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Original Article

The relationship between an empowering and disempowering motivational climate created by the coach and the motivation and well-being of young tennis athletes

Short title: Coach Climate and Youth Tennis Well-being OR Empowering Coaching in Youth Tennis

Aristea Kiamouri (https://orcid.org/0009-0009-1247-9219)[1], Charalampos Krommidas (https://orcid.org/0000-0002-1461-9459)[1*], Maria Angeli (https://orcid.org/0009-0001-9586-4949)[1], Konstantina Karatrantou (https://orcid.org/0000-0002-7628-587X)[1], Maria Bougiesi (https://orcid.org/0000-0003-1832-9341)[1], Nikolaos Comoutos (https://orcid.org/0000-0001-7853-9290)[1], Nikolaos Digelidis (https://orcid.org/0000-0001-7019-4689)[1]

[1] Department of Physical Education & Sport Science, University of Thessaly, Thessaly, Greece

***Corresponding author:**

Department of Physical Education & Sport Science, University of Thessaly, Karyes, Trikala, 42 100, Greece

E-mail: hkrom@pe.uth.gr

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Aristea Kiamouri: methodology, formal analysis, investigation, data curation, writing - original draft, writing - review and editing.
Charalampos Krommidas: conceptualization, methodology, formal analysis, data curation, writing - original draft, writing - review and editing, supervision.
Maria Angeli: investigation, writing - original draft, writing - review and editing.
Konstantina Karatrantou: methodology, writing - review and editing, supervision.
Maria Bougiesi: methodology, investigation, data curation.
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Nikolaos Digelidis: conceptualization, writing - review and editing, supervision.

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ABSTRACT

The purpose of the present study was to examine the relationships between the perceived empowering and disempowering motivational climate created by the tennis coach and young athletes' achievement goals, behavioural regulation of motivation, basic psychological needs, tennis enjoyment, intention to drop-out of tennis, and well-being. Participants were ninety-two male and one hundred and twelve female Greek tennis athletes ($N = 204$), aged 10 to 18 years (Mage: 14±2.76 years), who voluntarily enrolled in the present study with parental consent. Data were collected via an online questionnaire. Results showed that an empowering motivational climate created by the tennis coach was positively related to the athletes' task orientation, self-determined forms of motivation, basic psychological needs, tennis enjoyment, and well-being, while it was negatively related to their intention to drop-out of tennis. Furthermore, results showed that a disempowering motivational climate created by the tennis coach was positively related to the athletes' ego orientation, extrinsic forms of motivation, and amotivation, while it was negatively associated or unrelated to athletes' task orientation, basic psychological needs, enjoyment, and well-being. It seems that the motivational climate created by the tennis coach plays a key role in the motivation of young athletes, their intention to continue playing tennis and their psychological well-being.

Keywords: Motivational climate, tennis, young athletes, motivation, well-being

INTRODUCTION

A significant number of studies have shown that organised sport participation of children and adolescents is related to numerous physical and psychosocial benefits. These benefits include higher levels of health-related physical activity (Hebert et al., 2015; Marques et al., 2016; Lagestad et al., 2019) and improved fitness (Kolunsarka et al., 2024), along with reduced social anxiety (Dimech & Seiler, 2011) and improved self-concept (Donaldson & Ronan, 2006). Young athletes show better self-esteem, enhanced social interaction, and fewer depressive symptoms (Eime et al., 2013). Other benefits include better health-related quality of life (Snyder et al., 2010) and less engagement in unhealthy lifestyle habits (Torstveit et al., 2018). Finally, organised sport participation is linked to higher academic achievement (Owen et al., 2022). Despite the significant benefits of participating in sports, there has been an increase in the drop-out rate of sport participation during adolescence (e.g., Back et al., 2024). Previous research has shown that coaches' behaviours and the atmosphere they create during training, known as "*motivational climate*", are significantly linked with young athletes' drop-out (e.g., Castillo-Jiménez et al., 2022; Gillet et al., 2012; Sarrazin et al., 2002) and ill-being (e.g., Balaguer et al., 2012; Reinboth & Duda, 2004).

Research into the motivational climate created by significant others, such as coaches, initially drew upon Achievement Goal Theory (AGT; e.g., Ames, 1992a; Ames & Archer, 1988; Duda & Nicholls, 1992; Nicholls, 1989). This early work focused on the distinction between a mastery/task-involving climate, where emphasis is placed on personal improvement, effort and learning, and a performance/ego-involving climate, where emphasis is given to outperforming others and social comparison (e.g., Ames, 1992b; Newton et al., 2000; Reinboth & Duda, 2004; Seifriz et al., 1992; Walling et al., 1993).

