

Perceived Motivational Climate and Team Cohesion in Adolescent Athletes

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This study was conducted to determine whether adolescent athletes' perceptions of their team's level and type of cohesion would be related to, or differ as a function of, their perceptions of their team's motivational climate. This hypothesized link was assessed using both group comparison and multivariate correlational analyses. Study participants (N = 351 adolescent athletes) were recruited from sports camps conducted for high school-aged athletes at universities, colleges, and other sport facilities throughout the United States. Athletes completed questionnaires to assess perceived coach-initiated motivational climate (PMCSQ-2) and perceived team cohesion (GEQ). Based on their scores on perceived motivational climate, athletes were divided into four climate type groups: Low Task/Low Ego; Low Task/High Ego; High Task/Low Ego; High Task/High Ego. MANOVA comparisons revealed that athletes in both high task groups (High Task/Low Ego and High Task/High Ego) exhibited higher perceptions of all forms of group cohesion. Canonical correlation analyses verified the primary link between a task-oriented team climate and high levels of group cohesion but also revealed some positive aspects of an ego-oriented climate. The obtained results revealed that a coach-initiated task-oriented climate is most strongly linked to high levels of perceived team cohesion. However, elements of an ego-oriented climate can also be positively associated with high levels of team cohesiveness provided they are accompanied by selected components of a mastery climate.

Keywords: team cohesion; perceived motivational climate; adolescents; coaching behavior; group dynamics

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Over the past couple of decades, a relatively large number of sport psychology-based studies have been conducted to examine cohesiveness within competitive sport teams. Recent reviews of this research (e.g., Carron & Brawley, 2008; Carron, Eys, & Martin, 2012) have provided support for the notion that high levels of cohesiveness within teams can serve as a facilitator of athletes' psychosocial well-being and possibly their performance. These reviews have also identified a number of factors that may impact team cohesion levels. One such factor may be the behavior of the coach. Although there is a relatively large literature base (see reviews by Chelladurai, 2007; Côté & Gilbert, 2009; Duda & Balaguer, 2007) examining how coaches' behaviors affect the psychological responses of individual athletes, there is less research that has looked at the effects of coaches' behaviors on the psychological well-being of the team.

The purpose of this study was to examine the relationship between the type of motivational climate that coaches create in practice and competitive contexts and their adolescent athletes' perceptions of their team's cohesiveness. This link was examined using both group comparison and multivariate correlational procedures. To provide a context for this study, the relevant research on cohesion and motivational climate is reviewed in the following sections.

Team Cohesion

Within the sport setting, team or group cohesion has been defined by Carron, Widmeyer, and Brawley (1985) as a dynamic process that is reflected in the group's tendencies to stick together and remain united in pursuing its instrumental goals and/or for the satisfaction of member affective needs. This definition reflects the notion that cohesion is comprised of two main dimensions: task and social. Task cohesion represents the degree to which members of the group are organized and committed to common goals and tasks while social cohesion is representative of the quality of the social interactions and the degree of social integration among group members. Furthermore, Carron and colleagues (Carron et al., 1985; 2012) specify that the construct of team cohesion includes both individual and group components. Thus, an individual can hold both a group (her/his perceptions regarding the team's task and social unity) and an individual perspective (his/her attraction/commitment to the team's task goals and social climate).

Carron and his colleagues (Carron, Hausenblas, & Eys, 2005) developed a conceptual model that provides a framework for examining the correlates of cohesion in sport teams. In particular four factors have been proposed: environmental or situational factors (e.g., organizational structure, group size), personal factors (e.g., members' motivational orientation, level of anxiety), team

factors (e.g., level of collective efficacy, team performance), and leadership factors (e.g., coaches' leadership styles, coach-athlete relationships, peer leader behaviors).

With regard to this last factor, there has been some research conducted to examine the link between coaches' leadership styles and behaviors and their athletes' perceptions of their team's cohesiveness. Several of these studies (e.g., Gardner, Shields, Bredemeier, & Bostrom, 1996; Jowett & Chaundy, 2004; Murray, 2006) utilized the perceived version of the Leadership Scale for Sports (LSS) (Chelladurai & Saleh, 1980) and provided consistent evidence that athletes who believed that their coaches exhibited a democratic, rather than an autocratic leadership style, and who provided high frequencies of training and instructional behavior, positive feedback, and social support generally tended to have higher levels of task and social cohesion.

