ORIGINAL ARTICLE

Coaches' emotional intelligence and athletes' psychological need satisfaction in taekwondo: Coaching behaviour as a mediator

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A Study Design
B Data Collection
C Statistical Analysis
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Abstract

Background and Study Aim: Coaches' role in sports is crucial. Their emotional intelligence and behaviour affect athletes' motivational processes. This study cognitive aim is knowledge about the interrelations among emotional intelligence, coaching behaviour and psychological need satisfaction.

Material and Methods: Participants were 228 taekwondo athletes registered in a South Korean university federation. Data included athletes' perceptions of their coaches, measured and collected using the Emotional Intelligence Scale, Controlling Coaching Behavior Scale, Autonomy-Supportive Scale and Psychological Need Satisfaction Scale.

Results: First, emotional intelligence positively predicted psychological need satisfaction and autonomy-supportive behaviour and negatively predicted controlling coaching behaviour. Second, controlling coaching behaviour negatively predicted psychological need satisfaction. We did not find a mediating effect of coaching behaviour on the relation between emotional intelligence and psychological need satisfaction.

Conclusions: Emotional intelligence was found as a positive predictor of PNS and AS and a negative predictor of CCB. Only CCB was negatively associated with PNS. However, we did not find the mediating effect of AS and CCB. These findings show that coaches' EI could be a key characteristic in enhancing coaching effectiveness as they show their athletes more supportive and not controlling behaviours, thus satisfying their athletes' psychological needs. Therefore, we should consider EI as part of coaching skills and educate the public on its importance

Keywords: coaching effectiveness • emotional skills • intrinsic motivation • motivation • self-determination

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Coach – *noun* someone who trains sports players or athletes ■ *verb* to train someone in [43].

Coaching – *noun* the activity or profession of training sports players or athletes [43].

Emotional intelligence – one's ability to perceive, express, understand, and regulate emotions in the self and others [12]

Self-determination theory – a theory of intrinsic motivatinal process in social relationships which emphasizes human autonomy [2].

Basic psychological need satisfaction – a mini-thoery under self-determinationa theory, which represents autonomy, competence and relatedneed to be satisfied in human being's well-being [2].

Motivation – *noun* **1.** the act of giving somebody a reason or incentive to do something **2.** a feeling of enthusiasm, interest, or commitment that makes somebody want to do something, or something that causes such a feeling **3.** the biological, emotional, cognitive, or social forces that activate and direct behaviour [43].

Intrinsic motivation – *noun* motivation to achieve a goal for reasons of pride, enjoyment and self-worth [43].

Performance – *noun* the level at which a player or athlete is carrying out their activity, either in relation to others or in relation to personal goals or standards [43].

Skill – *noun* an ability to do perform an action well, acquired by training [43].

INTRODUCTION

A coach is a key participant in team effectiveness. They not only contribute to athletes' skill development, beliefs and attitudes but also influence their life through their expectations, goals, values and beliefs in various ways [1]. Horn provided a working model of coaching effectiveness that highlights coaches' roles in athlete performance and psychological readiness in a competition and training context. Therefore, addressing coaches' behaviour and emotional skills is important with respect to athletes' psychological needs [1]. Grounded both in basic psychological needs theory [2] and the coaching effectiveness model [1], this present work seeks to explore basic psychological need satisfaction in a large sample of taekwondo athletes through two predictors: coaches' emotional intelligence and autonomy-supportive and controlling coaching behaviour.

Basic psychological needs theory, under self-determination theory [2], provides a conceptual framework in which athletes' psychological needs should be emphasised and studied in relation to coaching style. Athletes' basic psychological needs that require satisfaction include autonomy, competence and relatedness, which are motivation-related antecedents within social environments that help athletes facilitate positive and adaptive outcomes [3, 4]. Ryan [5] posited that relatedness satisfaction refers to one's sense of belonging and feeling connected to others in a group, competence satisfaction involves feeling capable of achieving one's desired goals in a social context, and autonomy satisfaction pertains to one's complete willingness to participate in a certain activity via self-determination. The satisfaction of basic psychological needs motivates one's internal process in meeting individual challenges [6]. For example, athletes face difficult tasks such as intensive training and pressure to win in a competitive environment, which may be influenced by the intertwined processes of basic psychological need satisfaction and intrinsic motivation. This shows that athletes' performance and motivation may fluctuate depending on the extent to which their needs are satisfied.

