

The Relationship between Perceived Coach's Competence Support, Task Orientation, Self-Efficacy and Engagement of Chinese High School Football Players

Chuantong Jiang^{1,2}, Norsilawati Abdul Razak^{1,*}, Nelfianty Mohd Rasyid¹

¹Faculty of Sports Science and Coaching, Sultan Idris Education University, Malaysia

²Faculty of Physical Education and Health, Zhaoqing University, China

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Abstract This study aims to investigate the relationship between perceived coach's competence support, task orientation, self-efficacy and engagement of Chinese high school football players from a competency motivation perspective. A cross-sectional survey of 385 Chinese high school football players (228 boys; 157 girls; Mage = 16.07 years; SD = 1.15; range = 14 - 19 years) was conducted using proportional stratified random sampling. A multivariate mediation model was tested using structural equation modelling (SEM) to investigate the relationships of perceived coaching competency support on athlete engagement directly, or indirectly through task orientation and self-efficacy. Perceived coach's competence support positively predicted athlete engagement through task orientation and self-efficacy ($\beta = .116$, $p < 0.01$; $\beta = .112$, $p < 0.01$), and perceived coach's competence support positively predicted self-efficacy through task orientation, and then positively predicted athlete engagement ($\beta = .045$, $p < 0.01$). Moreover, perceived coach's competency support also directly and positively predicted athlete engagement ($\beta = .135$, $p < 0.01$). The results showed that task orientation and self-efficacy played a partial mediating role between competence-supportive coaching behavior

and athlete engagement ($\beta = .272$, $p < 0.01$). This study shows that perceived coach's competency support not only directly predicts athlete engagement, but also indirectly predicts athlete engagement through the multi-mediated chain of task orientation and self-efficacy. This speaks volumes about the need to develop competence-supportive techniques among high school football coaches in order to maximize athletes' motivation and engagement.

Keywords Competence Support, Coaching Behavior, Athlete Engagement, Task Orientation, Self-Efficacy

1. Introduction

Following the advancement of positive psychology, the concept of engagement has gained increasing attention in some fields of human activities [1]. In the field of sports, athlete engagement refers to a state of mind associated with sports that are sustained, positive, and complete with emotion and cognition, characterized by confidence, dedication, enthusiasm, and vigor [2]. As a positive

psychological indicator, it plays an important role in preventing burnout [3], promoting more effective self-regulation [4], having greater amounts of flow experience [5], and striving for higher perfection [6], which are the premise and guarantee for athletes to enhance competitive ability and obtain excellent athletic performance [7]. Drawing from current theories and research advancements, the determinants of individual engagement and continuous participation in sports have been interpreted in a variety of ways, such as self-determination theory [8], self-efficacy theory [9], and achievement goal theory [10, 11]. All these theories have a common feature, namely, the concept of ability. They emphasize the perception of competence as a determinant of human motivation and behavior in any given environment, including the field of sports and exercise.

In fact, previous studies have shown that competency-supportive coaching behavior in general can create a structured environment of positive motivational feedback for athletes [12], which seems to predict athletes' task goal orientation [13], self-efficacy [14] and engagement [15, 16], and these findings are fully consistent with the assumption of effectance motivation (also commonly known as competency motivation) theory [17]. However, in recent years, with the inclusion of competency constructs in different motivational theories, interest in competency motivation theory has waned. To date, few studies have investigated competency support, task goal orientation, self-efficacy and engagement in a single model. Investigating this relationship in an integrated model would provide evidence that independent variables (i.e., a competency-supportive environment provided by a coach) and mediating variables (i.e., athlete's task goal orientation and self-efficacy) explain subsequent behavioral outcomes (i.e., athlete engagement). Therefore, this study aims to investigate how competency-supportive coaching behavior predicts athlete engagement through athletes' task-goal orientation and self-efficacy.

1.1. Competence and Motivational Processes

Two concepts from different motivation theories illustrate the ability belief, concept and motivation process of individuals in the sports context. The first kind of motivation, achievement goals, refers to the purpose of individuals' participation in achievement-related behaviors and the meaning they attribute to these behaviors [10, 18, 19]. A second kind of motivation, self-efficacy, is how confident individuals are that they can accomplish a specific task with the skills they have [20]. As the motivation process within individuals, these two theories emphasize that how they judge their ability and how this judgment influences their motivation and behavior are the most critical factors. Furthermore, the competency motivation theory proposes that perceptual ability is the consequence of someone mastering the goal, thus

improving the quality of motivation [17], which provides an important theoretical basis for investigating the relationship between task goal orientation and self-efficacy in the sports context.

