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Competence, achievement goals, motivational climate, and pleasant psychobiosocial states in youth sport

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Abstract
We examined the three-way interactions among competence (actual and perceived), individuals' dispositional goal orientation (task/ego), and perceived sport motivational climate (mastery/performance) in the prediction of pleasant psychobiosocial states (i.e. emotion, cognition, motivation, bodily reaction, movement, performance, and communication) as conceptualized by the Individual Zones of Optimal Functioning model. The sample consisted of 320 Italian youths (160 girls and 160 boys) aged 13–14 years who were involved in individual or team sports. The assessment included a perceived competence scale, a goal orientation questionnaire, a motivational climate inventory, and pleasant psychobiosocial descriptors. An actual competence scale was also administered to coaches asking them to assess their youngsters. Moderated hierarchical regression analysis showed that perceived competence, actual competence, and task orientation were the strongest predictors of pleasant psychobiosocial states. Moreover, actual competence and perceived competence interacted in different ways with dispositional goal orientations and motivational climate perceptions in the prediction of psychobiosocial states. It is therefore recommended that both constructs be included in motivational research.

Keywords: *Actual competence, perceived competence, achievement goal theory, IZOF model*

Introduction

Theoretical approaches to motivation, such as achievement goal theory (Nicholls, 1984) and self-efficacy (Bandura, 1997), highlight the fundamental role of perceived competence as a predictor of motivation and behaviour in different human endeavours, including sport and exercise. Perceived competence refers to individuals' evaluation of their own capability to interact effectively in a specific achievement domain (Horn, 2004). It is related but a more general construct than self-efficacy, which refers to the personal beliefs of being able to attain a desired outcome on a specific task (Bandura, 1997). High perceived competence facilitates positive expectations for success, intrinsic motivation, and achievement-oriented behaviours, such as engagement, effort to master skills, persistence in the face of difficulty, and choice of challenging tasks (for a review, see Roberts, Treasure, & Conroy, 2007).

Perception of competence is a central construct within achievement goal theory. Nicholls (1984) argued that achievement goals and behaviours might differ depending on the conception of ability held by an individual. Highly task-oriented individuals focus on self-improvement and effort in mastering a task; their perception of competence is self-referenced. In contrast, highly ego-oriented people strive to outperform others or to do better than others with less effort and, as a consequence, they are concerned with demonstrating normative competence. Task-involved persons are expected to exhibit positive and adaptive motivated behaviours, regardless of their levels of perceived competence. Adaptive motivational patterns should also appear in ego-involved individuals with high perceived competence. However, ego-involved persons with low perceived competence are likely to show maladaptive motivational responses (e.g. avoidance behaviour), because they tend to be concerned with how adequate their ability is compared with others.

An additional fundamental tenet of achievement goal theory is the motivational climate (Ames, 1992), which has been suggested to be a situational variable created by influential persons (e.g. the coach) that moderates the influence of individual goal orienta-

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tion. A mastery (or task-involving) climate emphasizes effort, cooperation, learning, improvement, social relations, and a positive approach to mistakes viewed as naturally associated with the learning process. In contrast, a performance (or ego-involving) climate fosters social comparison, intra-team competition, normative-based evaluation; individuals are disapproved of when committing mistakes or underperforming. A mastery climate tends to promote adaptive cognitions, emotions, and behaviours, such as well-being, satisfaction, motivation, and task perseverance, whereas a performance climate is likely to induce maladaptive cognitive, motivational, and affective responses, including dissatisfaction, lack of motivation, reduced effort, and task avoidance (for a review, see Ntoumanis & Biddle, 1999).

The above position is in line with Harter's (1978, 1981) competence motivation theory. According to Harter, people are motivated to achieve competence in a number of achievement areas such as academia, athletics, and social relationships. Young people, in particular, are motivated by a perception of mastery in these areas and, in turn, perceived mastery will stimulate them in continued effort investment in an attempt to improve their skills or competency. Success at mastery attempts leads to positive competence beliefs, pleasant emotional responses, enhanced intrinsic motivation and involvement. Based on Harter's theory, Weiss and colleagues (Weiss, Amorose, & Wilko, 2009) examined the relationship between coaches' motivational climate and the perceived competence, enjoyment, and intrinsic motivation of female adolescent soccer players. Findings showed that greater emphasis placed by coaches on a mastery climate, and less emphasis placed on a performance climate, was significantly related to greater ability perceptions, intrinsic motivation, and enjoyment.

