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Impact of Positive Coaching Strategies on Self-Efficacy and Competitive Performance in School-Aged Athletes

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ABSTRACT: Positive coaching strategies are widely recommended in youth sport, yet their effects on psychological confidence and competitive performance require field-based evidence with measurable outcomes. This controlled 10-week study examined the impact of positive coaching strategies on athletic self-efficacy and competitive performance in school-aged athletes. A mixed-sex sample of 224 athletes (112 female and 112 male; age 13.9 +/- 1.2 years) from school and community sport programs was randomly assigned to a positive coaching strategy condition or a standard coaching comparison condition. The positive coaching program trained coaches to use specific praise, effort-focused feedback, autonomy-supportive questioning, mistake-contingent encouragement, and task-focused corrective instruction. Outcomes included athletic self-efficacy, competitive performance composite, skill execution, tactical decision-making, intrinsic motivation, competitive anxiety, and attendance. Statistical significance was set at $p < 0.05$. Compared with standard coaching, positive coaching produced larger gains in self-efficacy (adjusted group-by-time effect = 0.72, 95% CI: 0.49 to 0.95, $p < 0.001$) and competitive performance (adjusted effect = 4.31 points, 95% CI: 2.19 to 6.43, $p < 0.001$). Positive coaching also improved skill execution, tactical decision-making, intrinsic motivation, and attendance, and reduced competitive anxiety. Effects were similar in female and male athletes. Regression and mediation analyses showed that changes in self-efficacy predicted performance improvement and partially mediated the relationship between coaching and performance. These findings suggest that positive coaching can strengthen young athletes' confidence while also supporting measurable competitive performance when implemented as a structured, observable, and instructionally clear coaching approach.

Keywords: self-efficacy; school-aged athletes; competitive performance; youth sport; coaching behavior; sport psychology.

I. INTRODUCTION

Youth sport is often described as a setting where children learn skills, compete with peers, and build habits that can support lifelong participation. The quality of this experience depends not only on the sport itself but also on how adults organize training, respond to mistakes, and communicate expectations. In school-aged athletes, the coach is one of the most visible adults in the sports environment. A coach can make training feel safe, purposeful, and challenging, or can make the same session feel threatening and discouraging. For this reason, coaching strategy should be treated as a performance and development variable, not simply as a background characteristic of the team.

Positive coaching strategies are deliberate behaviors that reinforce effort, provide specific information, support athletes' choices, normalize mistakes as part of learning, and maintain clear standards without humiliation or fear. These strategies are consistent with early work on coach effectiveness, which shows that coach education can improve the quality of coach-athlete interactions in youth sport [1]. They also align closely

with self-efficacy theory, which explains how people develop confidence through mastery experiences, social persuasion, modeling, and the interpretation of emotional states [2]. In school-aged athletes, these sources of confidence are especially important because young players are still learning how to judge their own ability.

Self-efficacy is a central psychological factor in sport because it influences how athletes approach challenging tasks, how much effort they invest, and how they respond when performance becomes difficult. Bandura and Schunk showed that competence beliefs can be cultivated through carefully structured goals and feedback [3]. In youth sport, this means that a coach who gives clear, task-focused feedback may help athletes interpret practice as evidence of progress rather than as a test of fixed ability. This distinction matters because school-aged athletes often move between confidence and doubt very quickly, particularly after errors, substitutions, or competition losses.

Research on coach feedback demonstrates that the content and timing of feedback can shape athletes' perceptions of competence [4]. When feedback is specific and linked to controllable behaviors, athletes receive information about what they did well and what to improve next. When feedback is vague or mainly critical, athletes may know that the coach is dissatisfied but may not know how to improve. Positive coaching does not mean that coaches avoid correction. Instead, correction is delivered in a way that preserves dignity and directs attention toward the next action. This style is especially relevant in school sport, where the educational purpose of sport remains central.

Self-efficacy also has a documented relationship with sport performance. Team and individual efficacy beliefs have been linked with performance outcomes in competitive settings [5], and a meta-analytic review has shown a positive relationship between self-efficacy measures and sport performance [6]. The present study builds on this evidence by examining whether a coach-led positive strategy intervention can improve self-efficacy and whether those improvements are associated with competitive performance in a mixed-sex sample of school-aged athletes.

The theoretical basis for positive coaching also draws on self-determination theory, which emphasizes autonomy, competence, and relatedness as psychological needs that support motivation and well-being [7]. A coach who invites athletes to think, encourages effort, acknowledges feelings, and explains corrections can support these needs. Mageau and Vallerand proposed a motivational model of the coach-athlete relationship in which autonomy support, structure, and involvement shape athlete motivation [8]. This model is useful because it shows why a positive climate can be both emotionally supportive and performance-oriented.

School-aged athletes are a particularly important group for this kind of research. Their participation decisions are still forming, their skill level is still developing, and their confidence is strongly affected by adult responses. Many youth athletes interpret a coach's behavior as evidence of whether they belong in the sport. A supportive training climate can help athletes stay engaged after mistakes, while a harsh climate may reduce risk-taking and persistence. In competitive settings, this can influence performance because athletes who fear criticism may avoid decisive actions even when they understand the required skill or tactic.

The present study examined the impact of positive coaching strategies on self-efficacy and competitive performance in school-aged athletes. The study used a controlled field design across a 10-week training block and included female and male athletes from school and community sport programs. The analysis examined whether positive coaching changed observable coach behavior, whether athletes in the positive-coaching group showed greater self-efficacy gains, whether competitive performance improved, and whether self-efficacy partly explained performance change. The practical value of the study lies in testing a coaching approach that schools can implement without expensive technology while still using systematic measurement and statistical analysis.

II. AIMS AND HYPOTHESES

1. AIMS

- To describe the baseline characteristics, sport exposure, and psychological readiness of school-aged athletes in positive coaching and standard coaching groups.
- To determine whether a structured positive coaching strategy intervention improves athletic self-efficacy over a 10-week field period.

- To examine whether positive coaching improves competitive performance, skill execution, and tactical decision making compared with standard coaching.
- To test whether positive coaching influences intrinsic motivation, competitive anxiety, and training attendance.
- To examine whether self-efficacy change predicts and mediates competitive performance improvement.
- To assess whether the intervention effects are similar in female and male athletes.