Sports studies have investigated athletes' basic psychological need satisfaction with respect to coaching behaviours. Certain coaching behaviours (e.g. autonomy support, pressure to win, intimidation, negative feedback, etc.) are directly related to athletes' psychological need satisfaction [7-9]. For example, Amorose and Anderson-Butcher [10] found the interactive effect of autonomy-supportive and controlling coaching behaviour on psychological need satisfaction in motivating adolescent athletes. Using hierarchical regression analysis, Amorose and Anderson-Butcher used autonomy-supportive behaviour and controlling behaviour as independent predictors in the first step and their interaction term (i.e. multiplying the two variables) in the second step. The significant coefficients of autonomy-supportive behaviour were 0.31, 0.46 and 0.54 for competence, autonomy and relatedness, respectively, while those of controlling behaviour were −0.21 for autonomy and −0.18 for relatedness. The interaction between the two different coaching styles revealed a negative effect on competence (−0.12) and autonomy (−0.13), but R^2 changes in the second model were minimal. These results suggested that basic need satisfaction, which is associated with athletes' adaptive and intrinsic motivational processes, can fluctuate depending on specific coaching behaviours.

In addition, emotional skills can be a key antecedent in the relation between coaching behaviour and athletes' intrinsic motivation as coaches' unpredictable, unstable and debilitative emotional responses do not lead to a facilitative coach–athlete relationship [11]. Legendary basketball coach John Wooden asserted that a coach in a competitive sport should be aware of their own emotional state and effectively regulate it to foster better relationships with athletes and enhance their performance. A coach's skills in dealing with emotions around athletes in a competitive setting are conceptualised by emotional intelligence (EI), which refers to one's ability to perceive, express, understand and regulate emotions in the self and others in general. Bar-On [12, p. 14] defined EI as 'an array of non-cognitive capabilities, competencies and skills that influence one's ability to succeed in coping with environmental demands and pressures'. These abilities can be understood in the personality domain with behavioural dispositions and self-perception in such skills as regulating, identifying/appraising, and utilising emotions that we may feel every moment in a specific situation [13, 14]. To build effective teams, coaches are encouraged to identify and assess their own and their athletes' emotional responses by regulating and utilising such emotions so that they can achieve a particular goal (e.g., changing mood and showing enthusiasm to encourage athletes).

As such, in the sports coaching context, EI has been studied as a key contributor to leadership [15]. Coaches may use their EI to facilitate interpersonal relationships with athletes, which may directly and/or indirectly influence effective team functioning and performance outcomes. Laborde et al. [16], in their review of EI and sport coaching research, suggested that EI could enhance coaching effectiveness by shaping coaching behaviour, coaching efficacy and coach–athlete relationships. Coaches' higher abilities in regulating and appraising their own emotional state were associated with better coaching efficacy and positive coaching behaviour [17]. Specifically, their ability to perceive and manage their emotion was positively associated with training and instruction, social support and situational consideration behaviours in Chelladurai's leadership model [18], which are key variables in coaching effectiveness [19]. A coach's lack of self-awareness in their emotional experience may lead to sudden changes in their coaching behaviour to overcome important situations such as championships, which would put more pressure on athletes. Since coaching behaviour may be shaped by negative emotional states such as anger, frustration and disappointment, a coach needs to regulate such emotional dispositions to facilitate coach–athlete interactions and use the negative emotion as a cue to direct attention to decreasing cognitive processes when making better team decisions [15].

Studies on the relation between coaches' EI and athletes' basic need satisfaction have recently commenced. For example, Watson and Kleinert [20] reported a significant correlation between coaches' EI and competence and relatedness among German youth athletes. Specifically, according to multilevel modelling analysis, coaches' emotional control led to higher relationship strength, and athletes' perceived autonomy support in coaching behaviour was higher in teams whose coaches have higher EI (i.e. emotional well-being). These results suggested that coaches' ability to deal with their emotional responses may help satisfy athletes' psychological needs, which may also be linked to the latter's increased motivation and optimal performance.