According to the achievement goal theory of Nicholls (1984, 1989), different ways of subjective success distinguish two kinds of orientation: task and ego orientation. Individuals with task goal orientation (i.e., perceived ability tends to be self-referenced) focus on mastering and developing competence in a task. In contrast, for individuals with ego goal orientation (perceived ability tends to be other-referenced), the focus is on the demonstration of competence relative to others, that is, subjective success means performing better on a task than others. These two goal orientations have been proposed to be orthogonal [21], and individuals can be task-oriented and ego-oriented at the same time. A meta-analytical study has shown that task orientation appears to be positively related to adaptive emotional, cognitive, and behavioral processes and outcomes, but there is disagreement (e.g., positive, neutral, or negative) about the results of ego orientation [22]. In general, task orientation is positively related to the mastery and development of knowledge or skills [23], which can more continuously motivate athletes' efforts, persistence and engagement [24-26], thus promoting their achievements.

In addition, more and more evidence has shown that task orientation can positively predict self-efficacy [27-29]. According to Bandura's (1977) social cognition theory, people will have different degrees of self-efficacy in the psychological process of performing an activity, which is derived from prior performance successes, vicarious experience, verbal persuasion, and physiological state. In turn, self-efficacy also affects people's behavioral choices, motivational efforts, cognitive processes and emotional processes [30]. In Bandura's conceptual system, self-efficacy is regarded as the expectation of whether an individual has the ability to execute a behavior in a given situation, as the determinant of the behavior [20]. Specifically, individuals with high self-efficacy are likely to work harder, persist longer and have a higher level of engagement, and thus achieve better achievements than individuals with low self-efficacy [31]. In the field of sports, several studies have confirmed that self-efficacy positively predicts athlete engagement [32, 33].

1.2. Competence-Supportive Coaching Behavior

The two types of competency motivation discussed earlier are the key intrinsic motivational processes for individuals to initiate, sustain and maintain sports participation [15, 16], while coaches and their coaching styles are related to the motivation and engagement of athletes as social and contextual factors [34]. According to self-determination theory [35], individuals have three innate psychological needs, and along with autonomy and relatedness, competence is one of the essential basic

psychological needs for cultivating an individual's intrinsic motivation and engagement. In the field of sports, the need for competence is regarded as the athlete's natural desire to master the task and the belief that he has the ability and opportunity to achieve the desired outcomes [35-37]. Previous research has indicated that athletes' competence satisfactions play a crucial role in initiating and sustaining individual motivation processes and engagement [e.g., 5, 37-39]. It is noteworthy that coaches' feedback and guidance prevalent in sports environment may directly support or hinder athletes' sense of competence [15]. Therefore, coaches, as significant others for social and contextual factors, can be the most important source of support for athletes' competence.

Competency support, as it is known, is a broad structure that means having feedback and guidance rather than control or direction. The provision of structure includes providing rich, clear, effectance-related feedback, encouraging reflection and providing assistance and guidance, fostering awareness and focus, and creating a capability-supported motivational climate by providing the support of an effective organismic integration and optimal challenges [12, 40]. Previous studies have shown that, first of all, competency-supportive coaching behaviors can help athletes develop a variety of adaptive consequences, such as motivation [37], engagement [41, 42] and achievement [15, 36]. Secondly, a study integrating self-determination and achievement goal theory shows that teachers' competence support can positively influence students' task orientation [13]. Based on this, in the field of sports, when coaches can give feedback and encouragement to skills, they can meet the competence needs of athletes, thus promoting task orientation [43]. Similarly, the competence support of significant others can directly influence an individual's self-efficacy [13]. SDT suggests that the self-perception of competence is closely related to the degree to which competence needs to be satisfied, which will determine the degree of task engagement and flow experience [5, 44].

1.3. The Present Study

Although the concept of competence has been included in previous studies when examining the relationship between coaches' behavior and athletes' motivation and engagement, little research has integrated tested the sequence of the relationship between competence motivation and athlete engagement. The research on the engagement of Chinese high school football players holds significant practical importance, particularly in the context of the pressing need to enhance campus football participation. In view of this, with competence as the core concept, we evaluated not only competency-supportive coaching behavior, but also athletes' task orientation and self-efficacy, aiming to investigate the relationship between perceived coach's competency support, task orientation, self-efficacy and athlete engagement. This can help researchers and practitioners to gain a better understanding of the mechanisms, by which competence support influences athlete engagement, and provide a new framework for enhancing athlete engagement and promoting positive sports experiences.