A variety of measures have been adopted to assess predictions stemming from achievement goal theory regarding constructs related to pleasant emotional states, such as enjoyment, satisfaction, interest, positive affect, and flow, and unpleasant emotional states, such as anxiety, distress, negative thoughts, negative affect, and boredom (Biddle, Wang, Kavussanu, & Spray, 2003; Mouratidis, Vansteenkiste, Lens, & Vanden Auweele, 2009). Emotion is usually conceived as reactions to stimulus events (either actual or imagined), which involves cognitive appraisal and processing, physiological changes, and behavioural components (e.g. action tendencies) (Fredrickson, 2001; Russell, 2003). The Individual Zones of Optimal Functioning (IZOF) model (Hanin, 2000) provides and alternative view. According to the IZOF model, emotion in sport can be conceptualized in a multidimensional and holistic perspective as a specific component of the experience of a performer's psychobiosocial state. A psychobiosocial state is manifested through seven pleasant or unpleasant interactive components subsumed within psychological (cognitive, emotional, motivational), biological (bodily, kinaesthetic), and social (performance, communicative) modalities. These interrelated components provide a relatively complete description of a performance state encompassing experiences and their displays (expression or suppression). Hanin (2010) added an eighth modality named volitional. The revised model includes cognitive (alert, focused, confused, distracted), affective (worried, nervous, happy, angry, joyful, fearful), motivational (motivated, willing, desirous, interested), volitional (determined, brave, daring, persistent), bodily (tired, jittery, restless, sweaty, painless, breathless), motor-behavioural (sluggish, relaxed, sharp), operational (smooth, effortless, easy, clumsy actions), and communicative (connected, related, in touch) modalities.

Bortoli and colleagues (Bortoli, Bertollo, & Robazza, 2009) were the first to examine the feasibility and utility of investigating a range of pleasant and unpleasant psychobiosocial states as related to achievement goals and motivational climate in youth sport. Findings showed that task and ego orientation and a perceived mastery climate were related positively to most components of pleasant psychobiosocial states. In addition, interaction results indicated task orientation to be associated with more pleasant states when mastery climate cues were high or performance climate cues were low. Overall findings supported the usefulness of investigating psychobiosocial states as conceptualized within the IZOF framework to examine achievement goal theory predictions in youth sport.

Bortoli et al. (2009), however, did not assess perceived or actual competence. As previously stated, competence can play a main role in predicting motivation and behaviour in sport and exercise (Roberts et al., 2007). Therefore, the purpose of the present study was to extend the investigation of Bortoli and colleagues by including the assessment of both perceived competence and actual competence. Specifically, we wished to examine the interactive effects of competence, dispositional goal orientation, and perceived motivational climate on pleasant psychobiosocial states, thereby focusing on three-way interactions among competence, goals, and climate. The focus of the study was on pleasant states because they are deemed relevant to youngsters' participation in sporting activities. The IZOF model places emphasis on the functional effects (i.e. optimal and dysfunctional) of psychobiosocial states on performance in the domain of competitive and high achievement sport (Hanin, 2000, 2007). In contrast, pleasant states, achievement motivation,

and perceived competence have been suggested to be more important than competition and competitive outcomes in youth sport (Papaioannou, Bebetsos, Theodorakis, Christodoulidis, & Kouli, 2006).

Drawing on research reviewed above, competence was expected to interact with youths' goal orientation and motivational climate in predicting their emotions and other pleasant psychobiosocial states. In particular, task-oriented or ego-oriented individuals who perceived themselves (or were judged by their coaches) as low competent were expected to experience higher levels of pleasant psychobiosocial states when involved in a mastery climate rather than a performance climate. An additional objective was to provide further evidence on the benefits of assessing a range of psychobiosocial states to the study of achievement goal theory predictions in youth sport. The validity and value of assessing multi-modal states as conceptualized within the IZOF framework has been demonstrated in different sports (e.g. Hanin & Stambulova, 2002; Ruiz & Hanin, 2004). However, with the exception of Bortoli and colleagues' (2009) study, no achievement goal theory research in sport has examined a range of psychobiosocial states.

Methods

Participants

Following approval from the University's Research Ethics Committee, the data were collected on a purposeful sample of participants selected from several youth sport organizations located in northeast Italy. The sample consisted of 320 youths (160 girls and 160 boys) aged 13–14 years (mean = 13.4 years, $s = 0.5$), who had been involved in team sports for 2–5 years ($n = 150$), such as basketball, soccer, water polo, and volleyball, or in individual sports ($n = 170$), such as track and field, gymnastics, martial arts, swimming, skating, and tennis. None of the participants had taken part in previous research on achievement goals, motivations, emotions or psychobiosocial states. Sport managers and coaches gave their consent to conduct the study after the general purpose of the investigation was explained to them. Children provided written assent and their parents signed an informed consent.