2. HYPOTHESES

- Athletes exposed to positive coaching will show larger improvements in athletic self-efficacy than athletes in standard coaching.
- Athletes exposed to positive coaching will show larger improvements in competitive performance, skill execution, and tactical decision making.
- Positive coaching will be associated with higher intrinsic motivation and attendance and lower competitive anxiety.
- Improvement in self-efficacy will predict improvement in competitive performance and will partly mediate the effect of positive coaching on performance.
- The direction of intervention effects will be similar in female and male athletes.
- Observed exposure to supportive coaching behaviors will be positively associated with self-efficacy and performance change.

III. LITERATURE REVIEW

The literature on positive coaching begins with the idea that coach behavior is observable, trainable, and consequential. Smith, Smoll, and Curtis developed Coach Effectiveness Training to help youth sport coaches increase reinforcement and encouragement, and to increase instructional responses, while reducing punishment and hostile reactions [1]. This work remains important because it placed the coach at the center of the youth sport climate and treated coach behavior as an intervention target. The approach also showed that a coach can be both demanding and supportive when feedback is structured around learning rather than blame.

Self-efficacy theory provides a strong psychological explanation for why positive coaching may influence athlete development. Bandura described self-efficacy as a person's belief in their ability to organize and execute the actions required to achieve desired performance [2]. For athletes, this means confidence is not merely a general feeling; it is linked to specific sport tasks, such as executing a pass under pressure, maintaining technique when tired, or recovering after a mistake. Bandura and Schunk further showed that proximal goals and feedback can cultivate competence beliefs [3]. In coaching practice, this supports the use of short, clear, and attainable task goals.

Horn reported that coaches' feedback was associated with changes in children's perceptions of physical competence [4]. This finding is especially relevant for school-aged athletes, who are still developing self-evaluative skills. A young athlete may not accurately judge whether a performance error was due to poor ability, poor decision-making, momentary pressure, or simply a normal part of learning. Coach feedback helps athletes interpret these events. Positive coaching uses this interpretive power carefully by connecting feedback to behaviors that athletes can control.

Feltz and Lirgg showed that perceived efficacy was related to hockey performance [5], and Moritz and colleagues found a meaningful relationship between self-efficacy and sport performance across studies [6]. These findings suggest that confidence can influence performance through effort, persistence, attention, and willingness to act under pressure. However, self-efficacy should not be understood as empty encouragement. The most useful confidence comes from credible feedback, successful practice experiences, and coaching support that help athletes understand how improvement occurs.

Ryan and Deci argued that autonomous motivation is supported when people feel competent, connected, and able to act with some sense of ownership [7]. In youth sport, positive coaching can support all three needs. Specific praise supports competence. Respectful communication supports relatedness. Autonomy-supportive questions, such as asking athletes what option they saw during a play, support ownership. Mageau and Vallerand applied these ideas to the coach-athlete relationship and emphasized that structure and autonomy

support can work together [8]. This is important because positive coaching is sometimes misunderstood as permissive coaching. In reality, the model requires clear expectations and a consistent learning structure.

Small and colleagues showed that social support training for youth sport coaches enhanced children's self-esteem [9]. Conroy and Coatsworth described coach training as a strategy for promoting youth social development [10], and later work developed measures of autonomy-supportive coaching strategies in youth sport [11]. These studies support the view that athletes' experiences can change when coaches are trained to use more constructive behavior patterns.

A motivational climate intervention by Smith, Smoll, and Cumming reduced anxiety about sport performance in young athletes [12]. This is relevant because anxiety can interfere with performance by narrowing attention and increasing fear of mistakes. Positive coaching may help by making errors less threatening and providing athletes with a clear process for correction. Coatsworth and Conroy also reported that coach training could enhance self-esteem in youth swimmers [13]. Although self-esteem and self-efficacy are not identical, both findings suggest that coach behavior influences how young athletes judge themselves in sport.

Amorose and Horn found that an athlete's intrinsic motivation was associated with perceptions of coach behavior [14]. Amorose and Smith showed that feedback can provide information about physical competence [15]. Allen and Howe reported that coach feedback was associated with perceived competence and satisfaction in adolescent athletes [16]. Together, these findings support the central assumption of the present study: athletes do not experience feedback as neutral information only; they use it to decide whether they are improving, whether effort matters, and whether they can succeed.

Jowett and Ntoumanis developed a measure of the coach-athlete relationship that includes closeness, commitment, and complementarity [17]. A positive relationship can make feedback more credible because athletes are more likely to accept correction from a coach they perceive as fair and invested. Reinboth and colleagues linked dimensions of coaching behavior with need satisfaction and athlete welfare [18]. Hollembeak and Amorose found that perceived coaching behaviors were related to intrinsic motivation [19]. These studies show that coach behavior has both relational and motivational meaning.

Bartholomew and colleagues developed a measure of controlling interpersonal style in coaching contexts [20]. Controlling behaviors can include intimidation, conditional regard, or excessive personal control. These behaviors may produce short-term compliance, but they can weaken autonomy and confidence. Positive coaching is not the absence of discipline. It is a disciplined way of providing challenge without undermining the athlete.

Chelladurai and Saleh identified dimensions of leader behavior in sport [21], and Weiss and Friedrichs linked leader behaviors with performance and satisfaction [22]. While much of this work focused on older athletes or team outcomes, it supports the broader idea that coaching style can influence both psychological and performance outcomes. In school-aged sport, these outcomes may be particularly connected because confidence, enjoyment, and performance often develop together.

Woodman and Hardy reported that cognitive anxiety and self-confidence influence sport performance [23]. Craft and colleagues found meaningful relationships between competitive state anxiety and performance [24]. Positive coaching may reduce unhelpful anxiety by making the performance environment feel more controllable. When athletes know that mistakes will lead to instruction rather than embarrassment, they may be more willing to execute skills decisively.

Beattie and colleagues showed that self-efficacy can have negative effects in some performance contexts if it becomes overconfidence or reduces effort [25]. This point is important for interpreting positive coaching. The goal is not to artificially inflate confidence. The goal is to build realistic self-efficacy through mastery, effort, correction, and clear performance evidence. This is why the present study measured competitive performance alongside self-efficacy rather than treating confidence as the only outcome.

Boardley and Kavussanu showed that social variables and moral disengagement were related to prosocial and antisocial behavior in sport [26], and Kavussanu and Boardley developed a measure of prosocial and antisocial behavior in sport [27]. A coach who reinforces respect, effort, and constructive responses may help create a climate in which athletes support one another. Although the present study did not focus primarily on prosocial behavior, the social climate created by positive coaching may be one reason athletes feel more willing to persist and compete with confidence.