Specifically, the first objective of this study was to test the direct relationship between coach competency support and athlete engagement. The second objective was to test the mediating effect of task orientation and self-efficacy on the relationship between coach competency support and engagement of Chinese high school football players (see Figure 1). Accordingly, the research questions include: (1) What is the relationship between the perceived competency-supportive coaching behavior and engagement among Chinese high school football players? (2) Does task goal orientation mediate the relationship between competency-supportive coaching behavior and engagement among Chinese high school football players? (3) Does self-efficacy mediate the relationship between competency-supportive coaching behavior and engagement among Chinese high school football players? (4) Does self-efficacy mediate the relationship between task orientation and engagement among Chinese high school football players?

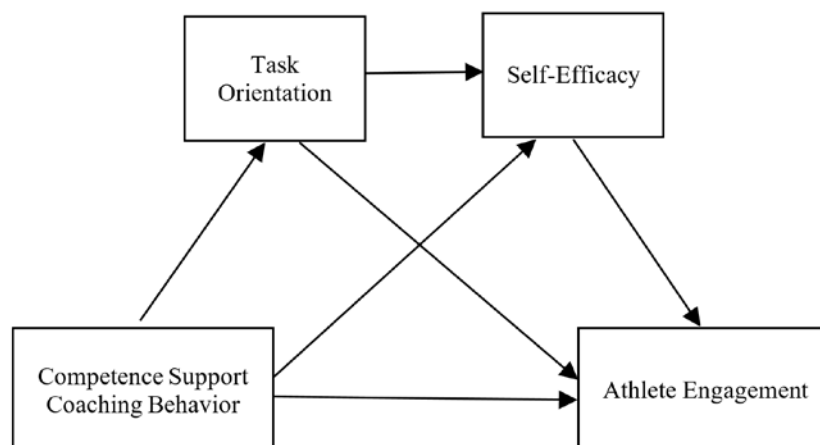


Figure 1. Research conceptual model

2. Method

2.1. Participants

The participants were 385 high school football players, with a mean age of 16.07 years ($SD = 1.15$; Range = 14-19 years; 228 boys and 157 girls), from 17 academic high schools and vocational high schools (13 boys' and 7 girls' soccer teams) in Zhaoqing, China. These athletes were selected from 45 boys' and 27 girls' football teams from 36 academic high schools and 9 vocational high schools using proportional stratified random sampling based on school type and gender. Specifically, 13 boys' teams and 7 girls' teams were randomly selected by gender, a ratio of 45:27. Next, 10 academic and 3 vocational high school football teams were randomly selected by school type, with a ratio of 36:9. The independent sample t-test results showed no significant differences in any variable between football players of different genders and school types ($p > 0.05$). In addition, all participants participated in at least one season of training and competition and covered football players positions, with 10% (39) as goalkeepers, 34% (131) as defenders, 25% (98) as midfielders, and 30% (11) as forwards.

2.2. Instruments

Competence-supportive coaching behavior. The subscale of The Interpersonal Behaviours Questionnaire (IBQ) in Sport, developed by Rocchi et al. [45], was used to evaluate the coach's competence support. There were four observed items in this subscale, for example: "My coach encourages me to improve my skills" and "My coach tells me that I can accomplish things". The athletes used a 7-point scale to rate each question, with 1 indicating do not agree at all and 7 indicating completely agree. According to this study, the questionnaire had a Cronbach's coefficient of 0.88, which is considered to be a good indicator of internal consistency reliability. The results of confirmatory factor analysis (CFA) also showed that the model fits well, $\chi^2 = 1.982$, $\chi^2/df = .991$, CFI = 1.000, TLI = 1.000, RMSEA = .000, SRMR = .005.

Task orientation. The athletes' task orientation was evaluated using 7 items in the Chinese version of the Task and Ego Orientation Questionnaire (TEOSQ) adapted by Chinese researchers Chen and Si [47] from Duda and Nicholls [46]. For example, "Something I learn makes me want to go practice more", to assess task orientation. The athletes were asked to rate each question on a 5-point scale, with 1 indicating strong disagreement and 5 indicating strong agreement. The questionnaire used in this study had a Cronbach's coefficient of 0.82, which suggests that it was highly reliable, and the CFA results also showed good model fit, $\chi^2 = 189.171$, $\chi^2/df = 2.956$, CFI = .963, TLI = .954, RMSEA = .072, SRMR = .044.