In summary, empirical research is insufficient with regard to the role of coaches' EI and behaviours in athletes' basic need satisfaction. The few studies that do exist provide useful insights and empirical results regarding the importance of EI in effective sports coaching (e.g. [15-17, 21, 22]) but have not examined EI's direct effect on athletes' intrinsic motivation. This study defines intrinsic motivation as the basic psychological need satisfaction under the theoretical tenet of self-determination [2]. Thus, we examine EI's potentially important role in coaching behaviour and athletes' internal motivational processes.

This study cognitive aim is–knowledge about the interrelations among emotional intelligence, coaching behaviour and psychological need satisfaction. The main research tasks are to verify the following hypotheses:

- H1. Coaches' EI shows positive and negative relations with autonomy-supportive and controlling behaviours, respectively.

- H2. Coaches' EI and coaching behaviours (autonomy supportive or controlling) directly predict athletes' basic need satisfaction.

- H3. Autonomy-supportive and controlling coaching behaviours mediate the relation between EI and the basic psychological need satisfaction.

MATERIAL AND METHODS

Participants

Study participants consisted of 228 taekwondo athletes who had registered for South Korea's University Taekwondo Federation Championship. They were recruited via convenience sampling in which they were invited to participate via e-mail. Of the participants, 164 were male and 64 were female, aged 20 to 25 (M = 21.59 ±1.16). Their taekwondo careers have an average of 3.82 years, with more than 43% of the participants at level 4 and above.

Measures

Emotional intelligence (EI). The *Emotional Intelligence Scale* [23], which was originally developed to measure individuals' EI, showed an acceptable construct validity (CFI = 0.94, TLI = 0.92, SRMR = 0.05) and reliability (0.76 to 0.89). Lee [24] validated the scale's Korean version, whose reliability ranged from 0.859 to 0.939 for each dimension. This scale examines athletes' perception of their coaches' EI during practices and competitions. It consists of 4 subdimensions with 15 items assessed using

a 7-point Likert scale from 1 (totally disagree) to 7 (totally agree). The subdimensions are *Self-emotion Appraisal* (SEA) with four items (e.g., "My coach has a good understanding of his or her own emotions"), Others' Emotion Appraisal (OEA) with four items (e.g., "My coach is a good observer of others' emotions and feelings"), *Regulation of Emotion* (ROE) with three items (e.g., "My coach has an ability to control own emotions") and Use of Emotion (UOE) with four items (e.g., "My coach is a good motivator").

Controlling coaching behaviour (CCB). Bartholomew et al. [25] developed a scale (CFI = 0.96, NNFI = 0.95, SRMR = 0.06, and RMSEA = 0.05) to evaluate coaches' controlling interpersonal style during practices and competitions, and the Korean version of the 15-item *Controlling Coaching Behaviour Scale* has been validated as well (K-CCBS) [26]. All four subscales demonstrated an acceptable factorial model (CFI = 0.92, TLI = 0.90, RMSEA = 0.08), with composite reliability coefficients ranging from 0.757 to 0.843. K-CCBS assesses athletes' perception of their coaches' behaviour using a 7-point Likert scale from 1 (totally disagree) to 7 (totally agree). It has four subdimensions: *Controlling Use of Rewards* (CUR) with four items (e.g., "The only reason my coach rewards/praises me is to make me train harder"), *Conditional Regard* (CR) with four items (e.g., "My coach is less supportive of me when I am not training and competing well"), *Intimidation* (IT) with four items (e.g., "My coach shouts at me in front of others when I couldn't do a given thing perfectly during practice or competitions") and *Excessive Personal Control* (EPC) with three items (e.g., "My coach tries to control what I do during my free time").

Autonomy support (AS). Coaches' autonomy-supportive coaching style was measured using the Autonomy Support Scale (ASS [27]), which was based on the original work of Williams et al. [28]. While the original version has 15 items, we used the short, six-item version to assess how athletes perceive their coaches' supportive style to autonomy. Both the original and revised versions of the ASS showed high internal consistency coefficients (0.87 to 0.91). The ASS uses a 7-point Likert scale from 1 (totally disagree) to 7 (totally agree) (e.g., "My coach gives me a choice and an opportunity when I practice taekwondo").

