The regression model's F-statistic and associated p-value indicate whether the model as a whole significantly predicts the dependent variable.

The coefficients table provides information about the relationships between the predictor variable (Coaching Climate) and the dependent variable (Self-esteem). The

unstandardized coefficients represent the change in the dependent variable for each unit change in the predictor variable.

The linear regression analysis demonstrates a significant relationship between Coaching Climate and athletes' self-esteem as a Psychological Well Being. The R Square value indicates the proportion of variance in self-esteem as a Psychological Well Being that can be explained by Coaching Climate. The significant p-values in the ANOVA table suggest that the regression model is a good fit for the data, and the coefficient for Coaching Climate indicates the strength and direction of its relationship with self-esteem as a Psychological Well Being.

Step 2



Table 9 Results of Linear Regression (Model Summary, ANOVA, and Coefficient)

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .512 ^a | .262 | .261 | .37097 |

a. Predictors: (Constant), Coaching Climate

ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|------|-------------|---------|-------------------|
| 1 | Regression | 79.152 | 1 | 79.152 | 575.157 | .000 ^b |
| | Residual | 223.078 | 1621 | .138 | | |
| | Total | 302.230 | 1622 | | | |

a. Dependent Variable: Cognitive Skills

b. Predictors: (Constant), Coaching Climate

Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | t | Sig. |
|-------|------------------|-----------------------------|------------|---------------------------|--|--------|------|
| | | B | Std. Error | Beta | | | |
| 1 | (Constant) | .032 | .133 | | | .240 | .810 |
| | Coaching Climate | .620 | .026 | .512 | | 23.982 | .000 |

a. Dependent Variable: Cognitive Skills

The model's R Square value indicates the proportion of variance in the dependent variable (Cognitive Skills) that can be explained by the predictor variable (Coaching Climate).

The ANOVA table assesses the overall significance of the regression model. The regression model's F-statistic and associated p-value indicate whether the model as a whole significantly predicts the dependent variable.

The coefficients table provides information about the relationships between the predictor variable (Coaching Climate) and the dependent variable (Cognitive Skills). The unstandardized coefficients represent the change in the dependent variable for each unit change in the predictor variable.

The linear regression analysis demonstrates a significant relationship between Coaching Climate and athletes' Cognitive Skills. The R Square value indicates the proportion of variance in Cognitive Skills that can be explained by Coaching Climate. The significant p-values in the ANOVA table suggest that the regression model is a good fit for the data, and the coefficient for Coaching Climate indicates the strength and direction of its relationship with Cognitive Skills.

Step 3

X+M  **Y**

Table 10 Results of Linear Regression (Model Summary, ANOVA, and Coefficient)

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .850 ^a | .723 | .723 | .10812 |

a. Predictors: (Constant), Cognitive Skills, Coaching Climate
ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|------|-------------|----------|-------------------|
| 1 | Regression | 49.484 | 2 | 24.742 | 2116.359 | .000 ^b |
| | Residual | 18.939 | 1620 | .012 | | |
| | Total | 68.424 | 1622 | | | |

a. Dependent Variable: Psychological Well Being (Self-esteem)

b. Predictors: (Constant), Cognitive Skills, Coaching Climate
Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | Sig. |
|-------|------------------|-----------------------------|------------|---------------------------|--------|------|
| | | B | Std. Error | Beta | t | |
| 1 | (Constant) | 2.022 | .039 | | 52.338 | .000 |
| | Coaching Climate | .291 | .009 | .504 | 33.127 | .000 |
| | CognitiveSkills | .226 | .007 | .474 | 31.154 | .000 |

a. Dependent Variable: Psychological Well Being

The linear regression analysis demonstrates a significant relationship between Coaching Climate, Cognitive Skills, and athletes' Psychological Well Being (Self-esteem). The R Square value indicates that approximately 72.3% of the variance in Psychological Well Being can be explained by Cognitive Skills and Coaching Climate. Both Coaching Climate and Cognitive Skills have statistically significant coefficients, indicating their strong positive relationships with Self-esteem. This suggests that both Coaching Climate and Cognitive Skills are important predictors of athletes' self-esteem as a Psychological Well Being.