Procedure

Assessment was conducted in nearby training facilities before a regular practice session. An investigator administered a multi-section questionnaire to groups of up to five participants of the same coach. Sixty-four coaches were thus involved in the investigation, to ensure the assessment of a range of youngsters' motivational climate perceptions. Before completing the questionnaire, participants were presented with instructions indicating that there were no right or wrong answers. Emphasis was placed on the confidentiality of responses to minimize social desirability and accentuate honesty. The questionnaire was intended to gauge trait-like characteristics (i.e. relatively enduring self-cognitions), which included perceived competence, achievement goal orientation, perceived motivational climate, and pleasant psychobiosocial states. Assessment lasted approximately 30 min, after which participants were debriefed about the purpose of the study. During assessment, but in a separate location, a second investigator asked the coach to indicate the actual competence of their youths on a Borg's scale.

Measures

Perceived competence. Participants' perceptions of competence in sport was determined by using an adapted version of the Perceived Physical Ability (PPA) subscale of the Physical Self-Efficacy scale developed by Ryckman and colleagues (Ryckman, Robbins, Thornton, & Cantrell, 1982). The PPA subscale consists of 10 items concerning physical abilities, such as strength, speed, and agility, dealing with individuals' generalized expectancies regarding their perceived competence in performing tasks involving the use of physical skills. Items are rated on a 6-point scale ranging from 1 (*strongly agree*) to 6 (*strongly disagree*). Five items are positive (e.g. ''I have excellent reflexes'') and five items negative (e.g. ''I can't run fast'').

In the Italian version (Bortoli & Robazza, 1997), the items are formulated into simple questions. Five of them are positive (e.g. ''Do you have good control of your movements?'') and five negative (e.g. ''Do you feel uncertain or insecure when moving?''). Items are rated on a 5-point scale, ranging from 1 (*yes, very much*) to 5 (*no, not at all*). The stem of items was adapted to assess respondents' perceived competence. Specifically, participants were required to rate responses to each question thinking about themselves when involved in their sport. Mean scale scores were derived after having reversed the score of the negative items. When the scale was administered to a large sample of Italian 10- to 20-year-old participants, the Cronbach alpha value of the scores was 0.81.

Actual competence. Actual competence was established by asking coaches to indicate, on a modified Borg Category Ratio (CR-10) scale, the level of sport competence (skilfulness, proficiency) of their youths. The scale has been used in psychological studies of exercise capacity, exertion, and pain (see Borg,

2001), and for investigation of emotional intensity (see Hanin, 2000). The verbal anchors of the scale, developed to avoid floor and ceiling effects, were 0 = *nothing at all*, 0.5 = *very, very little*, 1 = *very little*, 2 = *little*, 3 = *moderately*, 5 = *much*, 7 = *very much*, 10 = *very, very much*, 11 = *maximal possible*.

Goal orientations. The Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1992) consists of 13 items assessing the two basic goal orientations, namely task orientation (seven items; e.g. ''I feel successful in sport when I work really hard'') and ego orientation (six items; e.g. ''I feel successful in sport when I can do better than my friends''). Item responses are rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Mean scale scores were computed for the task orientation and the ego orientation scales. The two-factor structure of the Italian version of the questionnaire was supported in a sample of boys and girls aged 8–14 years, and the Cronbach alpha value of the scales ranged from 0.73 to 0.85 across gender and age (Bortoli & Robazza, 2005).

Perceived motivational climate. The Perceived Motivational Climate in Sport Questionnaire (PMCSQ; drawn from Newton, Duda, & Yin, 2000) is a 12-item measure comprising a 6-item mastery climate scale (e.g. ''In this sport, the coach makes sure participants improve on skills they're not good at'') and a 6-item performance climate scale (e.g. ''In this sport, participants are encouraged to outplay the other participants''). Item responses are ranked on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Mean scale scores were computed for the two scales. The two-factor structure of the translated questionnaire was shown in an Italian sample, and the Cronbach alpha value was 0.76 on mastery scale scores and 0.70 on performance scale scores (Bortoli & Robazza, 2004).