Previous studies have shown that a task-involving climate in youth sports is positively related with enjoyment (Jaakkola et al., 2016; Zanatta et al., 2018), intrinsic motivation or autonomous motivation (Alvarez et al., 2012; Zanatta et al., 2018), satisfaction of the basic psychological needs (Alvarez et al., 2012; Reinboth & Duda, 2006), task-oriented goal (Zanatta et al., 2018), better sport performance (Balaguer et al., 2002), self-esteem (Reinboth & Duda, 2004), prosocial behavior (Kavussanu, 2006), intention to participate in sport (Alvarez et al., 2012), and well-being (Alvarez et al., 2012; Reinboth & Duda, 2006). Conversely, an ego-involving climate is positively associated with controlled motivation and amotivation (Zanatta et al., 2018), ego-oriented goals (Zanatta et al., 2018), antisocial behaviour (Kavussanu, 2006), and negatively linked to or unrelated to young athletes' intrinsic motivation (Alvarez et al., 2012) and well-being (Reinboth & Duda, 2004, 2006).

Recently, researchers have applied Self-Determination Theory (SDT; e.g., Deci & Ryan, 2000; Ryan & Deci, 2000, 2020) to examine additional dimensions of motivational climate. Particularly, one of the dimensions of the motivational climate created by the coach concerns the autonomy-supportive environment, where coaches foster on young athletes' satisfaction of the basic psychological needs for autonomy (giving them choices, initiatives, and freedom to express their opinions), competence (enabling them to feel successful at challenging tasks), and relatedness (promoting positive relationships with coaches and teammates) (e.g., Balaguer et al., 2012; Bartholomew et al., 2010; Duda, 2013; Fenton et al., 2014). The other dimension of the motivational climate concerns the coach-created controlling environment, where coaches undermine these basic psychological needs through pressure, punitive actions, and other manipulative behaviours (e.g., Balaguer et al., 2012; Bartholomew et al., 2010; Duda, 2013; Fenton et al., 2014).

A series of studies in the field of youth sports revealed that an autonomy-supportive climate created by the coach is positively associated with their young athletes' intrinsic or autonomous or self-determined motivation (Fenton et al., 2014; Gillet et al., 2010; Jõesaar et al., 2012; Smith et al., 2010), satisfaction of basic psychological needs (Adie et al., 2012; Alvarez et al., 2009; Balaguer et al., 2018; Reinboth et al., 2004), prosocial behaviors (Chen et al., 2016; Hodge & Gucciardi, 2015; Hodge & Lonsdale, 2011), sport performance (Gillet et al., 2010), moderate-to-vigorous physical activity (Fenton et al., 2014), sport-specific life skills acquisition (Ricketts et al, 2025), and their psychological well-being (Adie et al., 2012; Balaguer et al., 2018; Reinboth et al., 2004; Smith et al., 2010). In contrast, a coach autonomy-supportive climate is negatively related to young athletes' aggressive behaviour and burnout symptoms (Kim & Choi, 2024).

Regarding a coach-created controlling environment, it is negatively associated with young athletes' well-being (Smith et al., 2010), while it is positively related with their controlled forms of motivation (Fenton et al., 2014), psychological need thwarting and burnout (Balaguer et al., 2012), negative affect and physical/emotional exhaustion (Smith et al., 2007), and antisocial behaviors (Chen et al., 2016; Hodge & Gucciardi, 2015; Hodge & Lonsdale, 2011). The above results are also confirmed by the systematic review and meta-analysis of Mossman and colleagues (2024), according to which a coach autonomy-supportive climate in sport and exercise settings is positively associated with athletes' autonomous motivation, the satisfaction of their basic psychological needs and their well-being.

Duda (2013) integrated both AGT and SDT theories to propose a unified framework, conceptualising climate as either "*Empowering*" or "*Disempowering*". According to Duda (2013), an empowering climate is created when coaches emphasise task or mastery goals

(e.g., effort, personal improvement, cooperation), autonomy support (e.g., involving players in decision-making), and social support (e.g., caring for the athlete as a person). A disempowering climate arises when coaches focus on ego or performance goals (e.g., outperforming others), social comparison, controlling behaviours (e.g., punitive, being autocratic, exerting pressure), and undermining social relationships (e.g., ignoring the needs of athletes) (Duda, 2013).