Psychological need satisfaction (PNS). Wilson et al. [29] developed a measure for the three psychological needs derived from self-determination theory (SDT) (CFI = 0.94, IFI = 0.94, SRMSR = 0.07, RMSEA = 0.09) with 18 total items consisting of Autonomy (6), Competence (6), and Relatedness (6). To assess the study participants' perceived PNS, we slightly adapted the items to the taekwondo practice setting with the subfactors *Autonomy* (4 items), *Competence* (4 items) and *Relatedness* (4 items) based on the fit indices to evaluate the revised PNS measurement model (CFI = 0.95, IFI = 0.95, RMSEA = 0.08). Athletes rated their perception of autonomy (e.g., "I feel free to choose which exercises I participate in the taekwondo practice from my coach"), competence (e.g., "I feel like I am capable of doing well during the taekwondo practice from my coach") and relatedness (e.g., "I feel like I am an important person when I am being with my friends from my coach") using a 7-point Likert scale from 1 (not true at all) to 7 (very true).

Data analysis

We analysed data in two stages [30]. In the first stage, we used IBM SPSS version 23 to implement descriptive statistics (i.e. mean and standard deviation) and bivariate correlations between latent variables (i.e. EI, CCB, AS and PNS) to determine whether the data were normally distributed and that sufficient relations existed between each variable. In the second stage, we first performed confirmatory factor analysis (CFA) to explore the measurement model by estimating the indicators' factor loadings and model fit to each latent construct. Then we examined the measurement model's validity and reliability via factor loading (cut-off point: 0.40), composite reliability (CR = 0.70) and average variance extracted (AVE = 0.50) as suggested by Fornell and Larcker [31]. Afterwards, we specified the hypothesised paths in a structural model using IBM AMOS version 18 for the baseline model (Model A, refer to Figure 1).

To estimate model fit, we used the covariance matrix and the maximum likelihood estimation method; for the structural equation modelling (SEM), we used the chi-square test (χ^2). A chi-square value larger than 3.0 represents an unacceptable fit [32]. However, the chi-square test depends on sample size (i.e. a sample size of more than 200 generally rejects the model) and is susceptible to deviations from model complexity (i.e. a more complex model could lead to a good fit) and multivariate normality [33] and [34]. Therefore, model fitness included other indices such as comparative fit index (CFI),