More recently, other researchers (e.g., Callow, Smith, Hardy, Arthur, and Hardy, 2009; Jowett & Chaundy, 2004; Turman, 2008) used different measures of coaching behavior (e.g., transformational leadership style, coach-athlete relationship, and coaches' use of verbal and non-verbal immediacy behaviors). The results using these disparate measurement approaches were consistent in further establishing a link between coaches' leadership styles and behaviors and athletes' perceptions of their team's cohesion. Another dimension of coach behavior that may be important to examine is motivational climate. This topic is reviewed in the next section.

Motivational Climate

The construct of motivational climate was developed on the basis of achievement goal theory (e.g., Nicholls, 1989) and speculates that the type of climate that is created by significant adults within any achievement context can affect the performance, behavior, and affective responses of the students/athletes within that context. Based on the work of Ames (1992), two types of coach-initiated motivational climates have been identified (see Duda & Balaguer, 2007). Coaches who create a mastery-oriented (task-involving) climate define success in terms of skill development, believe that the process is more important than the outcome, show value for all players on their team, foster cooperative learning, and view performance mistakes as opportunities for learning. In contrast, coaches who create a performance-oriented (ego-involving) climate pit individual players on the team against each other, punish athletes for mistakes, and give the most attention to the skilled players while ignoring others.

Over the last 15-20 years, a considerable amount of research (see reviews by Duda & Balaguer, 2007; Harwood, Spray, & Keegan, 2008) has provided support for the facilitative effects of a mastery-oriented climate on a number of positive attitudes and behaviors in athletes (e.g., self-determined motivation, sport enjoyment, and persistence). Furthermore, a performance-oriented climate has been linked to higher levels of athletes' anxiety, worry, and use of maladaptive coping strategies.

In contrast to the relatively large number of studies that have examined the impact of motivational climate on individual athletes, only a few studies have been conducted to examine the link between motivational climate and team-oriented variables. Magyar, Feltz, and Simpson (2004) used hierarchical linear modeling procedures to examine the effects of a set of predictors on the collective efficacy levels of a sample of adolescent rowers. Their results revealed positive effects of a mastery-oriented climate on collective efficacy levels in the athletes. Other researchers (e.g., Boixadós, Cruz, Torregrosa, & Valiente, 2004; Ommundsen, Roberts, Lemyre, & Treasure, 2003) found that aspects of the coach-initiated motivational climate do impact athletes' perceptions of their own attitudes and/or their team's norms with regard to sportspersonship and moral behavior. Other studies have found links between motivational climate and athletes' perceptions of, and satisfaction with, their own and their team's level of performance improvement (Balaguer, Duda, Atienza, & Mayo, 2002) as well as their perceptions of their relationships with their teammates (Ommundsen, Roberts, Lemyre, & Miller, 2005).

From a theoretical perspective, a link between motivational climate and sport team cohesion has also been noted (e.g., Duda & Balaguer, 2007; Harwood et al., 2008). These writers have argued that a mastery-oriented climate with its emphasis on improvement, cooperative learning, and the valuing of the role each athlete plays would seem conducive for the development of both task and social cohesion. In contrast, a performance-oriented climate, which is characterized by punishment-oriented behaviors, unequal treatment of athletes, and high levels of intra-team rivalry would seem antithetical to the development of task and social cohesion.

In 2006, Heuzé and his colleagues (Heuzé, Sarrazin, Masiero, Raimbault, & Thomas) designed a season-long study to test the link between motivational climate, perceived team cohesion, and collective efficacy. The study sample included 124 professional level female basketball and handball players ($M_{\text{age}} = 28$ years) who completed questionnaires assessing their perceptions of their team's cohesion and collective efficacy at the beginning and the end of a competitive season. The use of both canonical correlation and hierarchical regression

analyses revealed that a mastery-oriented climate positively predicted changes over the season in athletes' perceptions of task cohesion and collective efficacy while a performance-oriented climate negatively predicted changes in athletes' perceptions of both task and social cohesion.

Interesting results were also found by Turman (2003) who conducted both an open-ended survey and an interview study with collegiate athletes. One aspect of his results revealed coaching behaviors that deterred team cohesion. These included the coach using high frequencies of embarrassment and ridiculing behaviors and exhibiting favoritism to individual athletes. Certainly, these behaviors might fit within the performance-oriented climate dimension.

In summary, then, the studies cited previously do suggest that the type of climate that coaches create may be linked to their athletes' perceptions of their team's cohesiveness. Given, however, that the Heuze et al (2006) study cited earlier was conducted with older athletes and that researchers (e.g., Gardner et al., 1996) have found some age-related differences in regard to cohesion, it seems important to examine the link between motivational climate and team cohesion in athletes younger than those in the Heuzé et al. study.