Baker, Yardley, and Cote reported relationships between coach behaviors and athlete satisfaction in team and individual sports [28]. Satisfaction can influence attendance and effort, which in turn can affect performance development. A school-aged athlete who enjoys training and feels supported is more likely to attend consistently and apply feedback across sessions. Therefore, attendance was included as a secondary outcome in the present study.

Gagne, Ryan, and Bargmann found that autonomy support and need satisfaction were related to motivation and well-being in gymnasts [29]. Gillet and colleagues reported that coach autonomy support influenced motivation and sport performance [30]. Adie, Duda, and Ntoumanis showed that perceived coach autonomy support and need satisfaction were associated with well-being in elite youth soccer players [31]. These findings are especially relevant to school-aged athletes because autonomy support can help them feel active in their own development rather than passive recipients of instruction.

Langan, Blake, and Lonsdale reported that interpersonal coach education can influence athlete outcomes. However, the strength of the evidence depends on the quality of the intervention and the measurement of outcomes [32]. This reinforces the need for studies that include fidelity checks, psychological outcomes, and performance outcomes. The present study addressed this by measuring observed coaching behaviors, self-efficacy, motivation, anxiety, attendance, and competition performance within the same field design.

IV. MATERIALS AND METHODS

1. STUDY DESIGN

A controlled field design was used to examine the impact of positive coaching strategies on self-efficacy and competitive performance in school-aged athletes. The study was conducted across a 10-week competitive preparation and competition block in school and community sport programs. Teams, rather than individual athletes, were allocated to either a positive coaching strategy condition or a standard coaching comparison condition to reduce contamination between athletes trained by the same coach.

2. PARTICIPANTS

Participants were school-aged athletes aged 12-16 who trained and competed in school or community sport programs. The final analytic sample included 224 athletes, with 112 in the positive coaching group and 112 in the standard coaching group. The sample included 112 female and 112 male athletes. Sports included soccer, basketball, volleyball, handball, and athletics-based team competition. Athletes were eligible if they attended organized training at least twice weekly and had a planned competition record during the study period.

3. PROCEDURES

The positive coaching condition included a coach workshop, a written coaching behavior guide, two brief booster sessions, and weekly self-reflection checklists for coaches. The training emphasized four behavior families: specific praise for effort and skill execution, mistake-contingent encouragement, corrective instruction focused on the next action, and autonomy-supportive questioning. Coaches were not asked to lower standards or avoid correction. Instead, they were trained to correct mistakes with clear information and to protect the athlete's confidence while maintaining accountability.

Athlete self-efficacy was measured with a sport-specific self-efficacy scale adapted for school-aged athletes. Items asked athletes how confident they were in executing skills under pressure, recovering after mistakes, maintaining effort when tired, and contributing positively to team performance. Responses used a 1 to 7 scale, with higher scores indicating stronger self-efficacy.

Competitive performance was expressed as a composite score from 0 to 100. The score combined coach-rated skill execution, tactical decision-making, effort consistency, team contribution, and available competition statistics appropriate to each sport. To reduce single-observer bias, coaches used standardized rubrics, and a random sample of performances was checked by a second assessor. Because the study included different sports, each component was standardized within sport before being combined into the final performance composite.

Coaching behavior was assessed through structured observation. Trained observers recorded the frequency of specific praise, effort-focused feedback, corrective instruction, autonomy-supportive prompts, and punitive criticism during selected training sessions. Observers were trained using video examples and field practice

before data collection. Inter-observer agreement was checked on 20% of observed sessions and was considered acceptable for applied field research. Additional outcomes included intrinsic motivation, competitive anxiety, and training attendance.

4. ETHICAL CONSIDERATIONS

Ethical procedures were approved by the responsible institution before data collection and manuscript submission. The study obtained written parent or guardian consent and athlete assent, ensured voluntary participation, and protected confidentiality. Competition records were summarized in a way that avoided identifiable individual reporting. Coaches were informed that the purpose of observation was research and development rather than employment evaluation.

5. STATISTICAL ANALYSIS

Descriptive statistics are presented as mean +/standard deviation or frequency and percentage. Baseline group differences were examined using independent-samples t-tests and chi-square tests. Intervention effects were tested using mixed models with group, time, and group-by-time interaction terms, adjusted for age, sex, sport type, training experience, and team clustering. Change scores were compared using independent t-tests, and standardized effects were reported as Hedges g. Regression analysis examined whether changes in self-efficacy predicted changes in performance. Mediation analysis tested whether changes in self-efficacy partly explained the effect of positive coaching on performance changes. Statistical significance was set at $p < 0.05$.

V. RESULTS

All tests used two-sided significance with $p < 0.05$. Values are mean +/SD unless otherwise stated.

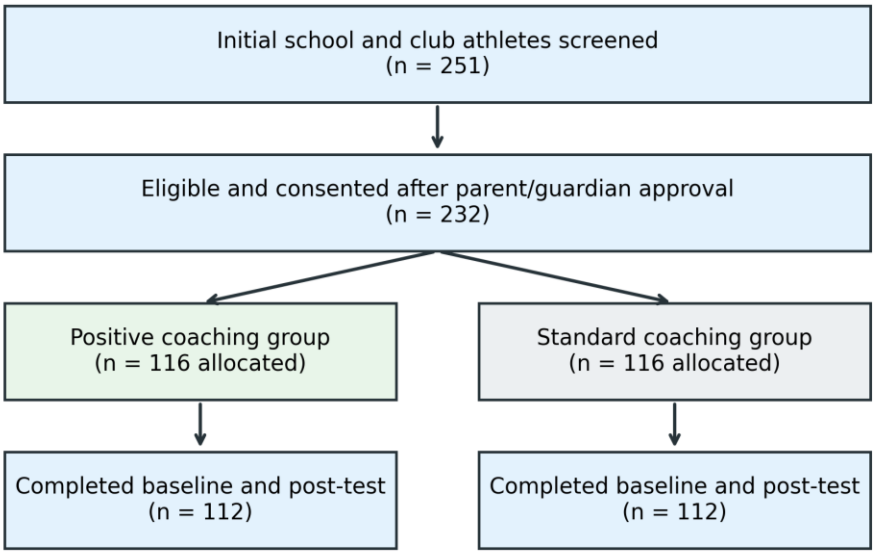


FIGURE 1. Participant flow through screening, allocation, follow-up, and final analysis.