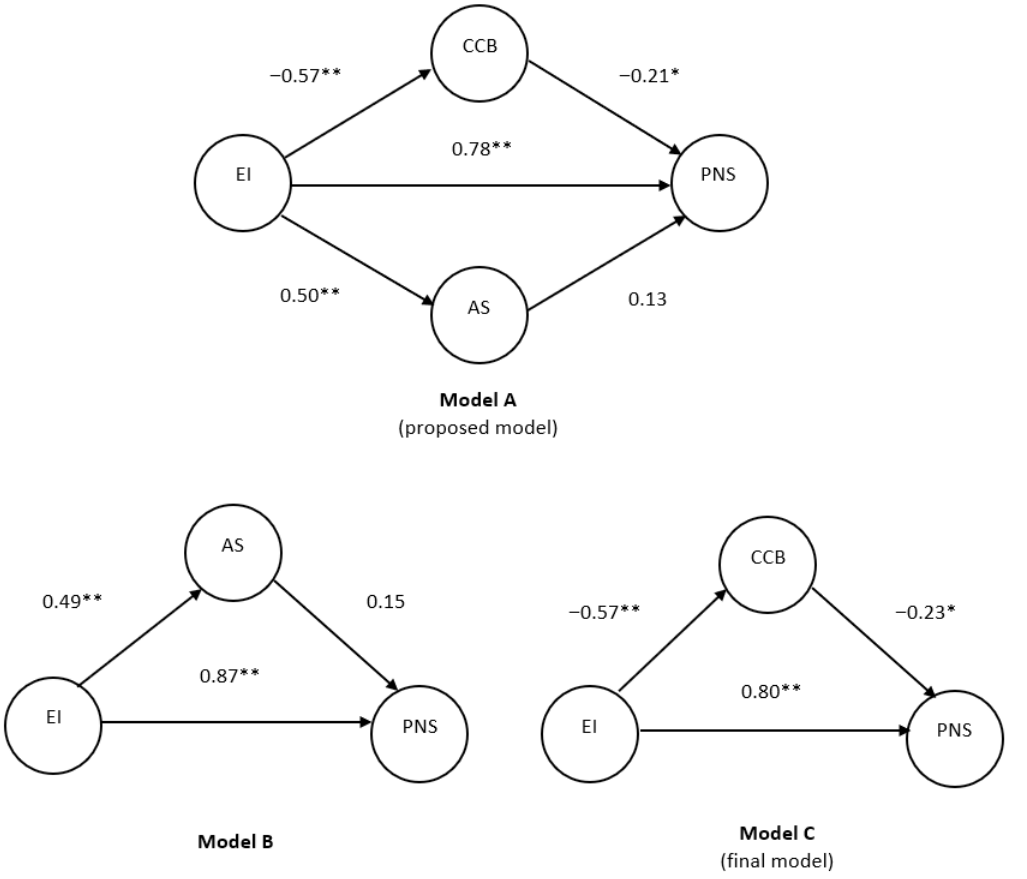

Figure 1. Structural models A, B, and C. Values are standardised coefficients. $^{**}p<0.01$, $^{*}p<0.05$. For graphical simplicity, this figure does not include all the subvariables, residual variances, and measurement model indicators (i.e. factor loading). Refer to Tables 1 and 2 for abbreviations and measurement model indicators.

Turker–Lewis index (TLI, aka non-normed fit index) and root mean square error of approximation (RMSEA). This study considered chi-square values and three indices to estimate the model fit adjustment to the data per Hu and Bentler's recommendation [34]. CFI and TLI values exceeding 0.90 and an RMSEA value of less than 0.08 generally indicate acceptable and excellent model fit [34]. In addition, we used a bootstrap resampling procedure (2,000 bootstrap samples) with 95% bias-corrected confidence intervals (CI) to test the significance of the direct and indirect effects. An indirect effect is considered significant if its 95% CI does not include zero [35].

RESULTS

Preliminary analyses

Table 1 shows descriptive statistics, bivariate correlations, skewness, kurtosis and Cronbach's alpha coefficients of the latent variables, all of which were normally distributed with reference to skewness (±2 less) and kurtosis (±7 less) [36]. In terms of overall relations, EI, AS and PNS were positively correlated with each other, but CCB showed negative relations with them, ranging from −0.137 (conditional regard–competence) to −0.474 (excessive personal control–UOE) at less than 0.05 statistical significance. In the positive relations between EI, AS and PNS, the coefficient between SEA and autonomy was highest at 0.576. The Cronbach's alpha coefficients for the latent variables, ranging from 0.726 to 0.953, indicated that the items were internally consistent for each variable.

Measurement model

To determine the measurement model of EI, CCB, AS and PNS, we performed CFA. For the default measurement model, the 15 observed measures of EI, 15 observed measures of CCB, 6 observed measures of AS and 12 observed measures of PNS were regressed on the

Table 1. Descriptive statistics and bivariate correlations of study variables (n = 228).

Variable		1	2	3	4	5	6	7	8	9	10	11	12
Emotional Intelligence	1.Others' emotion appraisal	1											
	2.Self-emotion appraisal	**0.30****	1										
	3 Use of emotion	**0.33****	**0.74****	1									
	4. Regulation of emotion	**0.24****	**0.59****	**0.69****	1								
Controlling coaching behavior	5. Controlling use of reward	−0.02	**−0.39****	**−0.42****	**−0.30****	**1**							
	6. Conditional regard	−0.05	**−0.40****	**−0.46****	**−0.38****	**0.68***	**1**						
	7. Intimidation	−0.05	**−0.36****	**−0.44****	**−0.34****	**0.66****	**0.77****	**1**					
	8. Excessive personal control	**−0.18****	**−0.58****	**−0.47****	**−0.41****	**0.52****	**0.63****	**0.70****	1				
	9. Autonomy supportive	**0.54****	**0.36****	**0.43****	**0.33****	**−0.17***	**−0.30****	**−0.31****	**−0.35****	1			
Physical need satisfaction	10. Autonomy	**0.26****	**0.58****	**0.64****	**0.50****	**−0.43****	**−0.36****	**−0.39****	**−0.46****	**.37****	1		
	11. Competence	**0.17***	**0.21****	**0.13***	0.09	**−0.19****	**−0.14***	−0.07	−0.10	**0.39****	**0.16***	1	
	12. Relatedness	**0.22****	**0.25****	**0.33****	**0.19****	**−0.17****	**−0.28****	**−0.36****	**0.40****	**0.19****	**0.29****	−0.07	1
Statistic indicators	Mean	4.76	5.29	5.50	5.24	2.71	2.43	2.39	2.30	5.21	5.54	4.39	5.43
	Standard deviation	1.13	1.06	0.99	1.11	1.36	1.24	1.26	1.26	1.22	1.01	1.52	1.60
	Skewness	−0.44	−0.32	−0.35	−0.37	0.57	0.82	0.81	0.82	−0.76	−0.44	−0.21	−0.71
	Kurtosis	−0.25	−0.55	−0.72	−0.35	−0.57	−0.28	−0.27	−0.42	.54	−0.64	−0..77	−0.76
	Cronbach's alpha	0.80	0.86	0.82	0.73	0.89	0.90	0.92	0.87	0.93	0.85	0.89	0.90