Self-efficacy. The athletes' self-efficacy was evaluated with the Self-efficacy Questionnaire for Soccer (SEQ-S),

which was modified by Munroe-Chandler et al. [48] from the SEQ developed by Mills et al. [49]. The questionnaire consists of 5 items, such as "I am confident I can work through difficult situations". The athletes were asked to rate questions on a scale of 1 to 5, where 1 indicated strong disagreement and 5 indicated strong agreement. The questionnaire demonstrated a high level of internal consistency ($\alpha = 0.82$). Meanwhile, the CFA results showed an adequate model fit, $\chi^2 = 6.850$, $\chi^2/df = 1.370$, CFI = .998, TLI = .996, RMSEA = .031, SRMR = .014.

Athlete engagement was evaluated employing the Athlete Engagement Questionnaire (AEQ) developed by Lonsdale et al. [50]. The questionnaire contains four sub-dimensions, namely confidence, dedication, enthusiasm, and vigor. For example, "I believe I am capable of accomplishing my goals in sport", "I am dedicated to achieving my goals in sport", "I feel energized when I participate in my sport", and "I feel excited about my sport". The athletes answered all questions on a 5-point scale to measure how frequently they have experienced these feelings over the past three months. Cronbach's coefficients of these subscales ranged from 0.88 to 0.90, indicating good reliability, and further analysis of the second-order CFA showed an acceptable model fit, $\chi^2 = 255.660$, $\chi^2/df = 2.557$, CFI = .965, TLI = .958, RMSEA = .064, SRMR = .042.

2.3. Procedure

Since the participants in this study were Chinese high school football players, we first employed the back-translation method [51] to translate the competency-supportive interpersonal behavior questionnaire, the self-efficacy questionnaire for soccer, and the athlete engagement questionnaire into Chinese. Second, we conducted a pilot study of 30 high school football players who were not involved in the formal survey to ensure that the translated questionnaire was clear, accurate, and appropriate for Chinese culture. Finally, data were collected based on standard procedures and ethical considerations through a structured questionnaire. The study was approved by the Research Ethics Committee of Sultan Idris Education University. The questionnaire survey was conducted with the permission of the local education bureau, school principals, and coaches. The study's purpose, anonymity, and data confidentiality procedures were communicated to both participants and their parents or guardians. All participants participated voluntarily in the survey, and the informed consent forms were signed and returned by both athletes and their respective parents or guardians.

2.4. Data Analysis

In this study, the data analysis was conducted using SPSS 25 and AMOS 24. Several steps were planned as follows: First, descriptive statistics and correlation analysis

were conducted for the data obtained. Prior to this, data screening (e.g., missing value assessment, outlier detection, and normality assessment) was performed, and CFA was used to test the reliability and validity of the measurement model before evaluating the proposed structural model, as suggested by Anderson and Gerbing [52]. To answer the questions proposed in this study, we used structural equation modelling (SEM) analysis and established a multivariate mediation model to evaluate the direct effects of competency-supportive coaching behavior on athlete engagement, as well as the indirect effects of task orientation and self-efficacy. In the structural model, competency-supportive coaching behavior was the predictive factor, task orientation and self-efficacy were the sequential mediating factors, and athlete engagement was the outcome factor. Considering that the product of unstandardized path coefficients of quantified mediating variables does not conform to the assumption of normal distribution, this study used bootstrapping, a nonparametric resampling process, to evaluate the mediating effect [53].

The parameter estimation of both the measurement and structural models was determined using the maximum likelihood method. To test fit validity, we utilized multiple goodness-of-fit indexes recommended by Hair et al. [54], Kline [55], and Jackson et al. [56]. These indexes included chi-square (χ^2), normed chi-square (χ^2/df), comparative fit index (CFI), Tucker-Lewis index (TLI), root-mean-square error of approximation (RMSEA), and standardized root mean residual (SRMR). Moreover, if the normed chi-square values are below 3, and the values for CFI and TLI are 0.95 or higher, while the values for RMSEA and SRMR are 0.08 or lower and 0.05 or lower respectively, it can be concluded that the hypothesis model fits well with the observed data [54].

3. Results

To ensure the accuracy of subsequent SEM analysis, the obtained data were screened, namely, missing value assessment, univariate and multivariate outlier detection, and normality assessment. In 32 items of the original sample ($N = 385$), although there was data missing, the missing rate was less than 1%, and the analysis showed that these missing values were random and irregular. To reduce missing data, we used the Bayesian methods built into Amos to interpolate missing data from observed items [57]. We identified univariate outliers by checking the frequency distribution of histogram, box graph and standardized Z-score. After the 6 cases with potential outliers were deleted, the Z-score of all observed items was within the absolute value of 4. Subsequently, based on the Mahalanobis D^2 measure, no potential multivariate outliers are detected in this study [54]. For the normality

assessment, the skewness value was between $-.839$ and $-.415$, and the kurtosis value was between $-.557$ and $.218$, indicating that the data conform to the normal distribution [54].