Psychobiosocial descriptors. Bortoli et al. (2009) used a 14-item list of pleasant and unpleasant descriptors to measure psychobiosocial experiences in youth sport. In the present study, we administered the 7-item pleasant scale. Each item included two or three descriptors instead of one descriptor, with the aim of conveying a clear-cut representation of an emotional experience related to the sporting context. Pleasant items for each psychobiosocial component were: ''happy, joyful, cheerful'' (emotion); ''convinced, resolute, purposeful'' (cognition); ''involved, determined, committed'' (motivation); ''physically fresh, reactive'' (bodily reaction); ''active, dynamic'' (movement); ''capable, proficient, effective'' (performance); and ''socializing, collaborative'' (communication). In Hanin's (2010) recent conceptualization, the terms resolute, purposeful (cognitive items), and determined (motivational item) are categorized as volitional. Participants rated each item on a 5-point scale, ranging from 0 (*not at all*) to 4 (*very, very much*), thinking of how they usually felt within their sporting context when practising and competing. Mean scale scores were calculated. The percentage of participants who reported low (0–1 points), moderate (2 points), and high (3–4 points) levels of pleasant psychobiosocial states was 2.8%, 88.8%, and 8.4%, respectively. An alpha coefficient of 0.84 on the scores of the pleasant scale indicated a high internal consistency (Bortoli & Robazza, 2007).

Results

Preliminary analysis

The means, standard deviations, and Pearson's product–moment correlations between the key variables of the overall sample are shown in Table I. Given the focus of the study on competence, it is interesting to note that perceived competence and actual competence correlated positively with one another, and with task orientation and pleasant psychobiosocial states. Moreover, perceived competence correlated positively with ego orientation.

Table I. Descriptive statistics, and bivariate correlations between measures ($N = 320$).

Measure	mean	*s*	Task orientation	Ego orientation	Mastery climate	Performance climate	Pleasant psychobiosocial states	Perceived competence
Task orientation	4.17	0.51	–					
Ego orientation	2.60	0.82	0.014	–				
Mastery climate	4.07	0.55	0.265**	−0.211**	–			
Performance climate	2.17	0.73	−0.121	0.304**	−0.333**	–		
Pleasant psychobiosocial states	2.57	0.64	0.412**	0.099	0.205**	−0.083	–	
Perceived competence	3.92	0.45	0.227**	0.184**	0.131	0.036	0.403**	–
Actual competence	4.41	1.79	0.178*	0.024	0.076	−0.026	0.268**	0.232**

Significant correlation: *$P < 0.01$, **$P < 0.001$ (two-tailed).

Moderated hierarchical regression analysis

After having screened the data to ensure that assumptions of normality, linearity, multicollinearity, and homogeneity of variance–covariance matrices were met (Tabachnick & Fidell, 2007), a series of moderated hierarchical regression analyses were performed. The mean total score of pleasant psychobiosocial states (aggregated category) and those of each of the psychobiosocial items (discrete psychobiosocial states) were entered separately as dependent variables. Competence (either perceived or actual), task orientation, mastery climate, ego orientation, and performance climate were entered as independent variables in the first step of the model. Gender and type of sport (individual or team) were included as covariates. Two-way interaction terms were entered in the second step (i.e. task × ego, competence × task, competence × mastery, competence × ego, competence × performance, task × mastery, task × performance, ego × mastery, and ego × performance) as well as three-way interaction terms relevant to the study's purposes (i.e.competence × task × mastery, competence × task × performance, competence × ego × mastery, competence × ego × performance). Interaction terms were derived by multiplying the centred (standardized) means of the respective predictors (Aiken & West, 1991). The *F*-ratio accompanying the change in variance (R^2) was examined to determine the significance of each step of the analysis at a 0.05 level. When significance was attained, the beta weights were assessed through the *t*-ratio. To interpret three-way interaction effects, we used the plotting procedure outlined by Aiken and West (1991) and Dawson and Richter (2006). Four regression lines were plotted to represent the regression of competence levels (low or high) and dispositional goal orientations (task or ego) on psychobiosocial states as a function of low (one standard deviation below the centred mean) and high (one standard deviation above the centred mean) motivational climate (mastery or performance). After having plotted interactions, *post-hoc* simple slope analyses were conducted.

The results of the regression analysis are contained in Tables II and III. Task orientation, ego orientation, mastery climate, perceived competence, and actual competence related positively to pleasant psychobiosocial states, whereas performance climate related negatively. Significant three-way interactions also emerged. A perceived competence × task × performance interaction was shown regarding the aggregated category of psychobiosocial states (Figure 1) and bodily reaction (the pattern of results was similar to that of the aggregated category). When perceived competence was low and task orientation was high, the relation of performance climate to psychobiosocial states (simple slope test, $\beta = -0.43$, $t = 4.32$, $P < 0.01$) and bodily reaction ($\beta = -0.36$, $t = 3.35$, $P < 0.01$) was negative. A perceived competence × task × mastery interaction also emerged with respect to communication. When both perceived competence and task orientation were high, the relation of mastery climate to communication was positive ($\beta = 0.30$, $t = 3.47$, $P < 0.01$).