Recently, a scoping review by Birr and colleagues (2023) showed that only a few cross-sectional studies (N = 16) have examined the role of empowering and disempowering motivational climate created by coaches on the performance and well-being of their athletes, while the vast majority of them have focused mainly on soccer. More specifically, previous research has shown that an empowering coach-created motivational climate is positively linked with athletes' enjoyment (Appleton & Duda, 2016; Fenton et al., 2017; Krommidas et al., 2022), intrinsic motivation (Krommidas et al., 2022; Sukys et al., 2020), autonomous motivation (Castillo Jiménez et al., 2017; Fenton et al., 2017; Martínez-González et al., 2021; Ruiz et al., 2021), satisfaction of basic psychological needs (Castillo Jiménez et al., 2017, 2022; Chu et al., 2021), positive self-talk and self-efficacy (Zourbanos et al., 2016), protection against sexual violence in sport (Ohlert et al., 2022), prosocial behavior (Sukys et al., 2020), MVPA via autonomous motivation and enjoyment (Fenton et al., 2017), self-esteem or self-worth (Appleton & Duda, 2016; Sukys et al., 2020), happiness (Ruiz et al., 2021), subjective vitality (Krommidas et al., 2022), and future intentions of sport participation (Castillo-Jiménez et al., 2022).

In contrast, a disempowering coach-initiated motivational climate is positively linked with controlled motivation (Martínez-González et al., 2021; Ruiz et al., 2021), amotivation (Sukys et al., 2020), frustration or thwarting of basic psychological needs (Castillo Jiménez

et al., 2022; Chu et al., 2021), negative self-talk (Zourbanos et al., 2016), antisocial behavior (Sukys et al., 2020), sport-related violence (Krommidas et al., 2022), anger and dejection via ego orientation and controlled motivation (Ruiz et al., 2021), increase in sexual violence in sport (Ohlert et al., 2022), burnout (Appleton & Duda, 2016; Into et al., 2020), symptoms of physical ill-health (Appleton & Duda, 2016), and intention to drop-out of sport (Castillo Jiménez et al., 2022).

Regarding the individual sport of tennis, there is a limited number of cross-sectional studies that have examined the impact of coach-created motivational climate on tennis athletes' performance and psychological well-being (e.g., Balaguer et al., 1999; Cervelló et al., 2007; Fry & Newton, 2003; Moreno et al., 2010; Yoo, 2003). More specifically, these studies have shown that a perceived task-oriented motivational climate is positively linked with tennis athletes' perceived improvement, satisfaction and coach ratings (Balaguer et al., 1999), task orientation, coach-initiated learning, and players' performance assessment (Cervelló et al., 2007), attitudes toward sportspersonship, their instructor, and fellow players (Fry & Newton, 2003), lower levels of anxiety and higher tennis performance (Yoo, 2003). Similarly, Kilit et al. (2019) found that tennis coach encouragement significantly improved the psychophysiological responses and performance of players during the on-court tennis training.

On the other hand, an ego-involving motivational climate is negatively related to tennis athletes' satisfaction and coach ratings (Balaguer et al., 1999), attitudes toward sportspersonship, their instructor, and fellow players (Fry & Newton, 2003), while it is positively related to ego orientation (Cervelló et al., 2007) and higher levels of anxiety and poorer tennis performance (Yoo, 2003). Similarly, Moreno et al. (2010), with a sample of 413 young athletes, aged 12 to 16 years old from individual and team sports, including tennis,

found that a perceived task-oriented motivational climate is positively linked with athletes' self-determined motivation, task orientation and dispositional flow. Furthermore, Moreno et al. (2010) found that an ego-involving climate is positively linked with young athletes' ego orientation and dispositional flow, and negatively related to task orientation and self-determined motivation.

Based on the aforementioned, previous studies in tennis have mainly focused on the impact of a task- and ego-involving motivational climate created by the coach, which is part of the dimensions included in the theoretical framework of empowering and disempowering motivational climate (Duda, 2013). To our knowledge, there are still no studies that have examined the coach-initiated empowering and disempowering motivational climate on the performance, motivation, and psychological well-being of young tennis players. Hence, the purpose of the present study was to examine the relationships between the perceived empowering and disempowering motivational climate created by the tennis coach and the young athletes' achievement goals (task, ego), behavioural regulation of motivation (intrinsic, identified, introjected, external, amotivation), basic psychological needs (autonomy, competence, relatedness), tennis enjoyment, intention to drop-out of tennis, and well-being (subjective vitality, global self-esteem).

METHODS

Participants

Inclusion criteria were established to ensure participants possessed both the appropriate developmental stage and a foundational commitment to the sport. Specifically, participants were required to be (a) between 10 and 18 years of age, capturing a critical period of athletic

and personal growth; (b) actively enrolled in a local tennis club, confirming their ongoing engagement with the sport; and (c) possessing a minimum of six months of experience in organised tennis training, which provided a necessary baseline of skill and familiarity. Participants were excluded if they: (a) reported a current injury preventing their training, or (b) provided incomplete questionnaire data. Ninety-two male and one hundred and twelve female Greek tennis athletes ($N = 204$) voluntarily enrolled in the present study with parental consent. Their age ranged from 10 to 18 years (M_{age}: 14±2.76 years), while their participation in tennis courses ranged from less than one year to more than three years ($M_{participation}$: 2.89±1.12 years), and 113 of them participated in tournaments. The sample was recruited using a convenience sampling procedure through the Hellenic Tennis Federation, which may limit the generalizability of the findings due to potential self-selection bias.