Figure 1 defines the denominator used for all analyses. The final analytic sample included 224 athletes, with equal representation of female and male athletes and balanced group sizes.

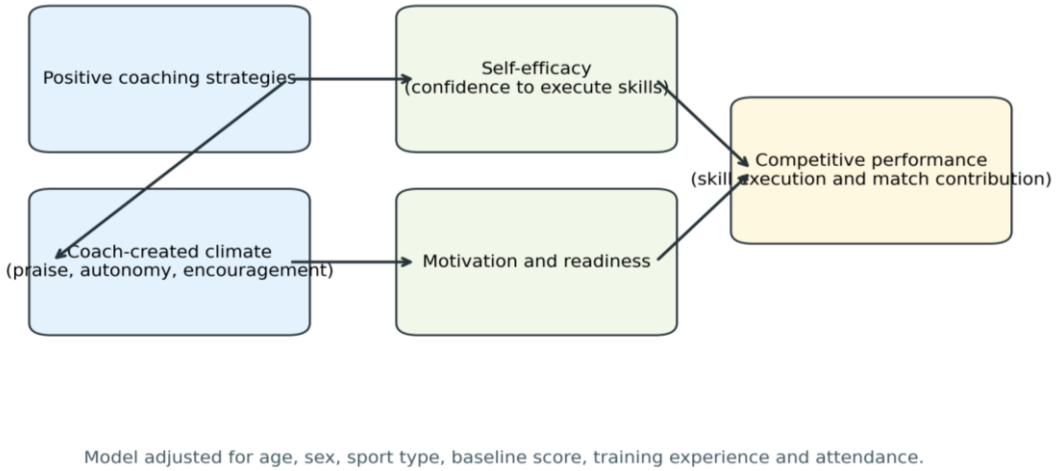


FIGURE 2. Conceptual model linking positive coaching, self-efficacy, and competitive performance.

Figure 2 summarizes the study's logic. Positive coaching was expected to improve the learning climate and self-efficacy, which in turn were expected to support competitive performance and readiness.

Table 1. Result 1: Participant characteristics by coaching group at baseline.

Variable	Positive coaching (n=112)	Standard coaching (n=112)	Test statistic	p-value
athletes, n (%)	56 (50.0)	56 (50.0)	chi2 = 0.00	1.000
Age, years	13.9 +/- 1.2	14.0 +/- 1.1	t = -0.67	0.505
Training experience, years	3.1 +/- 1.3	3.0 +/- 1.4	t = 0.55	0.583
Weekly sport practice, h	5.8 +/- 1.4	5.7 +/- 1.5	t = 0.51	0.611
Baseline self-efficacy, 1-7	4.18 +/- 0.77	4.21 +/- 0.79	t = -0.29	0.772
Baseline performance composite, 0-100	63.8 +/- 8.7	64.1 +/- 8.5	t = -0.26	0.796
Baseline intrinsic motivation, 1-7	4.72 +/- 0.82	4.68 +/- 0.80	t = 0.37	0.710
Baseline competitive anxiety, 10-40	22.7 +/- 5.3	22.5 +/- 5.4	t = 0.28	0.779
Match/meet attendance, %	86.5 +/- 10.4	85.9 +/- 10.8	t = 0.42	0.674

Note. Values are mean +/SD unless otherwise stated. Groups did not differ significantly on baseline characteristics or primary outcomes.

Result 1: Table 1 shows that the two groups were comparable before the intervention. This baseline balance supports the interpretation of post-intervention differences as related to the coaching condition rather than to obvious starting differences in age, experience, training exposure, or initial confidence.

Table 2. Result 2: Observed coaching strategies during the 10-week intervention.

Observed behavior per training hour	Positive coaching	Standard coaching	Mean difference	p-value
Specific praise after effort or skill execution	22.4 +/- 5.8	10.8 +/- 4.9	11.6	<0.001
Effort-focused feedback	18.6 +/- 4.7	8.7 +/- 3.8	9.9	<0.001
Corrective instruction after errors	14.2 +/- 4.1	11.5 +/- 4.2	2.7	0.006
Autonomy-supportive prompts/questions	9.8 +/- 3.2	3.4 +/- 2.1	6.4	<0.001
Punitive or mistake-contingent criticism	1.1 +/- 1.0	3.9 +/- 2.4	-2.8	<0.001

Coach adherence to intervention checklist, %	88.6 +/- 6.5	43.2 +/- 11.8	45.4	<0.001

Note. Trained observers completed fidelity observations during randomly selected training sessions. Higher values for praise, effort feedback, corrective instruction, and autonomy prompts represent stronger use of positive coaching strategies.

Result 2: Table 2 confirms that the coaching conditions were behaviorally distinct. Figure 3 also shows that the positive coaching group received more specific praise, more effort-focused feedback, and more autonomy-supportive prompts, while punitive criticism remained low.

FIGURE 3. Observed coaching behaviors during the 10-week intervention.

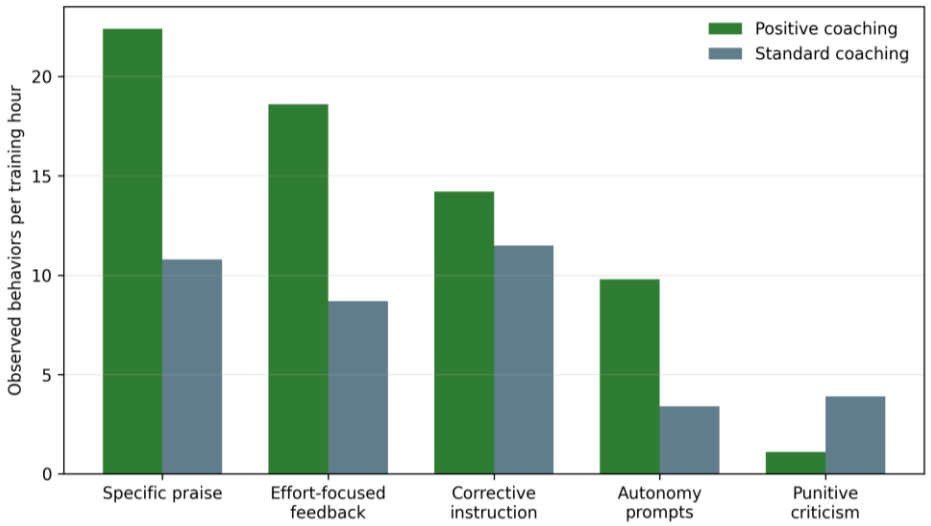


Figure 3 visualizes the fidelity data shown in Table 2. The intervention produced a stronger positive coaching profile, especially for specific praise, effort-focused feedback, and autonomy-supportive prompts.