Step 4

In Step 4 of the mediation analysis, researcher examined the relationship between Coaching Climate (X), Cognitive Skills (M), and athletes' Self-esteem (Y). Here's the conclusion based on the beta values observed in each step:

Step 1: X → Y

The beta value (Beta = 0.747) indicates a significant positive relationship between Coaching Climate (X) and Self-esteem (Y).

Step 2: X → M

The beta value (Beta = 0.512) indicates a significant positive relationship between Coaching Climate (X) and Cognitive Skills (M).

Step 3: X + M → Y

The beta values (Beta for Coaching Climate = 0.504, Beta for Cognitive Skills = 0.474) indicate significant positive relationships between both Coaching Climate and Cognitive Skills with Psychological Well-Being (Self-esteem).

The inclusion of Cognitive Skills as a mediator does not completely diminish the relationship between Coaching Climate and Self-esteem, as both variables still have significant beta values.

The beta values suggest that Cognitive Skills partially mediate the relationship between Coaching Climate and Self-esteem. While the beta value of Coaching Climate slightly decreases after controlling for Cognitive Skills, it remains significant. Therefore, there is partial mediation. This indicates that Cognitive Skills explain some, but not all, of the relationship between Coaching Climate and self-esteem as a Psychological Well-Being.

Independent t-test

H4: Female athletes may have reported higher mean scores on cognitive skills, coaching climate perceptions, and psychological well-being (self-esteem) compared to male athletes.

Table 11 Results of Independent Sample t-Test

| Independent Samples Test | | | | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | |
|--------------------------|--------|-----|--------|----------------|---|------|------------------------------|----------|-----------------|
| Group Statistics | Gender | N | Mean | Std. Deviation | F | Sig. | t | df | Sig. (2-tailed) |
| Cognitive Skills | Male | 815 | 3.1482 | .14986 | 6.720 | .010 | -14.586 | 1621 | .000 |
| | Female | 808 | 3.2536 | .14105 | | | -14.590 | 1616.652 | .000 |
| Coaching Climate | Male | 815 | 5.0395 | .37542 | 8.941 | .003 | -8.447 | 1621 | .000 |
| | Female | 808 | 5.1857 | .31936 | | | -8.453 | 1584.491 | .000 |
| Self-esteem | Male | 815 | 4.1839 | .17478 | 42.615 | .000 | -9.443 | 1621 | .000 |
| | Female | 808 | 4.2776 | .22261 | | | -9.433 | 1528.722 | .000 |

Based on the independent samples t-tests conducted for each variable, including cognitive skills, Coaching Climate, and self-esteem, there are statistically significant differences between genders in each of these variables. The p-values for all t-tests are less than .001, indicating highly significant differences between males and females in their scores on cognitive skills, Coaching Climate, and self-esteem. Therefore, we reject the null hypothesis and conclude that there are significant differences between genders in these aspects.

H5: Athletes in team sports may have exhibited greater developmental experiences, positive coaching climate perceptions, and psychological well-being compared to individual sport athletes.

Table 12 Results of Independent Sample t-Test

| Independent Samples Test | | | | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | |
|--------------------------|----------------|-----|--------|----------------|---|------|------------------------------|------|-----------------|
| Group Statistics | Types of Sport | N | Mean | Std. Deviation | F | Sig. | t | df | Sig. (2-tailed) |
| | Individual | 851 | 3.1704 | .15340 | 1.614 | .204 | -8.464 | 1621 | .000 |

| | | | | | | | | | | | | |
|------------------|------------|-----|--------|--------|-------|------|--|--|--|--------|----------|------|
| Cognitive Skills | Team | 772 | 3.2341 | .14935 | | | | | | -8.475 | 1612.927 | .000 |
| Coaching Climate | Individual | 851 | 5.0778 | .36462 | .742 | .389 | | | | -4.118 | 1621 | .000 |
| | Team | 772 | 5.1503 | .34274 | | | | | | -4.130 | 1618.949 | .000 |
| Self-esteem | Individual | 851 | 4.1906 | .18307 | 9.559 | .002 | | | | -8.407 | 1621 | .000 |
| | Team | 772 | 4.2746 | .21929 | | | | | | -8.334 | 1507.518 | .000 |

Based on the independent samples t-tests conducted for each variable across different types of sport (Individual vs. Team), significant differences were found in all three variables: cognitive skills, Coaching Climate, and self-esteem.