Next, descriptive statistics and correlation analysis between variables were performed. As shown in Table 1, on a 7-point scale, the mean score of perceived coaches' competence support by athletes was 6.007, with a standard deviation of .919, indicating that participants believed their coaches were exhibiting a high level of competence-supportive coaching behavior. In the 5-point scale of task orientation, self-efficacy and athlete engagement, respondents reported an average score of 4.272 ($SD = .654$) for task orientation, 3.916 ($SD = .719$) for self-efficacy, and 4.327 ($SD = .629$) for athlete engagement. These scores also indicated that respondents showed a high level of task orientation, self-efficacy and athlete engagement. All bivariate correlation estimates were statistically significant ($p < .01$). The correlation between self-efficacy and engagement ($r = .661$), task orientation and engagement ($r = .643$) was the strongest, while the correlation between competence-supportive coaching behavior and task orientation ($r = .280$), competence-supportive coaching behavior and self-efficacy ($r = .371$) was the weakest (see Table 1). These results showed that there was no multicollinearity problem between variables and no uncorrelated variables [58].

Prior to analyzing the structural model, the CFA was performed on the measurement model (i.e., perceived competence support, task orientation, self-efficacy, and athlete engagement) based on the two-step approach recommended by Anderson and Gerbing [52]. As shown in Table 2, all standardized factor loadings were found to be statistically significant ($p < .001$), ranging from .705 (TO2) to .894 (CS1), so all items were retained [54]. Subsequently, the overall measurement model results showed an adequate data fit, $\chi^2 (164) = 282.586$, $p < .001$, $\chi^2/df = 1.723$, CFI = .977, TLI = .974, RMSEA = .044, SRMR = .034. Although the p -value was significant, this problem may be caused by the large sample size of this study [59]. The AVE estimates ranged from .590 to .764, and item reliability ranged from .518 to .799, all exceeding the 0.5 standard. Composite reliabilities ranged from .878 to .928, all exceeding the 0.7 standard. Cronbach's α coefficient (.877~.927) also obtained similar results (see Table 1). Taken together, the data analysis results support the convergence validity of the measurement model. In addition, as shown in Table 1, the arithmetic square roots of AVE were greater than the absolute value of the correlation coefficient, indicating that there were differences and discriminant validity among the variables [60].

Table 1. Descriptive analysis, correlation, reliability, and discriminant validity (n = 379)

	Mean	SD	Skewness	Kurtosis	α	1	2	3	4
1. Competence-supportive coaching behaviour	6.007	.919	-.839	.218	.927	.874			
2. Task orientation	4.272	.654	-.598	-.557	.920	.280**	.792		
3. Self-efficacy	3.916	.719	-.415	-.271	.877	.371**	.455**	.768	
4. Athlete engagement	4.327	.629	-.710	-.460	.903	.407**	.643**	.661**	.836

Note: N = 379. Diagonal elements in bold are the square root of AVE; The elements below the diagonal in the matrix are the Pearson correlation coefficients between the latent constructs; ** p < 0.01

Table 2. CFA results for the measurement model

Construct	Item	Parameter Significance Estimation				Convergent Validity			
		Unstd.	S.E.	t-value	P	Std.	SMC	CR	AVE
Competence-supportive coaching behavior	CS1	1.000				.894	.799	.928	.764
	CS2	.957	.039	24.799	***	.886	.785		
	CS3	1.031	.043	23.946	***	.871	.759		
	CS4	.994	.044	22.469	***	.843	.711		
Task orientation	TO1	1.000				.754	.569	.922	.628
	TO2	.868	.062	14.026	***	.705	.497		
	TO3	1.043	.064	16.297	***	.805	.648		
	TO4	.966	.058	16.601	***	.818	.669		
	TO5	1.010	.058	17.541	***	.857	.734		
	TO6	.900	.063	14.367	***	.720	.518		
	TO7	1.084	.061	17.892	***	.872	.760		
Self-efficacy	SE1	1.000				.742	.551	.878	.590
	SE2	.967	.068	14.189	***	.751	.564		
	SE3	.907	.062	14.512	***	.767	.588		
	SE4	1.087	.069	15.637	***	.826	.682		
	SE5	.927	.065	14.232	***	.753	.567		
Athlete engagement	CON	1.000				.870	.757	.903	.699
	DED	.979	.048	20.556	***	.835	.697		
	ENTH	.878	.044	20.044	***	.823	.677		
	VIG	.867	.044	19.784	***	.816	.666		

Note: N = 379. Unstd = unstandardized factor loading; S.E. = standard error; t-value = critical ratios; *** p < .001; Std = standardized factor loading; SMC = item reliability; CR = composite reliability; AVE = average variance extracted.