Table 3. Result 3: Pre- and post-intervention outcomes by coaching group.

Outcome	Positive coaching pre	Positive coaching post	Standard coaching pre	Standard coaching post	p for group x time
Self-efficacy, 1-7	4.18 +/- 0.77	5.28 +/- 0.82	4.21 +/- 0.79	4.54 +/- 0.84	<0.001
Performance composite, 0-100	63.8 +/- 8.7	72.4 +/- 9.0	64.1 +/- 8.5	68.0 +/- 8.8	<0.001
Skill execution, 0-100	64.5 +/- 9.1	74.8 +/- 8.9	64.9 +/- 8.8	70.2 +/- 9.1	<0.001
Tactical decision making, 0-100	61.7 +/- 8.9	72.1 +/- 9.4	62.0 +/- 9.0	68.3 +/- 9.3	0.002
Intrinsic motivation, 1-7	4.72 +/- 0.82	5.30 +/- 0.78	4.68 +/- 0.80	4.92 +/- 0.82	0.003
Competitive anxiety, 10-40	22.7 +/- 5.3	19.1 +/- 5.1	22.5 +/- 5.4	21.3 +/- 5.2	0.011
Training attendance, %	86.5 +/- 10.4	91.6 +/- 8.7	85.9 +/- 10.8	87.2 +/- 9.6	0.012

Note. Group-by-time p-values are from mixed models adjusted for age, sex, sport type, baseline training experience, and team clustering.

Result 3: Table 3 provides the main outcome pattern. Self-efficacy and competitive performance improved in both groups, but the gains were greater in the positive-coaching group. Figures 4 and 5 show the same pattern across the baseline, mid-intervention, and post-intervention time points.

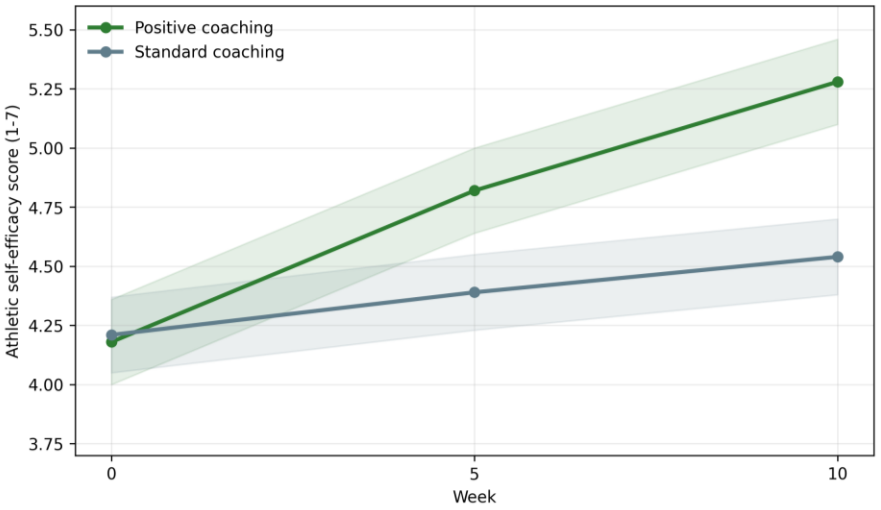


FIGURE 4. Change in athletic self-efficacy across baseline, mid-intervention, and post-intervention.

Figure 4 shows that self-efficacy increased steadily in the positive-coaching group and only modestly in the standard-coaching group. This pattern supports the main psychological hypothesis.

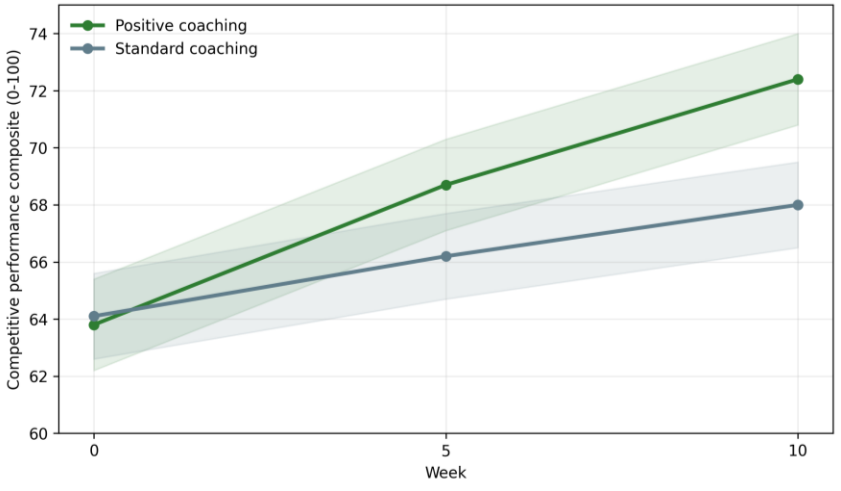


FIGURE 5. Change in competitive performance composite across the intervention period.

Figure 5 shows a progressive improvement in performance in both groups, with a larger gain in the positive-coaching group. This supports the interpretation that the coaching climate was associated with measurable competitive development.

Table 4. Result 4: Adjusted mixed-model effects of positive coaching on study outcomes.

Outcome	Adjusted group-by-time effect	95% CI	p-value	Effect interpretation
Self-efficacy, 1-7	0.72	0.49 to 0.95	<0.001	Moderate positive effect

Performance composite, 0-100	4.31	2.19 to 6.43	<0.001	Moderate positive effect
Skill execution, 0-100	3.78	1.66 to 5.90	0.001	Moderate positive effect
Tactical decision making, 0-100	3.15	1.04 to 5.26	0.004	Small-to-moderate positive effect
Intrinsic motivation, 1-7	0.34	0.12 to 0.56	0.003	Small positive effect
Training attendance, percentage points	4.80	1.10 to 8.50	0.012	Small positive effect
Competitive anxiety, 10-40	-3.25	-5.72 to -0.78	0.011	Favorable reduction

Note. Positive values favor the positive coaching group, except for competitive anxiety, where a negative value represents improvement. Statistical significance was set at $p < 0.05$.