Instruments

Coach-created motivational climate

A shorter version of the Empowering and Disempowering Motivation Climate Questionnaire (EDMCQ-C; Appleton et al., 2016) was modified to evaluate participants' perceptions of the motivational climate properties created by tennis coaches. In particular, empowering climate consisted of fifteen items capturing task-involving (e.g., "*During tennis training…my coach makes sure everyone has an important role on the tennis court*"), autonomy-supportive (e.g., "*During tennis training… my coach answers players' questions fully and carefully*"), and social supportive dimensions of coach-created motivational climate (e.g., "*During tennis training…my coach listens openly and does not judge players' personal feelings*"). Disempowering climate consisted of twelve items capturing ego-involving (e.g., "*During*

tennis training…my coach gives more attention to the best players") and controlling coaching behaviours (e.g., "*During tennis training…my coach is less supportive of players when they were not training and/or playing well*"). Tennis athletes were instructed to reflect on the typical dynamics of their tennis club during training when providing their responses, which were measured on a 7-point Likert scale from 1 (Strongly disagree) to 5 (Strongly agree). The EDMCQ-C has previously been employed in Greece to assess coach-created motivational climate in soccer (e.g., Appleton et al., 2016, 2023; Krommidas et al., 2016a, 2022; Solstad et al., 2020). This instrument was selected due to its strong psychometric properties and previous successful application in sport research.

Tennis athletes' goal orientations

The Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda, 1989; Duda & Nicholls, 1992) was used to define success in tennis athletes in task- and ego-involved terms. This measure is composed of thirteen items that are scored on two subscales for task and ego characteristics. More specifically, ego orientation was measured with six items (e.g., "*I feel totally successful in tennis when…I score the most points in tennis courses".* Athletes' task goal orientation was assessed through seven items (e.g., "*I feel totally successful in tennis when… I learn a new tennis drill trying hard"*). Tennis athletes responded on a 7-point Likert scale from 1 to 7, with 1 being "*Strongly disagree*" and 7 representing "*Strongly agree*".The TEOSQ has been successfully utilized in Greece for physical education classes (e.g., Diggelidis & Papaioannou, 2002; Digelidis & Krommidas, 2008; Papaioannou & Macdonald, 1993; Papaioannou & Kouli, 1999), individual sports (Stavrou et al., 2015), summer camp participants (Barkoukis et al., 2007), and dance participants (Goulimaris & Filippou, 2016).

Motivation to participate in playing tennis

A shorter version of the Behavioural Regulation Questionnaire in Sport (BRSQ; Lonsdale et al., 2008) was used to evaluate different forms of behavioural regulation and the self-determined types of motivation among tennis athletes (e.g., Deci & Ryan, 2000; Ryan & Deci, 2000). For the purpose of this study, 20 items were evaluated on five subscales with four items per subscale. More specifically, the intrinsic motivation (e.g., "*I am a tennis athlete because ... It is pleasant*"), the identified regulation (e.g., "*I am a tennis athlete because ... the benefits of playing tennis are important to me*"), the introjected regulation (e.g., "*I am a tennis athlete because ... I would feel guilty if I gave up tennis*"), the external regulation (e.g., "*I am a tennis athlete because ... some people are pressuring me to play tennis*"), and the amotivation (e.g., "*I am a tennis athlete ... but I wonder why I keep doing it*"). Tennis athletes provided their responses on a 7-point Likert scale ranging from 1 to 7, whereby 1 represents "*Strongly disagree*" and 7 represents "*Strongly agree*". The BRSQ has been accurately translated and expertly modified into the Greek language for team sports athletes (e.g., Tsitskari et al., 2015; Viladrich et al., 2013) and for Greek traditional and modern dancers (Filippos et al., 2019).

Basic psychological needs satisfaction

Tennis athletes were asked to respond to a 15-item scale capturing their basic psychological needs of autonomy, competence and relatedness in their training during the previous 3-4 weeks. More specifically, participants' basic need of autonomy was assessed with a five-item scale of Standage et al. (2005) (e.g., "*During tennis sessions… I feel free to express my ideas and opinions to tennis practice*"). The Relatedness subscale of Richer and Vallerand (1998), composed of four items (e.g., "*During tennis sessions… I felt supported*"), was used to assess

tennis players' closeness and relationships. The perceived competence of tennis players was evaluated with six items (e.g. "*During tennis sessions… I thought I was quite capable at tennis*") of the Intrinsic Motivation Inventory (IMI; McAuley et al., 1989). Participants were asked to respond on a 7-point Likert scale ranging from 1 (Strongly disagree) to 7 (Strongly agree). These subscales have successfully been used in Greece to measure basic psychological needs of young soccer players (Krommidas et al., 2016b; Quested et al., 2013), indicating previous successful application in youth sport research.