*p<0.05; **p<0.01 (two-tailed)

latent variables. We found that the fitness of the measurement model was not acceptable (χ^2 = 1946.7, df = 1014, p = 0.000, CFI = 0.879, TLI = 0.865, RMSEA = 0.064). To improve the measurement models' fit, we further examined the factor loadings to the latent variables. Some items, such as items 45 and 47 for PNS–Relatedness, were eliminated because of low factor loading (i.e. less than 0.50). Based on modification indices in AMOS, we set additional covariances between items 31 and 32, items 17 and 19 and items 40 and 41. The final measurement model demonstrated an acceptable model fit to the data (χ^2 = 1598.3, df = 919, p = 0.000, CFI = 0.909, TLI = 0.901, RMSEA = 0.057). Table 2 describes the factor loadings, CR and AVE in the final measurement model, in which all obtained values satisfied the cut-off values except for RI–ROE. However, since other criteria showed acceptable fit and the discrepancy from the cut-off point in AVE was minuscule (.02), we decided to preserve the EI–ROE variable for further analysis.

Structural equation modelling and mediation test

We specified the hypothetical paths to examine the direct and indirect effects (mediation) among the variables (Figure 1). Based on the proposed model (Model A), paths from EI to CCB, AS and PNS, and additional paths from CCB and AS to PNS were set to show a dual mediation. Model A did not show acceptable model fit (χ^2 = 350.574, df = 114, p = 0.000, TLI = 0.883, CFI = 0.902, RMSEA = 0.096). Then we tested the two mediating variables (AS and CCB) in different models. Models B and C contained only AS and CCB, respectively, as mediating variables. For AS, Model B's fitness did not satisfy the cut-off values for fit indices (χ^2 = 197.683, df = 62, p = 0.000, TLI = 0.900, CFI = 0.921, RMSEA = 0.098). As seen in Table 3, Model C was the most parsimonious model as only CCB was set as a mediating variable in the relation between EI and PNS. The obtained model fitness is as follows: χ^2 = 97.870, df = 41, p = 0.000, TLI = 0.935, CFI = 0.951, RMSEA = 0.078. EI showed a positive predictive

Table 2. Factor loadings of the final measurement model.

Latent variables	Unstandardised estimate	Standard error	t	Standardised estimate	Construct reliability	Average variance extracted
Others' emotion appraisal						
Item 1	0.812	0.078	**7.41*** **	0.683	0.806	0.518
Item 2	0.959	0.075	**12.706*** **	0.824		
Item 3	0.621	0.084	**10.433*** **	0.504		
Item 4	1.000	-	-	0.820		
Self-emotion appraisal						
Item 5	0.987	0.092	**10.737*** **	0.762	0.863	0.613
Item 6	1.088	0.093	**11.732*** **	0.839		
Item 7	1.129	0.099	**11.402*** **	0.812		
Item 8	1.000	-	-	0.712		
Use of emotion						
Item 9	0.846	0.074	**11.363*** **	0.686	0.826	0.545
Item 10	0.875	0.080	**10.997*** **	0.669		
Item 11	0.825	0.064	**12.992*** **	0.757		
Item 12	1.000	-	-	0.831		
Regulation of emotion						
Item 13	1.115	0.124	**8.976*** **	0.809	0.732	0.480
Item 14	0.968	0.124	**7.776*** **	0.647		
Item 15	1.000	-	-	0.606		
Controlling use of reward						
Item 16	1.000	-	-	0.089	0.893	0.676
Item 17	0.825	0.050	**16.657*** **	0.841		
Item 18	0.884	0.058	**15.157*** **	0.796		
Item 19	0.815	0.059	**13.913*** **	0.756		
Conditional regard						
Item 20	1.000	-	-	0.878	0.904	0.703
Item 21	0.847	0.052	**16.143*** **	0.825		
Item 22	0.782	0.050	**15.064*** **	0.809		
Item 23	0.920	0.055	**16.673*** **	0.840		
Intimidation						
Item 24	1.000	-	-	0.815	0.919	0.740
Item 25	0.926	0.059	**15.700*** **	0.865		
Item 26	0.988	0.063	**15.658*** **	0.863		
Item 27	1.037	0.063	**16.567*** **	0.896		
Excessive personal control						
Item 28	1.000	-	-	0.812	0.874	0.699
Item 29	1.015	0.069	**14.648*** **	0.865		
Item 30	1.222	0.080	**13.953*** **	0.830		