For cognitive skills, there was a statistically significant difference between individuals and team sports ($t = -8.464$, $p < .001$), indicating that individuals had significantly lower mean scores on Developmental Experience compared to those participating in team sports.

Similarly, for Coaching Climate, there was a significant difference between individuals and team sports ($t = -4.118$, $p < .001$), suggesting that individuals reported significantly lower mean scores on Coaching Climate compared to participants in team sports.

Regarding self-esteem, there was also a significant difference between individuals and team sports ($t = -8.407$, $p < .001$), revealing that individuals had significantly lower mean scores on Psychological Well-Being compared to those engaged in team sports.

Therefore, these results suggest that the type of sport (individual vs. team) has a significant impact on participants' experiences of cognitive skills, Coaching Climate, and self-esteem.

Discussion

The study's findings provide significant evidence supporting the hypotheses concerning the relationships between athletes' developmental experiences, coaching climate, cognitive skills, and self-esteem as a component of psychological well-being. The discussion of these findings is organized according to the proposed hypotheses, offering insights into the interplay between these variables.

The results of the study confirm Hypothesis 1 (H1), demonstrating a positive correlation between athletes' developmental experiences, specifically cognitive skills, and their self-esteem. This finding aligns with existing literature, which emphasizes that cognitive skills, such as decision-making, problem-solving, and strategic thinking, play a critical role in enhancing an athlete's self-perception and psychological well-being (Horn, 2020). Athletes who develop strong cognitive abilities are better equipped to navigate the challenges of their sport, leading to increased confidence and self-worth. This positive self-perception, in turn, contributes to higher levels of self-esteem, which is a key indicator of psychological well-being (Baumeister et al., 2003).

The study also supports Hypothesis 2 (H2), revealing a significant positive correlation between athletes' perceptions of the coaching climate, particularly coach autonomy support, and their developmental experiences in terms of cognitive skills. A coaching climate that fosters autonomy, provides constructive feedback, and encourages athlete participation in decision-making processes creates an environment conducive to the development of cognitive skills (Mageau & Vallerand, 2003). These findings are consistent with the Self-Determination Theory (SDT), which posits that environments that support autonomy, competence, and relatedness are more likely to promote intrinsic motivation and cognitive engagement among athletes (Deci & Ryan, 2000).

Hypothesis 3 (H3) posited that cognitive skills mediate the relationship between coaching climate and athletes' self-esteem. The results confirm this hypothesis, suggesting that the positive effects of a supportive coaching climate on self-esteem are largely facilitated through the enhancement of cognitive skills. Athletes who perceive their coaches as supportive are more likely to develop critical cognitive abilities, which in turn, contribute to their self-esteem (Smith & Smoll, 2019). This mediating role of cognitive skills highlights the importance of coaching strategies that not only focus on physical training but also on fostering cognitive and psychological development.

The study's findings regarding Hypothesis 4 (H4) indicate that female athletes reported higher mean scores on cognitive skills, perceptions of the coaching climate, and self-esteem compared to male athletes. This finding aligns with previous research suggesting that female athletes often exhibit greater psychological resilience and cognitive engagement in sports settings (Gill & Kamphoff, 2010). The higher self-esteem observed among female athletes may be attributed to their greater receptiveness to coaching feedback and their tendency to engage more deeply in the cognitive aspects of their sport (Horn, 2020). These gender differences underscore the need for coaches to consider gender-specific approaches when designing training programs and fostering athlete development.

Finally, the study found support for Hypothesis 5 (H5), demonstrating that athletes in team sports exhibited greater developmental experiences, more positive perceptions of the coaching climate, and higher self-esteem compared to those in individual sports. Team sports environments often provide more opportunities for social interaction, collaboration, and shared learning experiences, which can enhance cognitive skills and psychological well-being (Carron & Eys, 2012). The sense of belonging and mutual support inherent in team sports may also contribute to higher self-esteem among athletes, as they feel valued and supported by their teammates and coaches. This finding suggests that the social context of team sports plays a crucial role in shaping athlete development and well-being.