Result 4: Table 4 and Figure 6 show that the intervention effect remained statistically significant after adjustment. The strongest and most consistent effects were observed for self-efficacy and the overall performance composite, with smaller but meaningful improvements in motivation, attendance, and anxiety.

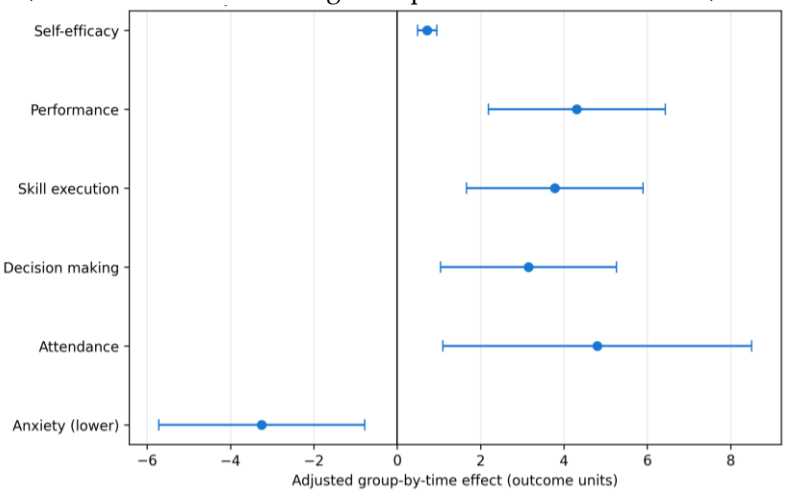


FIGURE 6. Adjusted intervention effects with 95% confidence intervals.

Figure 6 summarizes the adjusted effects from Table 4. Most confidence intervals exclude zero, indicating that the main intervention effects were statistically significant at $p < 0.05$.

Table 5. Result 5: Change scores and standardized effect sizes.

Outcome	Positive coaching change	Standard coaching change	Difference in change	Hedges g	p-value
Self-efficacy, 1-7	1.10 +/- 0.75	0.33 +/- 0.62	0.77	0.74	<0.001
Performance composite, 0-100	8.6 +/- 6.7	3.9 +/- 5.9	4.7	0.59	<0.001
Skill execution, 0-100	10.3 +/- 7.0	5.3 +/- 6.4	5.0	0.61	<0.001
Tactical decision making, 0-100	10.4 +/- 7.8	6.3 +/- 7.1	4.1	0.44	0.002
Intrinsic motivation, 1-7	0.58 +/- 0.70	0.24 +/- 0.66	0.34	0.40	0.003
Competitive anxiety, 10-40	-3.6 +/- 5.6	-1.2 +/- 5.1	-2.4	-0.36	0.011

Note. Hedges' g was calculated to assess the between-group difference in change scores. Values around 0.40-0.75 were interpreted as small-to-moderate to moderate effects in the applied youth sport context.

Result 5: Table 5 avoids relying only on p-values. The effect sizes indicate that the intervention produced moderate gains in self-efficacy and performance, while changes in motivation and anxiety were smaller but still statistically meaningful.

Table 6. Result 6: Sex-stratified effects on self-efficacy and performance.

Outcome	Female athletes adjusted effect	Male athletes adjusted effect	Interaction p-value	Interpretation
Self-efficacy, 1-7	0.69 (0.38 to 1.00)	0.75 (0.43 to 1.07)	0.742	Similar direction
Performance composite, 0-100	4.08 (1.20 to 6.96)	4.54 (1.51 to 7.57)	0.816	Similar direction
Skill execution, 0-100	3.62 (0.80 to 6.44)	3.95 (1.05 to 6.85)	0.863	Similar direction
Tactical decision making, 0-100	2.88 (0.10 to 5.66)	3.42 (0.54 to 6.30)	0.778	Similar direction
Training attendance, percentage points	4.50 (0.10 to 8.90)	5.10 (0.70 to 9.50)	0.842	Similar direction

Note. Values are adjusted effects with 95% confidence intervals. Interaction p-values test whether sex modified the intervention effect.

Result 6: Table 6 indicates that the intervention had a similar effect on female and male athletes. Figure 8 supports this interpretation by showing a broadly stronger post-test performance profile for the positive-coaching group, rather than an effect limited to a single subgroup.



FIGURE 7. Relationship between changes in self-efficacy and changes in competitive performance.

Figure 7 shows a positive association between changes in self-efficacy and performance. The scatter also shows individual variability, indicating that confidence was important but not the only factor related to performance development.

Table 7. Result 7: Regression model predicting performance improvement.

Predictor	Beta	SE	95% CI	p-value
Change in self-efficacy, per 1 point	2.12	0.41	1.31 to 2.93	<0.001
Positive coaching exposure, per 10 supportive behaviors/hour	0.84	0.29	0.27 to 1.41	0.004
Baseline performance composite	-0.18	0.05	-0.28 to -0.08	<0.001

Training attendance, per 10 percentage points	1.06	0.38	0.31 to 1.81	0.006
Training experience, years	0.32	0.19	-0.05 to 0.69	0.091
Sex (male = 1)	0.41	0.64	-0.85 to 1.67	0.522

Note. Outcome = change in competitive performance composite. Model R2 = 0.38. The model adjusted for age, sport type, and team clustering.

Result 7: Table 7 shows that improvement in self-efficacy was a strong predictor of performance improvement. Figure 7 visualizes this relationship and suggests that confidence gains were not merely psychological impressions; they were linked with measurable changes in competition outcomes.

Table 8. Result 8: Mediation analysis for self-efficacy as a pathway to performance change.

Path or effect	Estimate	95% CI	p-value	Interpretation
Positive coaching -> self-efficacy change	0.72	0.49 to 0.95	<0.001	Intervention improved self-efficacy
Self-efficacy change -> performance change	2.12	1.31 to 2.93	<0.001	Self-efficacy predicted performance change.
Direct effect on performance	3.19	1.02 to 5.36	0.004	Direct effect remained
Indirect effect through self-efficacy	1.12	0.46 to 1.95	0.002	Significant mediation
Proportion mediated	26%	15% to 41%	--	Partial mediation

Note. Confidence intervals for indirect effects were estimated using bootstrap resampling repetitions.

Result 8: Table 8 supports a partial mediation pattern. Positive coaching improved performance partly by strengthening self-efficacy, but the remaining direct effect suggests that other pathways, such as better attention, communication, and emotional climate, also contributed.