A larger pattern of significant results emerged when actual competence rather than perceived competence was entered into the regression analysis. In the actual competence × task × mastery interaction, when competence was low and task high the relation of mastery climate to psychobiosocial states ($\beta = 0.32$, $t = 2.67$, $P < 0.01$; Figure 2), movement ($\beta = 0.25$, $t = 1.98$, $P < 0.05$), and performance ($\beta = 0.41$, $t = 3.30$, $P < 0.01$) was positive (the pattern of results for movement and performance was similar to that of the aggregated category). In the actual competence × task × performance interaction, when competence was high and task high the relation of performance climate to psychobiosocial states ($\beta = -0.18$, $t = 2.25$, $P < 0.05$; Figure 3), cognition ($\beta = -0.26$, $t = 3.10$, $P < 0.01$), and motivation ($\beta = -0.26$, $t = 3.31$, $P < 0.01$) was negative (the trend for cognition and motivation was similar to that of the aggregated category). Finally, the competence × ego × mastery interaction was significant. When actual competence was low and ego orientation also low, positive relations were shown of mastery climate to psychobiosocial states ($\beta = 0.39$, $t = 3.88$, $P < 0.01$), bodily reaction ($\beta = 0.21$, $t = 2.08$, $P < 0.05$), and performance ($\beta = 0.44$, $t = 4.29$, $P < 0.01$). Figure 4 shows the pattern of results for psychobiosocial states (bodily reaction and performance followed a similar trend).

Discussion

The main aim of the present study was to examine the three-way interactions among competence (actual and perceived), individuals' dispositional goal orientation, and perceived sport motivational climate in the prediction of pleasant psychobiosocial states as conceptualized by the IZOF model (i.e. emotion, cognition, motivation, bodily reaction, movement, performance, and communication). We believe that this issue is important in relation to youngsters' participation in sporting activities. A further objective was to offer additional evidence on the advantages of assessing a range of psychobiosocial states to the study of achievement goal theory predictions in youth sport.

Perceived competence, actual competence, and task orientation were the strongest predictors of pleasant psychobiosocial states. This finding is

Table II. Significant results of moderated hierarchical regression analysis of perceived competence, dispositional goal orientations (task and ego), and motivational climate (mastery and performance) as predictors of pleasant psychobiosocial states.

Variables	*B*	S.E. *B*	*β*	*t*	Unique R^2
Aggregated pleasant psychobiosocial states					
Step 1					0.28
Competence	0.45	0.07	0.31	6.17**	
Task orientation	0.39	0.06	0.31	6.09**	
Step 2					0.07
Competence × Task × Performance	0.71	0.19	0.22	3.73**	
Emotion					
Step 1					0.10
Task orientation	0.30	0.09	0.19	3.37**	
Performance climate	−0.14	0.07	−0.13	−2.08*	
Cognition					
Step 1					0.20
Competence	0.47	0.09	0.27	5.08**	
Task orientation	0.36	0.08	0.24	4.44**	
Performance climate	−0.18	0.06	−0.17	−2.96**	
Motivation					
Step 1					0.30
Competence	0.28	0.09	0.16	3.18**	
Task orientation	0.64	0.08	0.41	8.18**	
Performance climate	−0.14	0.06	−0.13	−2.52*	
Bodily reaction					
Step 1					0.17
Competence	0.54	0.10	0.30	5.39**	
Task orientation	0.27	0.09	0.17	3.11**	
Step 2					0.07
Competence × Task × Performance	0.72	0.26	0.18	2.74**	
Movement					
Step 1					0.28
Competence	0.78	0.10	0.42	8.19**	
Task orientation	0.30	0.08	0.18	3.58**	
Performance					
Step 1					0.31
Competence	0.54	0.08	0.32	6.38**	
Task orientation	0.47	0.07	0.32	6.32**	
Ego orientation	0.11	0.05	0.12	2.33*	
Communication					
Step 1					0.17
Competence	0.23	0.11	0.12	2.21*	
Task orientation	0.38	0.09	0.23	4.13**	
Mastery climate	0.29	0.09	0.18	3.16**	
Step 2					0.10
Competence × Task × Mastery	1.15	0.42	0.19	2.74**	