In addition, although the research studies on motivational climate in sport and physical activity contexts (see Duda and Balaguer, 2007; Harwood et al., 2008) suggest that a mastery-oriented climate is most strongly associated with psychosocial health in athletes, several recent studies (e.g., Cumming, Smoll, Smith, & Grossbard, 2007; Gould, Flett, & Lauer, 2012) have noted that a performance-oriented climate can also be positively (but perhaps more weakly) linked to some aspects of athletes' psychosocial well-being. Given that the two dimensions of motivational climate are not orthogonal to each other (Duda & Balaguer, 2007), it certainly seems possible, even likely, that sport team climates may be perceived by athletes as predominantly mastery-oriented, predominantly performance-oriented, or, as a mix of the two climates (e.g., high or low on both). Furthermore, using Chelladurai's (2007) notion that the effects of different coaching styles and behaviors may vary as a function of the particular sport context (e.g., sport programs designed for the pursuit of pleasure versus those designed for the pursuit of performance excellence), it is possible that climates that contain a mix of the mastery and performance-oriented climates may be more (or equally as) facilitative of cohesion as the predominantly mastery-oriented climates for athletes at the more elite/older youth sport levels.

Thus, the current study was designed to investigate this issue in a sample of older (16 to 18 years of age) high-school aged athletes. In particular, the relationship between motivational climate and team cohesion was investigated

using two different statistical procedures. First, to compare athletes from four different types of motivational climates (Low Mastery/Low Ego; Low Mastery/High Ego; High Mastery/High Ego; High Mastery/High Ego), a multivariate analysis of variance (MANOVA) was used with the four climate groups created by using a median split procedure. However, because the use of a median split procedure with a continuously-measured variable such as motivational climate can result in loss of measurement sensitivity, especially when such a procedure also results in loss of the individual sub-dimensions (sub-scales) comprising the two types of climates (see argument by Harwood et al., 2008 on this point), the link between climate and cohesion was also examined using multivariate correlational procedures, thus including the full range of scores as well as all dimensions of climate. This second procedure also provided a way to determine the particular elements (if any) of a performance-oriented climate that could be positively linked to perceived team cohesion.

Although this was considered an exploratory study, it was generally hypothesized for the MANOVA that a predominantly mastery-oriented team climate (High Task/Low Ego) would be most strongly associated with high levels of perceived team cohesion but that a high performance-oriented climate would also be positively linked to cohesion but only if it occurred in combination with a high mastery-oriented climate (High Task/High Ego). Correspondingly, it was also hypothesized that the multivariate correlational results would indicate particular elements of a performance-oriented climate that, again in combination with elements of a mastery-oriented climate, would be positively linked to high perceived team cohesion.

Method

Participants

The sample recruited for this survey study included 351 high school athletes (163 males and 188 females) who ranged in age from 16 to 18 years ($M = 16.35$; $SD = 0.55$) and had just completed either their freshman (29.9%), sophomore (36.5%), junior (30.7%), or senior (2.9%) year of high school. Study participants were from a range of team sports (basketball, volleyball, soccer, lacrosse, softball, baseball, football, and hockey).

Athletes were recruited for participation in this study from summer sports camps that were conducted at colleges, universities, and other sport facilities throughout the United States and that were specifically targeted for high school athletes. Prior to each sport camp, the camp director was contacted, and a data collection session was scheduled. At this session, athletes were assembled into

groups and were given a description of the research project, and were assured of the anonymity of their responses. Because it had been anticipated that many athletes would currently be participating in more than one sport, the survey required that athletes identify and write down one particular sport (e.g., basketball) as well as one particular team (e.g., school varsity basketball team) that they would use in completing the questionnaires. It should be further noted that the athletes comprising this study sample were not nested within teams as the sports camps were targeted for higher level high school-aged athletes who wished to enhance their sport competence. Thus, athletes attending these camps were from a broad range of high schools. All study procedures were approved by a human subjects institutional review board.

Measures

Perceived Motivational Climate in Sport Questionnaire-2. The Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2) (Newton, Duda, & Yin, 2000) was used to assess the type of motivational climate that athletes in the current study perceived their coaches to create within their specific sport environment. This questionnaire consists of 33 items, and the stem for all statements is, "On this team:". A five-point Likert-type response scale is used with response choices ranging from "*Strongly Disagree*" (1) to "*Strongly Agree*" (5).