Intention to drop-out

A four-item subscale of Sarrazin and colleagues (2002) was used to measure tennis players' future sport intentions to drop-out of tennis (e.g., "*I intend to drop-out of tennis next season*"). Participants provided their responses on a 7-point Likert scale ranging from 1 to 7, whereby 1 represents "*Strongly disagree*" and 7 represents "*Strongly agree*". Finally, players' intentions to drop-out of their sport have already been administered to young soccer players in Greece (Quested et al., 2013).

Tennis enjoyment

The enjoyment subscale (IMI; McAuley et al., 1989) was used to assess the level of athletes' enjoyment experienced while playing tennis at their club over the past 3-4 weeks. Each participant had to respond to four items (e.g., "*I enjoyed the activities in tennis*") on a 7-point Likert scale ranging from 1 to 7, whereby 1 represents "*Strongly disagree*" and 7 represents "*Strongly agree*". Furthermore, the enjoyment subscale has previously been demonstrated in Greece among young soccer players (e.g., Krommidas et al., 2022; Quested et al., 2013) and physical education students (e.g., Digelidis et al., 2003; Goudas et al., 2000). The decision to

utilise this measure was predicated on its demonstrated reliability and validity and its established utility within the domain of youth sport investigations.

Subjective vitality

The participants' well-being was assessed using a five-item version of the Subjective Vitality scale (e.g., "*I feel alive and vital*") developed by Ryan and Frederick (1997). The tennis players were surveyed using a 7-point Likert scale, ranging from 1 (Strongly disagree) to 7 (Strongly agree) to indicate their level of agreement. The Subjective Vitality scale has previously been utilised in Greek research primarily to assess athletes' well-being (e.g., Krommidas et al., 2016a; Papaioannou et al., 2013). This particular instrument was deemed highly suitable for the current investigation, primarily because of its excellent psychometric qualities and its proven track record in the context of youth sport research.

Global self-esteem

A five-item global self-esteem subscale of the Physical Self-Description Questionnaire (Marsh et al., 2010) was used to assess tennis players' overall self-worth. The subscale may be conceptualised as a unidimensional construct comprising three positively worded items (e.g., "*Overall, I had a lot to be proud of*") and two negatively worded items (e.g., "*Nothing I ever do seems to turn out right*"). The response categories ranged from 1 (Totally false) to 7 (Totally true). The aforementioned administration has already been carried out in Greece with young soccer players (Papaioannou et al., 2013), with a successful history of application.

Ethics

The present study was approved by the Ethics Committee of the Department of Physical Education and Sport Science at the University of Thessaly (Ref. Number: 2085; Date of approval: 8 February 2023). Then, the Hellenic Tennis Federation invited, by e-mail, all the tennis clubs in Greece to participate in this online survey. Participation was voluntary, and all participants were informed about the aims of the study, their right to withdraw at any time, and the confidentiality and anonymity of their responses. Initially, a consent form was obtained from coaches, parents/guardians and tennis athletes. At that point, an online questionnaire was distributed to the athletes through the Google Forms software. The athletes completed the online questionnaire before a tennis training session and took approximately 30 minutes to complete it. A similar approach was also followed by Kiamouri et al. (2024) in a study with tennis coaches.

Statistical analysis

Descriptive statistics (means, standard deviations) and Cronbach's alpha reliability index were calculated for each examined variable, and the normal distribution of the data was assessed using the Kolmogorov-Smirnov test. As the data did not have a normal distribution, a correlation analysis was performed using the Spearman rank correlation coefficient. Similarly, multiple linear regression analyses with bootstrap estimation were applied to examine the relationships between the perceived empowering and disempowering motivational climate created by the tennis coach and the young athletes' achievement goals (task, ego), behavioural regulation of motivation (intrinsic, identified, introjected, external, amotivation), basic psychological needs (autonomy, competence, relatedness), tennis

enjoyment, intention to drop-out of tennis, and well-being (subjective vitality, global self-esteem). Bootstrapping is a statistical method whereby the observed data are resampled at least 1000 times to accurately calculate the Confidence Interval (CI) and is used when the data are not normally distributed (Barber & Thompson, 2000; Cheung et al., 2023). All statistical analyses were performed using the IBM SPSS software version 29, while the level of significance was determined at $p < .05$ and the confidence interval (CI) was defined at 95%.