Latent variables	Unstandardised estimate	Standard error	t	Standardised estimate	Construct reliability	Average variance extracted
Autonomy supportive						
Item 31	0.932	0.076	**12.232*****	0.707	0.930	0.860
Item 32	1.038	0.067	**15.583*****	0.830		
Item 33	1.030	0.062	**16.536*****	0.860		
Item 34	1.046	0.064	**16.378*****	0.855		
Item 35	1.058	0.062	**16.939*****	0.872		
Item 36	1.000	-	-	0.843		
Autonomy						
Item 37	1.000	-	-	0.737	0.850	0.586
Item 38	1.124	0.098	**11.442*****	0.800		
Item 39	1.207	0.110	**10.958*****	0.765		
Item 40	1.022	0.094	**10876*****	0.759		
Competence						
Item 41	1.000	-	-	0.678	0.889	0.670
Item 42	1.395	0.122	**11.441*****	0.868		
Item 43	1.296	0.113	**11.478*****	0.871		
Item 44	1.380	0.124	**11.168*****	0.841		
Relatedness						
Item 46	1.000			0.830	0.930	0.828
Item 48	1.069	0.084	**12.703*****	0.936		

***$p<0.001$ (two-tailed); refer to Table 1 for abbreviations.

effect on PNS ($\beta = 0.80$, $p<0.01$) and a negative predictive effect on CCB ($\beta = -0.57$, $p<0.01$), which in turn negatively predicted PNS ($\beta = -0.23$, $p<0.05$). In testing for a mediating effect of CCB on the relation between EI and PNS, the results were not significant ($\beta = 0.129$, $p = 0.068$).

DISCUSSION

This study's findings indicated that coaches' emotional skills, along with their coaching behaviours, could contribute to athletes' motivational processes. Emotionally intelligent coaches would show more autonomy-supportive behaviours and less controlling behaviours, which in turn would affect their athletes' PNS. While this study did not find a mediating effect of coaching behaviour, all the direct effects were significant.

First, the results supported the hypotheses involving the relations between EI and coaching behaviour. Coaches with higher EI showed more autonomy-supportive behaviours and less controlling coaching behaviours via athletes' perception, which is consistent with the findings of studies on effective leadership style. George [37] argued that leaders need to possess EI to motivate and transform their team members. In a meta-analysis of 141 studies, Mills [38] found a moderate relation between EI and effective leadership. Coaching skills reflected through EI would help coaches identify emotional states in the self and among their athletes, relate emotionally to them, and understand their needs, hopes and feelings. Therefore, it would be logical to accept EI as a key contributor in generating an effective coaching environment. In sports particularly, Iancheva and Prodanov [19] found that coaches' EI to manage their and their athletes' emotions was highly associated with social support and situational consideration behaviour in Zhang et al. [39] modified version of Chelladurai's leadership-style model. Hwang et al. [17] showed similar results, finding that EI had significant associations with leadership style among high school

Table 3. Structural equation modelling analysis and mediation test.