The 33 items are divided into two higher-order factors (task-involving and ego-involving) that describe two different types of team climates. Each of these first order factors is further sub-divided into three more specific sub-scales that assess different dimensions of the higher order factor. Specifically, the task-involving higher order factor contains three subscales: (a) cooperative learning (coach emphasizes cooperation among team members); (b) important role (coach fosters notion that each athlete makes a unique contribution to the team); and (c) effort and improvement (success is defined as demonstration of effort and skill improvement). The second higher order factor, an ego-involving team climate, is also characterized by three subscales: (a) punishment for mistakes (coach typically is punitive in response to player errors); (b) unequal recognition (coach gives the most attention to the most skilled players); and (c) intra-team rivalry (coach cultivates or encourages rivalry among team members). A considerable amount of research has been conducted to provide evidence for the reliability and validity of the PMCSQ-2 for older adolescent and adult athletes (Duda & Balaguer, 2007; Newton et al., 2000).

Group Environment Questionnaire (GEQ). To measure athletes' perceptions of their team's cohesiveness, the Group Environment Questionnaire (Carron et al., 1985) was administered. The GEQ is an 18-item scale that

assesses four different dimensions of group cohesion: (a) Group Integration-Task (GI-T); (b) Group Integration-Social (GI-S), (c) Individual Attraction to the Group-Task (ATG-T), and (d) Individual Attraction to the Group-Social (ATG-S). These four dimensions assess athletes' perceptions of both task and social cohesion but also differ in regard to the standpoint from which the respondent is answering. The GI-T and GI-S subscale items are formulated as 'our' and 'we' responses, and the ATG-T and ATG-S questions are from the 'I' and 'me' perspective. Although the GEQ was designed with a 9-point Likert-type response format (choices ranging from "*strongly disagree*" to "*strongly agree*"), the scale used in the current study incorporated an 8-point format, with the same response format¹.

Content, concurrent, predictive, factorial and construct validity were all assessed during the initial construction of the GEQ (Carron et al., 1985). Subsequent studies have also provided support for the psychometric properties of the scale for use in a competitive sport setting with older adolescents and young adults (see reviews by Carron et al., 2005; 2012).

Statistical Analyses

Descriptive statistics for all variables were computed and screened for linearity and normality, and Cronbach's alpha analyses assessed the internal consistency of all subscales. Univariate correlational analyses were conducted to determine whether any multicollinearity existed within each data set. For the main study analysis, MANOVA procedures were used to compare athletes who were exposed to four different types of motivational climates in regard to their perceptions of their team's cohesiveness. Finally, canonical correlation was used to assess the multivariate relationship between the subscales from the PCMSQ-2 and the GEQ.

Results

Descriptive Results

Means and standard deviations for all study variables are presented in Table 1. Examination of the means from the GEQ indicates that this sample of athletes scored above the midpoint on all four subscales, but the standard deviation values do indicate that there was considerable inter-individual variability within the sample in their perceptions of their team's cohesion. It should be noted that these descriptive results (i.e., subscale scores above the midpoint) are very consistent with other studies using the GEQ in high school-aged (e.g.,

Murray, 2006; Sénécal, Loughead, & Bloom, 2008; Spink, Wilson, & Odnokon, 2010) athletes. Furthermore, all GEQ subscale scores were found to be normally distributed.

The descriptive statistics for the motivational climate subscales (Table 1) reveal mean scores that were above the midpoint on all task-related subscales but below the midpoint on all ego-related subscales. Again, however, the ranges and the standard deviations indicate considerable interindividual variability, and all subscales were normally distributed.

To assess the internal consistency of the subscales from the PMCSQ-2 and the GEQ, a series of Cronbach's alpha analyses were conducted (Table 1). For the GEQ, three of the four subscales exhibited coefficients that were at (or above) the recommended standard of .70 (Nunnally & Bernstein, 1994). The exception was the ATG-S subscale with a coefficient of .57. The inter-correlations between items on this subscale were examined, and the alpha coefficients when each item was deleted were also computed. However, it appeared that no one item contributed to the low overall alpha coefficient for this subscale.

Inspection of the internal consistency of the six subscales from the PMCSQ-2 and for the two higher-order subscales (task- and ego-involving climates) (see last column in Table 1) revealed acceptable levels (.70) for all but one of the subscales. The exception was the subscale labeled Intra-Team Member Rivalry (alpha = .49). Again, examination of the inter-correlations between items and the alpha coefficients with deletion of individual items indicated that no one item contributed to the low overall alpha coefficient.