The results of structural model analysis evaluated the path coefficients between variables and the proportion of variance explained by exogenous variables (see Figure 2). As expected, competence-supportive coaching behavior had a significant positive effect on task orientation ($\beta = .280$, $t = 5.018$, $p < .001$), self-efficacy ($\beta = .264$, $t = 4.882$, $p < .001$), and athlete engagement ($\beta = .135$, $t = 3.088$, $p < .01$), while task orientation had a significant positive effect on self-efficacy ($\beta = .381$, $t = 6.501$, $p < .001$), and task orientation ($\beta = .413$, $t = 8.013$, $p < .001$) and self-efficacy ($\beta = .423$, $t = 7.888$, $p < .001$) had a

significant positive effect on athlete engagement. In addition, squared multiple correlations (R^2) were also considered as an indicator to measure the effect size of the predicted endogenous variables. The R^2 of athlete engagement was .60, indicating that competence-supportive coaching behavior, task orientation, and self-efficacy as predictors of athlete engagement explain 60% of the variance. Taken together, the research model proposed had strong statistical power in explaining athlete engagement.

This research further tested the direct and indirect effects

of competence-supportive coaching behavior on athlete engagement. As shown in Table 3, the findings of the mediating effect indicated that the direct effect of competency-based coaching behavior on athlete engagement is statistically significant ($\beta = .135, p < .001$), and that competence-supportive coaching behavior has a positive indirect effect on athlete engagement via task orientation ($\beta = .116, p < .001$) or self-efficacy ($\beta = .112, p$

$< .001$). Moreover, competence-supportive coaching behavior indirectly but positively predicts athlete engagement via task orientation and self-efficacy ($\beta = .045, p < .001$). All the bootstrapping confidence intervals did not contain the value zero, which further proved the direct and indirect effects of competence-supportive coaching behavior on athlete engagement, and also indicated that the structural model was a partially mediated model.

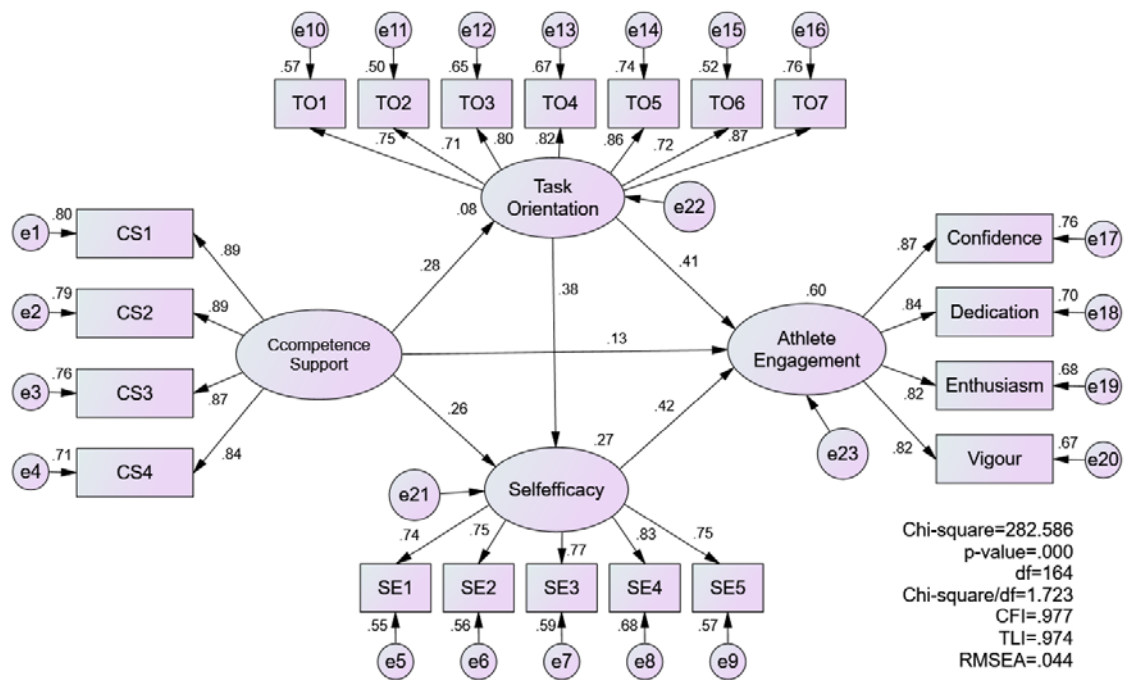


Figure 2. Results of structural model analysis with standardized coefficients and R²