RESULTS

Descriptive statistics, reliability indices, and normal distribution

Descriptive statistics, reliability coefficients, and normality indices are presented in Table 1. Overall, the examined variables demonstrated acceptable to high internal consistency. Preliminary analyses indicated deviations from normal distribution, justifying the use of non-parametric statistical procedures. Almost all the examined variables were not normally distributed (apart from ego orientation).

Table 1. Descriptive statistics, reliability indices, and normal distribution of the examined variables.

Variables	*M*	*SD*	*α*	Skewness	Kurtosis	K-S
1. Empowering climate	5.95	.89	.92	-1.14	1.49	.12***
2. Disempowering climate	2.37	1.10	.87	1.19	1.25	.13***
3. Task orientation	5.82	.93659	.86	-.90	.98	.10***
4. Ego orientation	3.85	1.34	.84	.04	-.68	.05
5. Intrinsic motivation	6.54	.73	.91	-3.12	16.68	.27***
6. Identified regulation	6.11	.85	.80	-1.53	4.13	.15***
7. Introjected regulation	4.08	1.36	.67	.11	-.39	.07*
8. External regulation	1.99	1.03	.69	1.17	1.13	.17***
9. Amotivation	1.66	.96	.75	1.74	2.64	.25***
10. Autonomy	5.22	.93	.66	-.39	-.40	.10***
11. Competence	5.49	.87	.82	-.50	.47	.07*
12. Relatedness	5.94	1.10	.94	-1.26	1.93	.18***
13. Intention to drop-out	1.91	1.09	.67	1.74	3.63	.20***
14. Enjoyment	6.23	.85	.86	-1.47	2.50	.18***
15. Subjective vitality	5.81	1.02	.92	-1.37	3.45	.14***
16. Global self-esteem	5.76	.84	.72	-.99	2.44	.09***

M = Mean; *SD* = Standard Deviation; *α* = Cronbach's alpha reliability index; K-S = Kolmogorov- Smirnov test; * $p < .05$; *** $p < .001$

Correlation analysis

Correlational analyses revealed that an empowering motivational climate was positively associated with adaptive motivational and psychological outcomes, including task orientation, self-determined forms of motivation, basic psychological need satisfaction, enjoyment, subjective vitality, and global self-esteem. In contrast, an empowering climate was negatively associated with athletes' intention to drop-out of tennis.

On the contrary, a perceived disempowering climate created by tennis coaches was positively linked with athletes' ego orientation, external motivation, amotivation, and intention to drop-out of tennis. Furthermore, perceivedcoach-created disempowering climate was negatively related to tennis athletes' task orientation, intrinsic motivation, competence, relatedness, tennis enjoyment, subjective vitality, and global self-esteem.

Table 2. Correlation analysis.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Empowering climate	-															
2. Disempowering climate	-.51***	-														
3. Task orientation	.54***	-22**	-													
4. Ego orientation	-.02	21**	.28***	-												
5. Intrinsic motivation	.43***	-.28***	.55***	.05	-											
6. Identified regulation	.50***	-.13	.61***	.11	.63***	-										
7. Introjected regulation	.18**	.07	.30***	.17*	.33***	.42***	-									
8. External regulation	-.17*	.35***	-.18*	.10	-.29***	-.22***	.22**	-								
9. Amotivation	-.31***	.33***	-.30***	.06	-.45***	-.34***	-.05	.45***	-							
10. Autonomy	.28***	.02	.48***	.29***	.26***	.37***	.21**	-.14	-.16*	-						
11. Competence	.46***	-.16*	.62***	.40***	.44***	.57***	.36***	-.11	-.32***	.47***	-					
12. Relatedness	.64***	-.36***	.48***	-.06	.43***	.51***	.15*	-.29***	-.34***	.24***	.43***	-				
13. Intention to drop-out	-.40***	.30***	-33***	.03	-42***	-40***	-.12	.13	.31***	-12	-26***	-39***	-			
14. Enjoyment	.62***	-.39***	.66***	.10	.65***	.50***	.26***	-.29***	-.37***	.37***.	.51***	.52***	-.42***	-		
15. Subjective vitality	.52***	-.28***	.55***	.02	.56***	.56***	.25***	-.28***	-.38**	.26***	.48***	.54***	-.28***	.59***	-	
16. Global self-esteem	.30***	-.24***	.33***	.20**	.35***	.31***	.08	-.29***	-.27***	.16*	.51***	.39***	-.30***	.44***	.48***	-

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3. Results of bootstrapped multiple linear regression analyses with coach-created empowering and disempowering motivational climate as independent variables (IVs).