The lower alpha levels (i.e., < .70) found for two of the subscales in this study have also been reported by other researchers using the GEQ (e.g., Heuzé et al., 2006; Jowett & Chaundry, 2004; Turman, 2008) and the PMCSQ (e.g., Newton et al., 2000; Olympiou, Jowett, & Duda, 2008). Some of these researchers have chosen to delete those particular subscales from their study. However, statisticians have recently urged caution in the use of coefficient alpha to assess the internal consistency of scales (e.g., Raykov, 2008; Sijtsma, 2009), with some arguing that the use of absolute "cut-off" points to delete subscales or subscale items may result in loss of criterion validity. Given, however, that the use of a subscale that exhibits low internal consistency may result in underestimation of relationships between that construct and others in the study, a low alpha level is of concern. Thus, for the current study, it was decided to retain the two subscales that exhibited low alpha levels but to also conduct all such analyses twice, once including the low alpha subscales and once without.

Because the results of these two analyses revealed virtually the same outcomes (i.e., same interpretation of obtained data), only the analyses that included the two subscales are reported.

Preliminary Results: Correlational Data

Univariate correlational analyses were conducted to determine the degree of association between the four subscales from the GEQ and the six factor scores from the PMCSQ (Table 1). In regard to the correlation between the GEQ subscales, the obtained coefficients ranged from .42 to .62, indicating moderate positive associations. Thus, multivariate statistical procedures are justified for use in the main study analyses (Tabachnick & Fidell, 2007).

The PMCSQ results revealed that the three task orientation subscales were strongly and positively correlated to each other (.70 to .74), while the three ego orientation subscales were moderately and positively correlated to each other (.46 to .64). As expected, the three subscales that measured the different dimensions of a task-involving climate were low to moderately negatively correlated with the three subscales that measured an ego-involving climate (-.20 to -.57). In addition, the two higher-order PMCSQ-2 subscale scores (task- and ego-involving climates) were moderately and negatively correlated with each other ($r = -.50$).

Main Study Analysis: Group Comparison Procedures

The purpose of the current study was to determine if adolescent athletes' perceptions of their team's motivational climate would differ as a function of, or be related to, their perceptions of their team's cohesiveness. As noted earlier, the connection between these two sets of data was assessed in two different ways. First, MANOVA procedures were used to compare athletes who differed from each other in terms of the type of motivational climate that they perceived their coaches to create. Specifically, based on the obtained PMCSQ-2 subscale scores for task and ego climate, study participants were separated (using a median split) into four different climate type groups. Group 1 ($n = 51$) included athletes who perceived that their coach-created climate was low in both task and ego characteristics (low task/low ego). Group 2 ($n = 129$) consisted of athletes who perceived their team's climate to be low in task but high in ego (low task/high ego) while Group 3 athletes ($n = 120$) perceived the opposite pattern (i.e., high in task and low in ego). Finally, those in Group 4 ($n = 51$) perceived high levels of both task and ego (high task/high ego). Following the separation of athletes into these four Climate Type groups, a one-way MANOVA was conducted to ensure that the groups did differ significantly on their scores on the PMCSQ-2. The results revealed a significant main effect for climate type, *Pillai's V* = 1.24, $F(18,$

1110) = 43.31, $p < .00$, $\eta^2 = .41$. Examination of the univariate F -values indicated that the four groups differed significantly ($p < .00$) on all six of the PMCSQ-2 subscale scores (with the six η values ranging from .61 to .76, indicating very large effect sizes) (Cohen, 1988).

To compare athletes from these four climate types on their perceptions of their team's cohesion, a 2 X 4 (Gender by Climate Type) MANOVA was conducted. The dependent variables included the four subscales scores from the GEQ, and the independent variables were athletes' gender and climate type. The decision to include gender as an independent variable was based on reviews by Carron and his colleagues (Carron et al., 2005, Carron et al., 2008) suggesting that athletes' gender might serve as a moderator of relationships in the group dynamics area and by the results of a preliminary analyses².

The results of this multifactorial MANOVA revealed a non-significant gender by climate type interaction effect, *Pillai's V* = .03, $F(12, 1026) = .71$, $p = .75$, $\eta^2 = .01$. However, a significant main effect for gender, *Pillai's V* = .08, $F(4, 340) = 7.06$, $p < .00$, $\eta^2 = .08$ was found. Inspection of the parameter estimates and univariate F -values indicated that females scored significantly higher than did their male peers on the individual GEQ task (Males: $M = 5.88$, $SD = 1.78$; Females: $M = 6.38$, $SD = 1.47$) and social (Males: $M = 5.84$, $SD = 1.35$; Females: $M = 6.26$, $SD = 1.26$) subscales. However, on the group social subscale, male athletes ($M = 5.30$, $SD = 1.68$) exhibited significantly higher scores than did the females ($M = 4.93$, $SD = 1.65$). No gender differences were evident in the group task subscale. Furthermore, the effect sizes for all significant gender differences were small ($\eta = .14$).