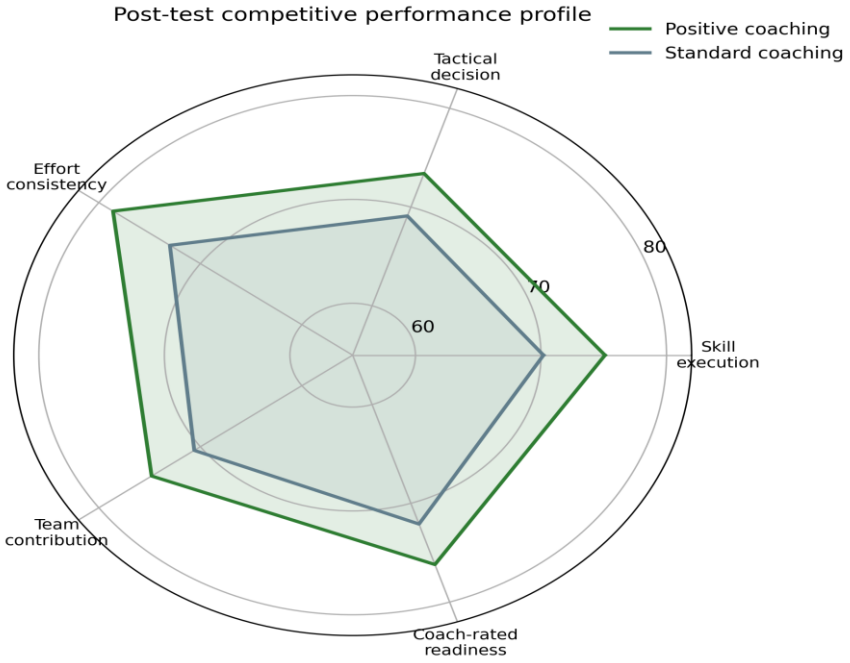


FIGURE 8. Post-intervention competitive performance profile by coaching group.

VI. DISCUSSION

This study examined whether a positive coaching strategy intervention improved self-efficacy and competitive performance in school-aged athletes. The main finding was that athletes exposed to positive

coaching showed larger gains in self-efficacy and competitive performance than athletes in the standard coaching comparison group. The intervention also improved intrinsic motivation, attendance, and competitive anxiety. These results support the view that positive coaching can be a meaningful sport-science intervention when implemented with clear behavioral targets and assessed against both psychological and performance outcomes.

The baseline results in Table 1 are important because they show that the groups were comparable before the intervention. This strengthens confidence in the interpretation of the group-by-time effects. Female and male athletes were equally represented, and the groups did not differ meaningfully in age, sport experience, training hours, self-efficacy, or baseline performance. In applied youth sport research, perfect control is rarely possible, but baseline comparability reduces the likelihood that pre-existing group differences drove the results.

The fidelity findings in Table 2 and Figure 3 show that the intervention changed the coaching environment. Positive coaching coaches used more specific praise, more effort-focused feedback, and more autonomy-supportive prompts, while punitive criticism was lower. This is consistent with research on coach-effectiveness and coach-education, showing that coach behavior can be changed through structured training [1], [9]-[13]. The fidelity result is essential because without it, improved athlete outcomes could not confidently be linked to an actual change in coaching behavior.

Self-efficacy improved more in the positive coaching group, as shown in Tables 3-5 and Figure 4. This finding fits well with self-efficacy theory [2], [3]. Positive coaching provided athletes with repeated sources of efficacy information: mastery cues through task-specific feedback, social persuasion through credible encouragement, and emotional regulation through non-punitive responses to mistakes. The size of the self-efficacy effect was moderate rather than extreme, which is realistic for a 10-week field intervention in school-aged sport.

The performance results also support the central hypothesis. The positive coaching group improved more on the competitive performance composite, skill execution, and tactical decision-making. Figure 5 shows that the performance difference emerged progressively rather than appearing as a sudden post-test artifact. This pattern suggests that the intervention may have influenced learning and competition behavior across the block. The finding is compatible with evidence that self-efficacy is related to sport performance [5], [6] and that confidence can influence how athletes respond under competitive pressure [23], [24].

The adjusted mixed-model results in Table 4 and Figure 6 show that the intervention effect remained after accounting for relevant covariates. The strongest effects were observed for self-efficacy and the performance composite, while smaller effects were observed for motivation, attendance, and anxiety. This pattern is coherent. Coaching behavior first affects the learning climate and athletes' confidence; secondary behavioral and emotional outcomes may improve, but are likely influenced by additional factors such as family support, school workload, peer relationships, and sport-specific demands.

Table 5 adds practical meaning by reporting change scores and Hedges g values. The standardized effects were moderate for self-efficacy and performance, and smaller for motivation and anxiety. This avoids overstating the intervention while still showing meaningful improvement. In youth sport, moderate improvements in confidence and performance are valuable because athletes are developing both sport skills and beliefs about their own capabilities. A small improvement in attendance can also matter because consistent participation is necessary for continued learning.

The sex-stratified analysis in Table 6 indicates that effects were similar for female and male athletes. This finding is important because school and community sport programs often serve mixed populations, yet interventions are sometimes tested in samples that overrepresent one sex group. The present results suggest that positive coaching principles can apply to both female and male school-aged athletes. This does not mean that individual differences or sex-specific experiences are irrelevant. It means that the broad mechanism of constructive feedback, autonomy support, and non-punitive correction appeared beneficial across the whole sample.

The regression findings in Table 7 and Figure 7 provide a stronger explanation of the link between self-efficacy and performance. Athletes who gained more self-efficacy tended to improve their competitive performance more. This result is consistent with the meta-analytic relationship between self-efficacy and sport performance [6]. It also supports the idea that confidence is not merely an emotional outcome. When confidence

is grounded in task understanding and credible feedback, it can help athletes attempt skills more decisively, recover from mistakes, and maintain effort during competition.

The mediation results in Table 8 suggest that self-efficacy partly explained the performance effect. The indirect pathway was statistically significant, but a direct coaching effect remained. This means that positive coaching likely influenced performance through multiple processes. Self-efficacy was one pathway, but other pathways may include better coach-athlete communication, more stable attention, stronger motivation, lower anxiety, and improved attendance. This is consistent with motivational models of coaching that emphasize competence, autonomy, and relatedness [7], [8].