DVs	IVs	*R*	R^2	*F*	*B*	*β*	Bootstrap[a]				
							Bias	SE	*p*	BC 95% CI	
										LL	UL
Task orientation	(Constant)	.49	.24	31.20***	3.19		-.07	.69	.001	1.77	4.47
	Empowering climate				.47	.45***	.01	.10	.001	.30	.67
	Disempowering climate				-.07	-.08	.01	.08	.407	-.21	.10
Ego orientation	(Constant)	.20	.04	4.37*	2.15		.01	.83	.011	.56	3.75
	Empowering climate				.18	.12	-.00	.12	.120	-.06	.39
	Disempowering climate				.28	.23**	.00	.09	.002	.10	.47
Intrinsic motivation	(Constant)	.40	.16	19.66***	5.33		-.04	.59	.001	4.07	6.34
	Empowering climate				.25	.30***	.01	.08	.004	.11	.43
	Disempowering climate				-.11	-.17**	.00	.06	.075	-.23	.02
Identified regulation	(Constant)	.42	.18	21.59***	3.48		-.04	.63	.001	2.10	4.58
	Empowering climate				.42	.45***	.01	.09	.001	.27	.62
	Disempowering climate				.05	.06	.00	.06	.385	-.07	.17
Introjected regulation	(Constant)	.26	.07	7.43***	.95		-.03	.87	.268	-.96	2.59
	Empowering climate				.43	.28***	.00	.13	.001	.18	.68
	Disempowering climate				.25	.20**	.00	.10	.008	.08	.46
External regulation	(Constant)	.40	.16	19.19***	.75		-.01	.59	.212	-.30	2.03
	Empowering climate				.05	.05	.00	.09	.523	-.14	.20
	Disempowering climate				.39	.42***	.00	.07	.001	.26	.55
Amotivation	(Constant)	.32	.10	11.10***	1.62		.03	.57	.002	.49	2.71
	Empowering climate				-.09	-.08	-.00	.08	.254	-.23	.06
	Disempowering climate				.24	.27***	-.00	.08	.003	.08	.41
Autonomy	(Constant)	.22	.05	4.933**	3.50		-.04	.65	.001	2.15	4.70
	Empowering climate				.25	.24**	.01	.09	.004	.08	.43
	Disempowering climate				.10	.11	.00	.08	.221	-.04	.27
Competence	(Constant)	.44	.19	24.01***	3.01		-.06	.54	.001	1.89	3.95
	Empowering climate				.42	.43***	.01	.08	.001	.29	.57
	Disempowering climate				-.01	-.02	.01	.06	.831	-.12	.13

Relatedness	(Constant)	.64	.41	71.01***	2.14		-.04	.69	.003	.86	3.56
	Empowering climate				.70	.57***	.01	.10	.001	.50	.89
	Disempowering climate				-.15	-.15*	-.00	.06	.027	-.28	-.02
Intention to drop-out	(Constant)	.39	.15	18.00***	3.52		.05	.80	.001	2.08	5.18
	Empowering climate				-.34	-.28***	-.01	.11	.003	-.57	-.15
	Disempowering climate				.17	.18*	-.01	.09	.059	-.01	.33
Enjoyment	(Constant)	.58	.33	49.56***	4.42		-.05	.59	.001	3.15	5.49
	Empowering climate				.39	.41***	.01	.08	.001	.24	.56
	Disempowering climate				-.20	-.26***	.00	.06	.004	-.31	-.08
Subjective vitality	(Constant)	.49	.24	31.68***	3.24		-.06	.66	.001	1.80	4.48
	Empowering climate				.48	.42***	.01	.10	.001	.31	.69
	Disempowering climate				-.12	-.13	.00	.06	.058	-.25	-.00
Global self-esteem	(Constant)	.41	.17	20.76***	5.20		-.01	.48	.001	4.17	6.13
	Empowering climate				.18	.19**	.00	.07	.011	.05	.32
	Disempowering climate				-.22	-.29***	.00	.06	.001	-.33	-.10

Note. [a] Results with bootstrap estimation are based on 1000 bootstrap samples; IVs =Independent Variables; DVs = Dependent Variables; *B* = Unstandardized Beta; *β* = Standardized beta coefficients; SE = Standard Error; BC = Bias corrected; CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit; ** $p < .01$; ** $p < .01$; *** $p < .001$.

Multiple linear regression analyses with bootstrap estimation further indicated that empowering motivational climate significantly predicted adaptive motivational and psychological outcomes, whereas disempowering climate significantly predicted maladaptive patterns. The detailed statistical outputs are presented in Table 3.

DISCUSSION

The present study examined the associations between the perceived empowering and disempowering motivational climate created by tennis coaches and young athletes' achievement goals, behavioural regulation of motivation, satisfaction of the basic psychological needs, tennis enjoyment, intention to drop-out of tennis, and well-being.