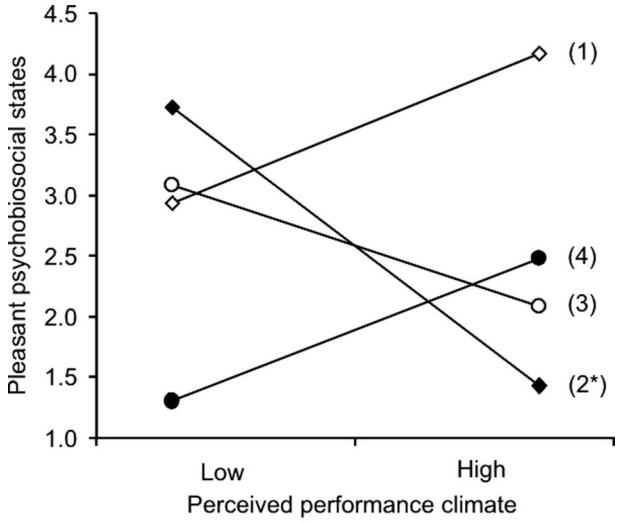
Note: Gender and sport are entered as covariates in the model. *$P < 0.05$; **$P < 0.01$.

consistent with the view that both competence and task orientation are determinants of intrinsic motivation and pleasant emotional states (Bandura, 1997; Deci & Ryan, 1985). However, more important for the present study are the interaction results. Notably, although two-way interactions did not emerge, several three-way interactions were observed, especially when actual competence rather than perceived competence was entered in the regression analyses. When perceived competence was entered, the relation of perceived performance climate to the global category of psychobiosocial states and bodily reaction was negative for those high-task oriented participants who perceived themselves low competent (Figure 1). When actual competence was analysed, the relation of perceived performance climate to the global category of psychobiosocial states, cognition, and motivation was negative for those high-task oriented participants whose coaches scored them high in competence (Figure 3). Thus, perceiving a high performance climate (usually typified by social comparison, intragroup competition, normative-based evaluation, and a negative attitude towards mistakes) seems

Table III. Significant results of moderated hierarchical regression analysis of actual competence, dispositional goal orientations (task and ego), and motivational climate (mastery and performance) as predictors of pleasant psychobiosocial states.

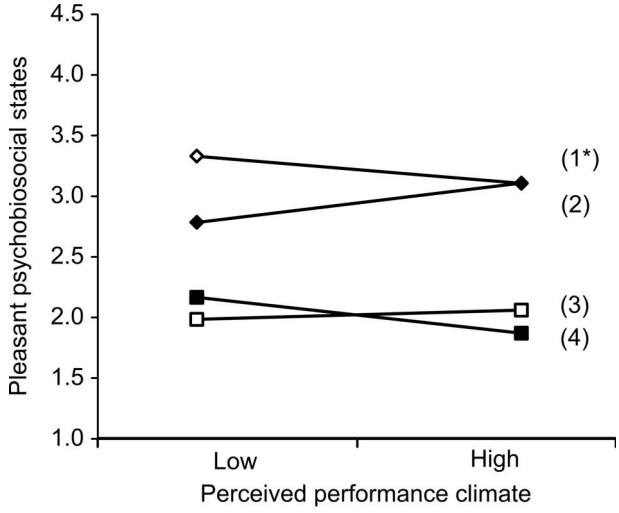
Variables	*B*	S.E. *B*	*β*	*t*	Unique R^2
Aggregated pleasant psychobiosocial states					
Step 1					0.23
Competence	0.07	0.02	0.20	3.96**	
Task orientation	0.43	0.07	0.34	6.51**	
Ego orientation	0.09	0.04	0.12	2.24*	
Mastery climate	0.13	0.07	0.11	2.05*	
Step 2					0.09
Competence × Task × Mastery	−0.25	0.08	−0.20	−3.15**	
Competence × Task × Performance	−0.12	0.04	−0.22	−3.23**	
Competence × Ego × Mastery	0.09	0.04	0.16	2.30*	
Emotion					
Step 1					0.10
Task orientation	0.30	0.09	0.19	3.38	
Performance climate	−0.13	0.07	−0.12	−2.03	
Cognition					
Step 1					0.17
Competence	0.09	0.02	0.21	3.96**	
Task orientation	0.39	0.08	0.26	4.78**	
Ego orientation	0.13	0.05	0.14	2.54*	
Performance climate	−0.16	0.06	−0.15	−2.67**	
Step 2					0.07
Competence × Task × Performance	−0.10	0.05	−0.16	−2.21*	
Motivation					
Step 1					0.30
Competence	0.06	0.02	0.13	2.67**	
Task orientation	0.65	0.08	0.42	8.41**	
Ego orientation	0.12	0.05	0.12	2.43*	
Mastery climate	0.16	0.08	0.11	2.11*	
Performance climate	−0.14	0.06	−0.13	−2.36*	
Step 2					0.05
Competence × Task × Performance	−0.10	0.04	−0.15	−2.35*	
Bodily reaction					
Step 1					0.13
Competence	0.10	0.03	0.22	3.99**	
Task orientation	0.31	0.09	0.20	3.51**	
Ego orientation	0.13	0.06	0.13	2.24*	
Step 2					0.08
Competence × Ego × Mastery	0.11	0.05	0.15	2.00*	
Movement					
Step 1					0.18
Competence	0.11	0.03	0.24	4.44**	
Task orientation	0.37	0.09	0.23	4.21**	
Ego orientation	0.15	0.06	0.15	2.64**	
Mastery climate	0.19	0.09	0.12	2.17*	
Step 2					0.11
Competence × Task × Mastery	−0.37	0.11	−0.22	−3.41**	
Performance					
Step 1					0.24
Competence	0.06	0.02	0.14	2.80**	
Task orientation	0.53	0.08	0.36	6.84**	
Ego orientation	0.16	0.05	0.17	3.24**	
Mastery climate	0.15	0.08	0.11	2.00*	
Step 2					0.07
Competence × Task × Mastery	−0.29	0.10	−0.19	−3.00**	
Competence × Ego × Mastery	0.14	0.05	0.21	3.03**	
Communication					
Step 1					0.15
Task orientation	0.43	0.09	0.25	4.56**	
Mastery climate	0.31	0.09	0.20	3.45**	