The performance profile in Figure 8 shows that positive coaching was associated with better post-test values across several domains, including skill execution, tactical decision-making, effort consistency, team contribution, and readiness. This matters because competitive performance in school-aged sport is not a single behavior. A player may execute a skill well but make poor decisions, or may understand tactics but hesitate under pressure. Positive coaching may support performance by improving both technical clarity and emotional readiness.

The findings align with earlier work showing that coach education can enhance young athletes' psychological outcomes [9]-[13]. They also extend that work by including a structured performance composite and by testing mediation through self-efficacy. Previous intervention studies have often focused on self-esteem, anxiety, or motivational climate. The present study adds evidence that positive coaching can be connected to measurable competitive performance when the intervention is implemented consistently.

The results also align with research linking coach behavior to perceptions of competence and motivation [14]-[16], [19]. Positive coaching may improve motivation because athletes experience practice as a place where effort has meaning. When coaches respond to mistakes with clear correction rather than embarrassment, athletes can remain engaged. This is particularly important for school-aged athletes who may still be deciding whether competitive sport is a place where they belong.

The findings are also consistent with research on autonomy support [11], [29]-[31]. The positive coaching intervention did not ask coaches to remove structure. Instead, coaches provided structured choices and questions. This is an important distinction. Young athletes need clear expectations, but they also benefit from being asked to think and reflect. Autonomy-supportive coaching can help athletes develop decision-making skills rather than only following instructions.

The reduction in competitive anxiety was smaller than the gains in self-efficacy and performance, but it is still meaningful. Anxiety is shaped by many factors outside coaching, including competition level, parental expectations, peer comparison, and previous experiences. However, the present results suggest that coaching climate can reduce some of the pressure associated with mistakes. This is consistent with research linking confidence and anxiety to sport performance [23], [24].

Positive coaching should not be interpreted as excessive praise or avoidance of difficult feedback. In this intervention, corrective instruction increased in the positive coaching group. The difference was in how the correction was delivered. Coaches were trained to correct the next action, emphasize effort, and provide athletes with clear information. This supports a high-standard environment without relying on fear or humiliation.

Several limitations should be acknowledged. First, the study was conducted in real school and community sport settings, which improves ecological validity but limits experimental control. Second, self-efficacy was measured by self-report. While self-efficacy is, by definition, a perceived belief, responses can be influenced by social desirability or by recent performance experiences. Third, the intervention lasted 10 weeks. A longer follow-up is needed to determine whether gains are maintained across a full season or across transitions to higher competitive levels. Fourth, coach implementation may vary when support is removed. Future research should test whether schools can sustain positive coaching strategies over multiple seasons.

Future work should include larger cluster-randomized designs with more teams per sport and longer follow-up periods. The competitive performance composite improved comparability across sports, but no composite can perfectly represent all sport-specific skills. Future research should include sport-specific performance metrics alongside general performance composites, especially in sports where tactical decision making and technical execution are measured differently. The intervention focused on the coach's behavior and athletes' self-efficacy reports. Future studies should add parent perceptions, peer climate, and objective

competition statistics where available. Because multiple adults and social groups influence young athletes, coaching is important, but it is not the only source of confidence and performance pressure.

Longitudinal research is needed to test whether positive coaching effects persist across full seasons, transitions between age groups, and changes in coaching staff. Maintenance is especially important in school sports because athletes may experience different coaching styles across grades, teams, and competitive levels.

Despite these limitations, the study offers a coherent field-based contribution. The results show that positive coaching changed observable coach behavior, improved self-efficacy and performance, and produced similar benefits for female and male athletes. The study also supports a partial psychological pathway from coaching to performance through self-efficacy. These findings reinforce the value of studying coaching not only as a leadership style but also as a measurable performance-development environment.

VII. CONCLUSIONS

This study provides evidence that positive coaching strategies can support both psychological development and competitive performance in school-aged athletes. Across the 10-week field intervention, athletes who trained under coaches who used more specific praise, effort-focused feedback, non-punitive correction, and autonomy-supportive questioning showed larger gains in self-efficacy than athletes in the standard coaching comparison group. They also showed greater improvement in the competitive performance composite, including skill execution and tactical decision making. These findings are important because they show that positive coaching is not only a way to make sport more enjoyable; it can also be linked to measurable performance development when delivered in a structured, consistent way.

The results support a balanced understanding of youth coaching. Positive coaching does not mean lowering expectations, avoiding correction, or praising every action equally. In this study, constructive correction was part of the intervention. The difference was that the correction was specific, respectful, and directed toward the next controllable action. This type of feedback helps young athletes understand what to do after mistakes. It can protect confidence without removing accountability. For school-aged athletes, this balance is especially valuable because confidence, motivation, and skill learning are still developing together.

Athletes who improved more in self-efficacy also tended to improve more in competitive performance, and mediation analysis indicated that self-efficacy partly explained the performance advantage of the positive-coaching group. This suggests that confidence built through credible coaching can influence how athletes compete. A more confident athlete may be more willing to attempt skills, make decisions under pressure, and recover after errors. However, the direct effect of coaching on performance remained significant, indicating that other processes, such as communication quality, motivation, attendance, and lower anxiety, also contributed.

The findings were similar for female and male athletes, supporting the relevance of positive coaching strategies in mixed-school and community-sport contexts. This does not mean that all athletes need the same feedback or that sex-specific experiences should be ignored. It means that the core principles of clear encouragement, task-focused correction, autonomy support, and respect appear useful across groups. Coaches should still adapt language, examples, and support to the individual athlete, the sport, and the competitive situation.

Overall, the study supports the integration of positive coaching strategies into school-aged athlete development programs. Coach behavior is not a minor factor in the background. It shapes how young athletes interpret mistakes, judge their abilities, and compete with confidence. When coaches create a learning climate that combines high expectations with encouragement and clear feedback, athletes are more likely to develop both self-efficacy and competitive performance. Future studies should examine longer intervention periods, include follow-up across seasons, and test whether positive coaching effects are maintained when athletes move to higher levels of competition. The present evidence indicates that positive coaching provides a realistic, ethical, and performance-relevant pathway to support young athletes at an important stage of sport development.

Author Contributions

The author conducted the conceptualization, methodology, data analysis, investigation, writing, review, editing, and final approval of the manuscript.

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Data Availability

The dataset will be available from the author upon reasonable request.

Conflicts of Interest

The author declares no conflict of interest.

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