In regard to climate type, a significant main effect was found, *Pillai's V* = .35, $F(12, 1026) = 11.30$, $p < .00$, $\eta^2 = .12$. Furthermore, the calculated value of .35 indicates a large effect size (Cohen, 1988). To identify which of the dependent variables was significantly affected by motivational climate type, the parameter estimates and the univariate F -values were examined. These results revealed that the four groups of athletes differed on all four of the GEQ subscales (see Table 2), and the effect sizes (using calculated η values) for each of the univariate comparisons ranged from .36 to .51 (all in the large range), with the highest effect size corresponding to the Group Task subscale.

To determine exactly how the motivational climate groups differed on the GEQ subscales, a series of post-hoc means comparison tests were conducted using a Bonferroni's correction factor to control for Type I error. The results of these procedures (Table 2) revealed that Groups 3 (High Task/Low Ego) and 4 (High Task/High Ego) scored significantly higher than did Groups 1

(Low Task/Low Ego) and 2 (Low Task/High Ego) on the two group subscales (Group Task and Group Social) and on the Individual Social subscale. On the other individual subscale (Individual Task), the high task/low ego group scored significantly higher than did all of the other groups (Low Task/Low Ego; Low Task/High Ego; High Task/High Ego). However, those athletes in group 4 (high task/high ego) were significantly higher than group 2 (low task/high ego) on this subscale.

Main Study Analysis: Correlational Procedures

In addition to the group comparisons analysis, the current study also examined the hypothesized link between cohesion and climate using multivariate (canonical) correlation. This second analysis was considered complementary to the MANOVA but also a necessary secondary analysis based on the two reasons specified earlier in this paper (i.e., loss of measurement sensitivity with use of a median split and loss of sub-dimensions of the PMCSQ-2 in the MANOVA comparison approach).

The results of the canonical correlational analysis revealed that a significant relationship did exist between the two sets of data, $Wilks' \Lambda = .42$, $F(24, 1190) = 14.06$, $p < .00$. Furthermore, this relationship was captured by three significant canonical functions ($R_1 = .72$, $R_1^2 = .52$; $R_2 = .28$, $R_2^2 = .08$, $R_3 = .19$, $R_3^2 = .04$). However, examination of the redundancy indices for the three functions indicated that the third explained less than 1% of the variance in the dependent variables once the first two were accounted for. Thus, the third function was not interpreted. The cumulative redundancy index for the two interpreted functions was 33.02, indicating that 33% of the variance in athletes' perceived team cohesion was explained by their perceptions of their team's motivational climate. According to Pedhazur (1982), a redundancy index of 10% or higher suggests significant and meaningful relationships between data sets. In addition, the 1- $Wilks' \Lambda$ value was .58, again suggesting a large effect size (Cohen, 1988).

To determine which variables within each function contributed to the multivariate relationship, the structure coefficients were examined (Courville & Thompson, 2001). These coefficients, along with the squared structure coefficients (r_s^2) and the communalities (h^2) across the two functions for each variable, are presented in Table 3. A criterion value of .35 was used to interpret the structure coefficients (at least 12% or higher of shared variance, Tabachnick & Fidell, 2007). For the first function, low scores on all three task-involving climate subscales, combined with high scores on two ego-involving subscales (punishment and unequal recognition), were correlated with all of the GEQ subscales. The relative size of the loadings suggests that the three task climate

scores and the group task cohesion score are the variables that contribute most to the relationship between the two sets. For the second function, high scores on two of the ego-involving climate dimensions (unequal recognition and intra-team rivalry), combined with low scores on one task climate subscale (effort and improvement), were predictive of high levels of group social cohesion but low scores on individual task cohesion.

The h^2 values (shown in the last column in Table 3) indicate the proportion of variance in each variable that is explained by the complete canonical solution. Thus, this value provides an estimate of the contribution that each observed variable makes to the overall analytic model (Sherry & Henson, 2005). Examination of these values indicates that all three of the task-involving climate subscales make high contributions to the overall model while the three ego-involving subscales make a more modest contribution. In regard to the group cohesion subscale scores, the two task subscales (individual and group) are particularly important to the relationship with perceived motivational climate, but the group social subscale is also relatively high, with the individual social scale making a markedly smaller contribution.

Discussion

This study was conducted to assess the link between adolescent athletes' perceptions of their team's cohesion and the type of motivational climate initiated by their coach. It had been hypothesized that a task-involving (mastery-oriented) motivational climate would be positively associated with all forms of team cohesion while an ego-involving (performance-oriented) climate would be positively associated with cohesion only when combined with a task-involving climate. The results from the group comparison analysis provided support for the hypotheses in showing that a task-involving climate is conducive to high levels of all forms of perceived team cohesion. Nevertheless, the results also indicated that an ego-involving motivational climate does not detract from high levels of perceived cohesion *provided* that the ego-involving climate is accompanied by high levels of a task-oriented climate (HighTask/High Ego). It should also be noted that although male and female athletes did differ significantly in their scores on the GEQ, they did not differ in the way in which perceived motivational climate was linked to perceived team cohesiveness (i.e., the gender by climate type interaction effect was not significant).