Model	χ^2	df	P	TLI	CFI	RMSEA
Model A	350.574	114	0.000	0.883	0.902	0.096
Model B	197.683	62	0.000	0.900	0.921	0.098
Model C (final model)	97.870	41	0.000	0.935	0.951	0.078
Acceptable criteria				**TLI >0.90**	**CFI >0.90**	**RMSEA <0.08**

basketball coaches. More specifically, coaches' emotional regulation showed a higher association with positive feedback, instructional, and situational consideration behaviours than other EI subdimensions such as utilisation and identification of emotions that coaches may experience when coaching and interacting with young athletes. In a survey involving Olympic-level coaches, Gould et al [40] found that coaches' control of their emotional state is necessary to create an effective coaching environment. These research outcomes could be linked to our results on more supportive and less controlling coaching behaviours. In our bivariate correlations, we found that EPC in controlling coaching and autonomy-supportive behaviours was highly associated with EI subdimensions based on athletes' perceptions. It would likewise make sense that athletes perceived their coaches' behaviours based on their EI. Emotionally intelligent coaches may be aware of their athletes' emotional states (e.g., burnout, stress, lack of focus, anxiety, etc.) and show supportive behaviours in an effective person-to-person relationship.

Worth noting is the differential prediction of coaching behaviour to PNS. We found no effect of AS on PNS but found a negative relation between CCB and PNS at statistical significance; these results are not consistent with those of other studies. Balaguer et al. [4] found that AS positively predicted need satisfaction but negatively predicted need thwarting through perceptions from young soccer players; in addition, controlling coaching style predicted only need thwarting. Balaguer also identified the positive mediating effect of need satisfaction in the relation between the autonomy-supportive coaching style and young athletes' psychological welfare. In the final model, the controlling coaching style is more important than the autonomy-supportive coaching style in predicting PNS. Our study's samples were taekwondo athletes who seem to be dealing with coaches who have controlling behaviours. Thus, these athletes could experience more controlling behaviours from their coaches, which would be more effective for the athletes considering their welfare and PNS in the team. Controlling coaching behaviours are also associated with the negative aspect of athletes' motivational processes. For instance, Barcza-Renner et al. [41] found the predictive effect of controlling style on athletes' perfectionism, amotivation and burnout.

Among the direct effects, the highest was that of EI on PNS. Since no study has been conducted on the direct relation between coaches' EI and athletes' internal motivation, this significant result should be emphasised as it proves that coaches' emotional capabilities are crucial in enhancing athletes' internal motivation and satisfying their psychological needs, such as autonomy, competence and relatedness. EI refers to an individual's ability to identify, regulate and utilise emotions in a person-to-person relationship, and coaches with higher EI may be sensitive to psychological changes in their athletes, who may feel higher pressure and demotivation during competitions and trainings. Such emotionally intelligent coaches are more likely to use affective actions and words (i.e. cheering up) to change unpleasant emotions that may affect athletes' demotivation. The findings in this study indicated that athletes' motivational processes should be influenced by coaches' EI; Prati et al. [42, p. 27] argued that 'the emotionally intelligent leader will induce collective motivation in team members'.

It is also notable that the hypothesis on the mediation effect was not supported. The findings did not support a theoretical coaching effectiveness model [1]. Horn's model presented multifaceted relations among coach- and athlete-related variables. Coaches' characteristics, such as EI, and behaviours affect athletes' performance, behaviour, beliefs and motivation in various ways. These findings suggest that future studies examine the complicated links between coaches and athletes using athletes from different sports and social and cultural contexts.

Our study's limitations pertain to the nature of self-reported measurements based on respondents' perceptions. While we sufficiently conducted psychometrical procedures to support the measurements' validity and reliability, the obtained scores may not necessarily represent true scores, and the perceptions of athletes and their coaches may be different. Only collegiate taekwondo athletes in South Korea participated in this study, which presents the challenge of generalisation to all social contexts in sports. Therefore, we recommend that future studies be conducted in different contexts to extend this study's findings. Another limitation is the lack of a coaching-specific EI measurement, which necessitates future studies in conceptualising EI in coaching and its evaluation. Developing a specific measure for EI would facilitate studies on its impact on coaching effectiveness. Also, we investigated only the global tendency among the latent variables EI, AS and PNS and did not specifically look at each subvariables. It could be meaningful to speculate and examine the detailed relations among these subvariables.

CONCLUSIONS

In this study, EI was found as a positive predictor of PNS and AS and a negative predictor of CCB. Only CCB was negatively associated with PNS. However, we did not find the mediating effect of AS and CCB. These findings show that coaches' EI could be a key characteristic in enhancing coaching effectiveness as they show their athletes more supportive and not controlling behaviours, thus satisfying their athletes' psychological needs. Therefore, we should consider EI as part of coaching skills and educate the public on its importance.

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