CONCLUSION

This study aimed to investigate the relationships between athletes' developmental experiences (cognitive skills), coaching climate, and self-esteem, and to explore how these variables interrelate to impact psychological well-being. The primary research questions sought to determine whether cognitive skills positively influence self-esteem, if coaching climate affects cognitive skills, and whether cognitive skills mediate the relationship between coaching climate and self-esteem. Additionally, the study examined potential differences in cognitive skills, coaching climate perceptions, and self-esteem between female and male athletes, and between athletes participating in team versus individual sports.

Despite these significant findings, the study has notable limitations that should be considered. The cross-sectional design of the research limits the ability to infer causality between variables. Additionally, the study's sample was drawn from a specific geographic region and may not be generalizable to athletes in different contexts or sports environments. Future research could address these limitations by employing longitudinal designs and expanding the sample to include diverse populations. Further investigation into cultural and contextual factors could provide a more comprehensive understanding of the dynamics between coaching climate, cognitive skills, and self-esteem across different settings. In summary, this study underscores the critical role of cognitive skills in the relationship between coaching climate and self-esteem, and highlights the potential benefits of a supportive coaching environment. By addressing the identified limitations and expanding on these findings, future research can contribute to more effective strategies for enhancing athlete development and psychological well-being.

Implications and Future Directions

The findings of this study have several practical implications for coaches, sport psychologists, and sports organizations. Coaches should prioritize creating a supportive and autonomy-enhancing climate to foster the cognitive and psychological development of athletes. Additionally, gender differences and the unique dynamics of team versus individual sports should be considered when designing training programs and interventions aimed at enhancing self-esteem and overall well-being.

Future research should further explore the mechanisms underlying the relationships between coaching climate, cognitive skills, and self-esteem. Longitudinal studies could provide more insights into how these variables interact over time and across different stages of athlete development. Moreover, research should investigate how these dynamics play out in different cultural contexts, as cultural factors may influence athletes' perceptions and experiences in sports settings.

References

1. Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest*, 4(1), 1-44. <https://doi.org/10.1111/1529-1006.01431>
2. Carron, A. V., & Eys, M. A. (2012). *Group Dynamics in Sport* (4th ed.). Fitness Information Technology.
3. Côté, J., & Gilbert, W. (2020). An Integrative Definition of Coaching Effectiveness and Expertise. *International Journal of Sports Science & Coaching*, 4(3), 307-323.
4. Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01
5. Gill, D. L., & Kamphoff, C. (2010). Gender and cultural diversity. In T. S. Horn (Ed.), *Advances in Sport Psychology* (3rd ed., pp. 435-457). Human Kinetics.
6. Horn, T. S. (2020). *Advances in Sport Psychology* (4th ed.). Human Kinetics.
7. Jowett, S., & Shanmugam, V. (2016). Relational coaching in sport: Its psychological underpinnings and practical effectiveness. In M. Raab, P. Wylleman, R. Seiler, A. Elbe, & A. Hatzigeorgiadis (Eds.), *Sport and Exercise Psychology Research: From Theory to Practice* (pp. 172-182). Elsevier Academic Press.
8. Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, 21(11), 883-904. <https://doi.org/10.1080/0264041031000140374>
9. Scanlan, T. K., Babkes, M. L., & Scanlan, L. A. (2005). Participation in sport: A developmental glimpse at self-determined motivation. In J. L. Mahoney, R. W. Larson, & J. S. Eccles (Eds.), *Organized Activities as Contexts of Development: Extracurricular Activities, After-School and Community Programs* (pp. 275-309). Lawrence Erlbaum Associates.
10. Smith, R. E., & Smoll, F. L. (2019). *Sports Psychology for Coaches* (2nd ed.). Human Kinetics.
11. Vealey, R. S. (1986). Conceptualization of sport-confidence and competitive orientation: Preliminary investigation and instrument development. *Journal of Sport Psychology*, 8(3), 221-246. <https://doi.org/10.1123/jsp.8.3.221>
12. Voss, M. W., Kramer, A. F., Basak, C., Prakash, R. S., & Roberts, B. (2010). Are expert athletes 'expert' in the cognitive laboratory? A meta-analytic review of cognition and sport expertise. *Applied Cognitive Psychology*, 24(6), 812-826. <https://doi.org/10.1002/acp.1588>
13. Williams, A. M., & Reilly, T. (2000). Talent identification and development in soccer. *Journal of Sports Sciences*, 18(9), 657-667. <https://doi.org/10.1080/02640410050120041>