The finding that a task-involving (mastery-focused) team climate is most conducive to high levels of team cohesion is certainly consistent with the current status of theory and research on this construct. However, the results from the MANOVA analysis in this study also indicated that an ego-oriented climate, in

and of itself, is not sufficient to harm athletes' perceptions of team cohesion. These results are consistent with those found by Magyar et al. (2004) in a study with elite adolescent rowers. Their results showed that a task-involving (mastery-oriented) team climate was positively linked to athletes' perceptions of their team's collective efficacy while an ego-involving climate was not a significant predictor.

Furthermore, a couple of other research teams have examined the effects of motivational climate on young athletes' psychosocial health and well-being using the same approach as this study (i.e., by creating comparison groups of athletes who are low and/or high in both dimensions of motivational climate). Boixadós et al. (2004), for example, conducted a study with a large sample of male soccer athletes who ranged in age from 10 to 14 years and found that athletes from the two high task-involving climate groups (high task/low ego and high task/high ego) were significantly higher than the other two groups (low task/low ego and low task/high ego) in perceived ability, satisfaction/interest, and in moral behavior attitudes. Thus, their results are similar to those of the current study. Interestingly, however, Ommundsen et al. (2003), who also created four climate groups with a sample of 12 to 14-year old elite soccer athletes, did not find that the effects of a high ego-involving (performance-oriented) motivational climate could be balanced by a co-existing high task-involving (mastery-oriented) climate in regard to athletes' preferences and perceptions of their team's social-moral atmosphere. Thus, it appears that the degree to which a motivational climate that is high in both task and ego can still have positive effects on athletes may vary as a function of which outcome variables are examined.

In the current study, the canonical correlation analysis was conducted in addition to the group comparisons analysis in order to determine which (if any) of the task and ego climate sub-dimensions might be most predictive of the four types of team cohesion. These results, again, indicated that all three aspects of a task-oriented climate are facilitative of all dimensions of group cohesion and that at least two of the ego-oriented climate subscales (punishment and unequal recognition) are detrimental to team cohesion. However, the second canonical function (which explained a significant amount of the variability in perceived team cohesion above and beyond that explained by the first function) revealed that some dimensions of an ego-oriented climate might be facilitative of some aspects of team cohesion. Specifically, these results indicated that coaches who create rivalry between members of teams, who treat players on their team in an unequal manner, and who de-emphasize the value of individual effort and improvement as a measure of success can facilitate high levels of group social cohesion. Interestingly, although this combination of ego and task-oriented climate was positively linked to high group social cohesion, it was also linked

to low levels of individual task cohesion, suggesting that such a climate may enhance high levels of attraction to the group but undermine the individual's perception of her/his commitment to the group's task goals. These mixed findings are consistent with research by Balaguer et al. (2002) who found that a task-involving motivational climate was positively linked to athletes' perceptions of both individual and team improvement as well as their satisfaction but that an ego-involving climate was positively linked to athletes' satisfaction with their team's performance outcomes.

Furthermore, these findings regarding the somewhat positive contribution of selected elements of an ego-oriented climate can also be interpreted relative to another dimension of group dynamics identified as role clarity/ambiguity (see recent review by Eys, Schinke, & Jeffery, 2007). The construct of role clarity/ambiguity describes the degree to which individual athletes on a team may (or may not) hold clear, consistent information regarding the expectations and responsibilities associated with their specific role on the team. As noted by Eys et al., role clarity appears to be an important correlate, or even predictor, of individual and team performance levels and of positive psychosocial responses on the part of athletes (e.g., low anxiety, high satisfaction). In relation to the current study, it may well be that adolescent athletes who are playing at a relatively high skill level (high school varsity and/or select/elite club teams) can accept the fact that there is unequal treatment of players on the team, that the coach encourages intra-team rivalry, and that the coach does not emphasize the use of effort and improvement to measure the success of individual and team performance.