Note: Gender and sport are entered as covariates in the model. *$P < 0.05$; **$P < 0.01$.



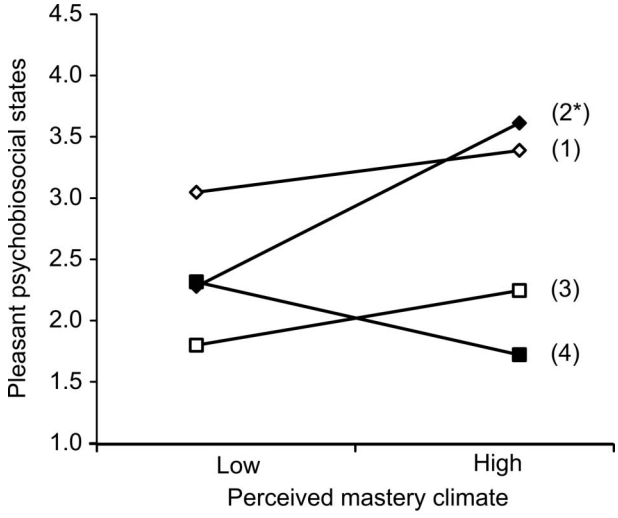
(1) High perceived competence, high task
(2) Low perceived competence, high task
(3) High perceived competence, low task
(4) Low perceived competence, low task

Figure 1. Perceived competence × task orientation × performance climate interaction for pleasant psychobiosocial states. *Significant slope.



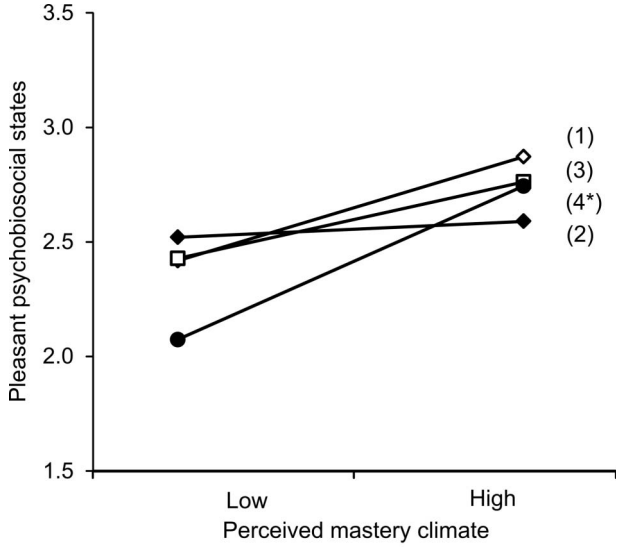
(1) High actual competence, high task
(2) Low actual competence, high task
(3) High actual competence, low task
(4) Low actual competence, low task

Figure 3. Actual competence × task orientation × performance climate interaction for pleasant psychobiosocial states. *Significant



(1) High actual competence, high task
(2) Low actual competence, high task
(3) High actual competence, low task
(4) Low actual competence, low task

Figure 2. Actual competence × task orientation × mastery climate interaction for pleasant psychobiosocial states. *Significant slope.