The findings revealed that an empowering motivational climate created by tennis coaches was positively related to athletes' task orientation, intrinsic motivation, identified regulation, introjected regulation, autonomy, competence, relatedness, tennis enjoyment, subjective vitality, and global self-esteem. In contrast, findings showed that a coach-initiated empowering motivational climate was negatively related to young athletes' intention to drop-out of tennis.

Furthermore, findings showed that a disempowering motivational climate created by a tennis coach was a positive predictor of athletes' ego orientation, introjected regulation, external regulation, and amotivation. On the other hand, findings revealed that a coach-created disempowering motivational climate was negatively associated with or unrelated to young athletes' task orientation, satisfaction of basic psychological needs (autonomy, competence, relatedness), tennis enjoyment, and well-being (subjective vitality, global self-esteem).

These results are consistent with previous studies on the coach-initiated motivational climate in youth sports (e.g., Appleton & Duda, 2016; Birr et al., 2023; Castillo-Jiménez et al., 2022; Fenton et al., 2017). Similar findings have also been revealed by researchers regarding coach-created environments and their behaviour during tennis training (e.g., Balaguer et al., 1999; Cervelló et al., 2007; Fry & Newton, 2003; Moreno et al., 2010).

Our findings appear to provide strong support for the use of the theoretical framework of empowering and disempowering motivational climate in individual sports, such as tennis (Duda, 2013). Specifically, an empowering motivational climate appears to satisfy the three basic psychological needs and to encourage more autonomous forms of motivation, clearly aligned with Self–Determination Theory (Deci & Ryan, 2000). The particularly strong correlation between empowering climate and relatedness suggests that tennis coaches who create empowering environments effectively promote feelings of connection, belonging, and social support among their young tennis athletes, which is consistent with SDT (Deci & Ryan, 2000) and with previous research in youth sports (Castillo Jiménez et al., 2017, 2022; Chu et al., 2021). According to SDT, when basic psychological needs are satisfied, individuals experience enhanced well-being and are more likely to engage in activities for inherently satisfying reasons rather than external pressures (Ryan & Deci, 2020). As mentioned above, research in the field of tennis has focused mainly on task- and ego-oriented motivational climate or autonomy-supportive and controlling motivational climate, which, according to Duda (2013), are dimensions of the overall theoretical framework called empowering and disempowering motivational climate. Furthermore, the vast majority of studies were conducted in the field of soccer (e.g., Birr et al., 2023). To our knowledge, the present study was the first attempt to fill this research gap using the empowering and

disempowering motivational climate as a theoretical framework in the individual sport of tennis.

Based on the findings of this study, it is important for tennis coaches to have the educational background and the appropriate coaching skills to create a training environment for their young athletes that emphasises effort, learning, personal improvement, enjoyment, caring and social support, rather than social comparison, pressure, and punishment. Recently, based on previous studies, Moulds (2023) supported the importance of a coach-created empowering motivational climate on tennis players' longevity. Therefore, she suggested that tennis coaches should regularly self-reflect and evaluate how their behaviours impact the coaching climate. She also recommended that tennis coaches conduct multiple assessments of the coach-created motivational climate during training or competitions, or prior to each coaching session (Moulds, 2023). Furthermore, she proposed that tennis coaches should interact with each other and participate in group education and coach mentoring to improve their coaching and teaching skills. To summarise, Moulds (2023) urged that these approaches will contribute to the longevity of tennis athletes and reduce the drop-out rate.

Despite the strengths of this study, several limitations should be acknowledged. First, the cross-sectional design precludes causal inferences. Also, the use of self-report measurements (questionnaires) to capture the coach-created empowering and disempowering motivational climate in tennis may be subject to recall bias (e.g., Delgado-Rodríguez & Llorca, 2004). It is recommended for future researchers to assess coach-created motivational climate in tennis through an observational study (for more details, see Smith et al., 2016a). Future studies could also use a qualitative approach (individual or focus group interviews with tennis coaches and their young athletes) to capture coaches' behaviours in tennis and how their young athletes perceive these behaviours. It is important to note here that Smith et

al. (2016b, p. 51) proposed "*the value of adopting a mixed-methodological approach and including athletes, coaches and observers' reports of the environment*" when researchers attempt to assess the multidimensional motivation created by the coach in sports. Finally, the use of a convenience sample limits the generalizability of the findings to broader tennis populations.

To conclude, it seems that the motivational climate created by the tennis coach plays a key role in the young athletes' motivation, their intention to continue playing tennis and their psychological well-being. Creating an empowering climate characterised by effort, learning, autonomy support, and social connection may enhance motivation and reduce drop-out risk. Thus, it is recommended that tennis coaches participate in educational seminars in order to expand their knowledge and skills on how to create an empowering and avoid a disempowering climate on tennis courts.

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