Table 3. Direct, indirect, and total effects of statistical model

Relationships	Point estimation			Bootstrapping				P	
	B	S.E.	Z	β	BC 95% CI		Percentile 95% CI		
					Lower	Upper	Lower	Upper	
Specific indirect effect									
CS→TO→AE	.083	.020	4.150	.116	.049	.129	.047	.125	.000
CS→SE→AE	.081	.023	3.522	.112	.045	.134	.041	.129	.000
CS→TO→SE→AE	.033	.010	3.300	.045	.018	.058	.016	.054	.000
Total indirect effect									
CS → AE	.197	.031	6.355	.272	.141	.267	.137	.261	.000
Direct effect									
CS → AE	.097	.036	2.694	.135	.027	.169	.027	.168	.006
Total effect									
CS → AE	.294	.042	7.000	.407	.214	.380	.211	.376	.000

Note: N = 379. 5,000 bootstrap sample; B = Unstandardized point estimation. β = Standardized point estimation; SE = standard error; BC = bias corrected; CI = confidence interval; CS = competence-supportive coaching behavior; TO = task orientation; SE = self-efficacy; AE = athlete engagement.

4. Discussion

This study aimed to investigate the relationship between the perceived competence support of coaches and their competence motivation (task orientation and self-efficacy) and engagement among Chinese high school football players. Under the guidance of Harter's (1978) effectance motivation, we proposed that athletes' task orientation and self-efficacy would serve as mediators between competence-supportive coaching behavior and athlete engagement. The structural equation modelling analysis method was employed to answer four specific research questions developed in this study. In general, the results supported the sequence of relationships between constructs presented by the research model, and further specify the impact of athletes' perceived competency-supportive coaching behavior on engagement directly, and indirectly through task orientation and self-efficacy.

As for the first research question to be answered (i.e., what is the relationship between competency-supportive coaching behavior and athlete engagement), the research findings suggest that competency-supportive coaching behavior had a direct positive effect on athlete engagement. This finding supported the assumption of self-determination theory and was consistent with the results of previous studies in the field of sports [42], which suggested that structure support (i.e., competence support) had a direct impact on an individual's behavioral engagement. Specifically, this means that the coach's expectations, skill guidance, encouragement, and positive feedback can directly and effectively promote athlete engagement. Moreover, this finding partially confirmed the conclusion of Van den Berghe et al. [41], namely, there is a positive correlation between an individual's behavior and emotional engagement and the need for support. Furthermore, it was found that there was a moderate correlation between competency-supportive coaching behavior and athlete engagement ($r = .407, p < .01$), while the path coefficient between competence-supportive coaching behavior and athlete engagement ($\beta = .135, p < .01$) was relatively small, suggesting that the mediators between them had a greater degree of indirect effect, which also fully indicated the importance of coaches' competence support because it can not only directly predict athletes' engagement, but also promote the motivational process of their engagement.

Next, this study discussed how competency-supportive coaching behavior influences athlete engagement through task orientation and self-efficacy, and these findings corresponded to three other research questions. On the one hand, this study found that athletes' task orientation had a specific mediating effect between perceived competence-supportive coaching behavior and engagement (i.e., research question 2). The relationship between competency-supportive coaching behavior, task orientation, and athlete engagement confirmed previous studies in sports and other fields that competency support

of significant others can predict individual task orientation, and thus promote their engagement [13]. Previous research showed that task orientation focuses on mastery of knowledge or skills [23], and that skill instruction, encouragement, and positive feedback provided by coaches may be antecedents that foster this key element. When athletes experience a competency-supportive coaching climate, they may be more inclined to task orientation, for instance, the satisfaction of athlete's need for competence will promote their task orientation [43]. Moreover, several previous studies showed that task orientation was a predictor of athlete engagement [24, 26, 28], which was consistent with the findings of this study. Taken together, competency-supportive coaching creates a mastery motivation climate for athletes, which prompts athletes to perceive ability and success from more self-referential perspectives, taking skill improvement and task mastery as the most important goals. Then, athletes' task orientation in turn promotes their engagement level during training or competition.