(1) High actual competence, high ego
(2) Low actual competence, high ego
(3) High actual competence, low ego
(4) Low actual competence, low ego

Figure 4. Actual competence × ego orientation × mastery climate interaction for pleasant psychobiosocial states. *Significant slope.

detrimental for task-oriented youngsters who perceive themselves to be low competent. A high performance climate also appears unfavourable (i.e. associated with a low level of pleasant psychobiosocial states) for task-oriented youngsters who are perceived by their coaches to be competent. This result may derive from the coaches' high competitive expectances on competent youths and the pressure they put on them to attain high achievement standards.

Perceived and actual competence, therefore, seems to play different roles, although in the two situations a low performance climate appears beneficial for high task-oriented individuals. These different findings regarding actual and perceived competence deserve further investigation. They may be due to the discrepancy between perceived and actual competence in youths. In our study, the correlation between perceived and actual competence was low ($r = 0.23$). Weiss and Amorose (2005) contended that accuracy (discrepancy between perceived and actual) of perceived competence is important for understanding achievement behaviours, cognitions, domain-specific emotions, and motivational processes. In their study of 8- to 14-year-olds attending a summer sports programme, they found between-age and within-age variability for perceived and actual competence. The authors recommended that among other aspects, actual ability and accuracy of perceived competence in research on self-perception and motivational processes with young people be considered simultaneously. Research findings warrant more attention and in future researchers may wish to assess actual competence through different measures including rating scales, such as the corresponding teacher's rating of children's perceived competence ratings (Harter, 1985; Weiss & Amorose, 2005), test batteries of movement skill proficiency (e.g. Barnett, van Beurden, Morgan, Brooks, & Beard, 2009), and sport-specific skill tests (e.g. Malina et al., 2005).

Additional interactions were shown regarding the mastery climate. When perceived competence was entered in the analysis, a high mastery climate (typically characterized by social cooperation, task mastery, individually based evaluation, and a positive approach to mistakes) appeared to benefit communication in high task-oriented participants who perceived themselves to be competent. The perception of a high mastery climate was also related to high scores on pleasant psychobiosocial states, performance, and movement for those high task-oriented youngsters who were judged by their coaches as low competent (Figure 2). These findings suggest that perceived and actual competence may have different effects on goal orientation and motivational climate interplay. Finally, positive relations were shown to exist between mastery climate and psychobiosocial states, bodily reaction, and performance for low ego-oriented participants reporting low actual competence (Figure 4).

Overall, interaction results suggest that pleasant psychobiosocial states, including performance (''capable, proficient, effective''), movement (''active, dynamic''), and bodily reaction (''physically fresh, reactive'') of both high task-oriented and low ego-oriented youngsters, presenting low actual competence levels, would increase in a mastery climate. This finding is consistent with the view that individuals may be more intrinsically motivated in environments matching their achievement goals (Jagacinski, Madden, & Reider, 2001), and hence they may experience more pleasant psychobiosocial states (Bortoli et al., 2009). According to this contention, pleasant psychobiosocial states, including cognition (''convinced, resolute, purposeful'') and motivation (''involved, determined, committed''), of high task-oriented participants evaluated as competent were shown to decrease in conditions of high performance climate. Findings of perceived competence also indicate the beneficial effects of a low performance and a high mastery climate for high task-oriented youngsters reporting low and high competence, respectively.

In summary, actual competence and perceived competence in youths seem to interact differently with dispositional goal orientation and motivational climate perceptions in predicting global and discrete psychobiosocial states. As a consequence, future motivation research should not only assess both constructs as we did in our study, but also examine in depth their functions and relations in motivational processes. Taken as a whole, our findings support the utility of assessing a range of psychobiosocial states beyond those usually studied (i.e. emotion and motivation) to investigate the predictions of achievement goal theory in youth sport. This line of research can expand our understanding of the individual's experience as related to achievement goals and motivational climate. For applied purposes, assessing psychobiosocial states, achievement goals, and motivational climate could help practitioners evaluate their interventions, and organize their activities to establish an effective and enjoyable learning environment. Our findings contribute to the extant research suggesting that creating a mastery-involving climate enhances performers' adaptive emotional responses. Therefore, coaches should feel fairly confident that emphasizing a mastery-involving environment will foster among their athletes a variety of pleasant states, enjoyment during the learning process, greater effort to master skills, and persistence in the face of difficulties.

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