On the other hand, the findings of this study also showed that self-efficacy had a specific mediating effect between perceived coach's competence support and athlete engagement (i.e., research question 3), and between task orientation and athlete engagement (i.e., research question 4). These results were consistent with previous research evidence that perceived competence-supportive coaching behavior can not only indirectly influence athlete engagement through self-efficacy [14], but also predict self-efficacy through task orientation, which in turn influences athlete engagement [23, 28]. Specifically, the skills instruction, encouragement, and positive feedback provided by the coach can make the athlete confident to overcome difficulties, confident to face challenges, and able to maintain focus, tenacity, and self-control [48], which determines the degree of athlete engagement during training or competition. Similarly, self-efficacy represents the expected level of performance and skill, while task-oriented athletes tend to be more interested in skill mastery, put effort into it, and practice more skills as their goal [47], therefore, this should be a key determinant of self-efficacy.

Overall, perceived competency-supportive coaching behavior partially mediated athlete engagement through task orientation and self-efficacy. All three mediating effects were statistically significant, suggesting that task orientation and self-efficacy may be the key mediators to explain how a coach's competence support influences athletes' engagement, which is conducive to understanding the mechanism of influencing the process of behavior outcome. Therefore, the results highlight the important role of athletes' ability motivation, while recognizing the interrelationship between perceived competence-supportive coaching behavior, task orientation, self-efficacy, and athlete engagement. It is suggested that coaches give full play to the competency-supportive

coaching style during training or competition, and further enhance the participation of Chinese high school football players by improving their task orientation and self-efficacy.

4.1. Contributions and Implications

This study reveals that perceived competence-supportive coaching behavior can improve athletes' engagement directly or indirectly by promoting task orientation and self-efficacy. The research findings have guiding significance for improving the engagement level of Chinese high school football players and the coaching practice of coaches. On the one hand, coaches should embed the characteristics of competency support in training or competition, including that they should provide adequate information before training or competition, clarify their expectations, provide clear guidelines, and provide help during the proposed training or competition, as well as provide positive feedback after the training or competition is completed. These are important predictors of an athlete's goal orientation and self-efficacy, as well as their sport participation. As Ryan and Deci [40] state, "Having feedback and guidance, rather than control or direction, can help a person feel more purposeful and confident in bringing about potential change". On the other hand, coaches should pay attention to the important role of goal orientation and self-efficacy of athletes. Focus on the training of athletes' task orientation, encourage them to master skills through more practice, cultivate their interest, and other strategies to promote their self-efficacy, so as to achieve the improvement of their level of engagement in training or competition.

4.2. Limitations and Future Research

Admittedly, this study has certain limitations. First, this research was a cross-sectional study and lacked longitudinal data to accurately infer the causal relationship between these constructs. Further studies should investigate whether the relationship between perceived competency-supportive coaching behavior, task goal orientation, self-efficacy, and athlete engagement will vary over time. Secondly, the construct measurement only used the data collected by the self-report method. Future studies will consider using multi-agent reports, such as coaches' self-reported competence support and coaches' inferred task orientation, self-efficacy, and engagement level of athletes, or other objective indicators, which can help reduce the measured deviation. Third, this study captured only part of the competence element. Future studies need to consider more comprehensive predictive models, including positive and negative path analysis, as well as other environmental factors such as parents and peers. Fourth, future research needs to give more thought to how athlete engagement is conceptualized theoretically and operationally. In fact, the operational definition of the

concept of athlete engagement has embedded elements of task goal orientation and self-efficacy, that is, some observed variables may overlap, which may therefore limit findings to some extent. Finally, although this study adopted a proportional stratified random sampling method and the sample size was large enough, the participants were only from one region of China and its universality may be limited. Therefore, it is necessary to consider a larger range of samples in future research.

5. Conclusions

Returning to the questions posed by this study, it can now be concluded that athletes' perceived competency-supportive coaching behavior, task orientation, and self-efficacy emerged as reliable predictors of athlete engagement. Moreover, these results support the independent and chain-mediating effects of task orientation and self-efficacy. According to the study's findings, coaches need to possess competency-supportive skills such as assisting athletes in identifying obstacles and setting goals, promoting an internal evaluation system, giving clear and relevant feedback, encouraging self-reflection, and providing pertinent information to improve their training and professional development. This structural coaching is a prerequisite for promoting athletes' motivation and engagement and enhancing our understanding of competency motivation and engagement. In conclusion, the findings of this research hold significant implications for the participation of athletes in training or competition practice.

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