In general, the findings from this study that suggest that there may be some positive implications of an ego-oriented team climate on adolescent athletes' psychosocial health and well-being has been noted by other writers (e.g., Balaguer et al., 2002; Chelladurai, 2007; Harwood et al., 2008; Turman, 2008). Nevertheless, the over-riding results from the current study (see communality estimates in the last column in Table 3) show that task climate is more important than ego climate in relation to athletes' perceptions of their team's cohesiveness

Limitations and Future Directions

Although the results of this study provide a somewhat different perspective on the links between coaching behavior and athletes' perceptions of team cohesion, some limitations should be noted. First, the study sample was comprised of older adolescent athletes (16 to 18 years) who were recruited from summer camps that were primarily designed for those high school athletes who were more serious about training for their sport. Thus, the results may apply

only to athletes in this age and skill range. The importance of sport context was established by Chelladurai (2007) and others (e.g., Côté & Gilbert, 2009) who have noted that effective leader behaviors may differ as a function of the sport context.

A second limitation to the current study is that data were collected using single-shot procedures (i.e., data collected at only one point in time). Longitudinal studies are needed that would track athletes' perceptions across time (over a competitive season or even across years). As noted by others who have employed longitudinal study designs (e.g., Heuzé et al., 2006; Leeson & Fletcher, 2005), athletes' perceptions of their team's cohesion do change somewhat over a competitive season. In particular, the different dimensions (task versus social; individual versus group) appear to change in differential ways. Thus, the interrelationships between team cohesion and motivational climate may also vary as a function of time in competitive season.

Third, the second function from the canonical analysis indicated that the individual and group cohesion subscales diverged in their relationship with the motivational climate subscales. These results suggest that the coaching behaviors that are facilitative of, or detrimental to, athletes' perceptions of their team's cohesiveness may vary as a function of the source of the cohesion (individual versus group). This more intricate relationship needs to be further explored.

Finally, this study was conducted under the assumption that high levels of team cohesion are positive. However, some writers and scholars have begun to question that assumption. In particular, two recent studies (Hardy, Eys, & Carron, 2005; Rovio, Eskola, Kozub, Duda & Lintunen, 2009) have revealed that negative consequences could occur at high levels of both task (e.g., increased peer pressure, social loafing) and social cohesion (e.g., decreased focus, increased time wasting, pressure to conform, "group think" mentality). Again, it would be interesting to examine these more negative consequences of high cohesion relative to the type of motivational climate created or initiated by both coaches and peers in the sport context.

Practical Implications

The clearest practical implication based on this study is that a task-oriented motivational climate is most facilitative of group cohesion in older adolescent athletes. Thus, coaches are advised to create a climate in which cooperative learning is encouraged, individual and team success is measured through use of improvement and effort, and in which coaches model an attitude that that every member of the team is valued and has an important role to fulfill.

In addition, however, the results of this study suggest that coaches of adolescent athletes who are at the higher end of the skill continuum can utilize some dimensions of an ego-oriented climate, provided they combine these coaching strategies with those that are reminiscent of a task-oriented climate. Thus, coaches of such athletes may be able to use intra-team rivalry to motivate players and to exhibit unequal treatment or recognition of individual athletes (as can happen, perhaps, when coaches have a stable starting line-up) as long as those behaviors occur within a general motivational climate that encourages cooperative learning and that provides recognition and value to all players (even those who do not start and/or get a lot of playing time). Borrowing, again, from the role ambiguity literature (Eys et al., 2007), it seems possible that adolescent athletes who reach a higher level of play (e.g., high school varsity, select/elite non-school club teams) may be able to accept the value of intra-team rivalry and unequal treatment (especially in the form of playing time) as long as coaches are clear about the importance of the role that each athlete plays.

Endnotes

¹ Due to the altered response format (8-point rather than 9-point) used in the current study for the GEQ, a confirmatory factor analysis was conducted to determine if the data from this sample conformed to the four-factor structure specified by Carron and his colleagues in their development of the GEQ (Carron et al., 1985; 2012). Results indicated a satisfactory fit of the data to the hypothesized four-factor structure (SRMR = .05; RMSEA = .07) (Marsh, Hau, & Wen, 2004; Russell, 2002).

² Carron and his colleagues (Carron et al., 2005, Carron et al., 2008) noted that athletes' gender may serve as a moderator of relationships in the group dynamics area. Furthermore, although the age range of the athletes in this study was rather small (16 to 18 years), the sample was spread across four academic grades (i.e., high school frosh to seniors). Therefore, a 2 X 2 (Gender by Academic Level) MANOVA was conducted to determine whether athletes' scores on the four GEQ subscales varied as a function of either their gender (male or female) or academic level (frosh/sophomores and juniors/seniors). The results of this analysis revealed a non-significant gender by academic level interaction effect ($p = .20$), and a non-significant main effect for academic level, *Pillai's V* = .03, $F(4, 344) = 2.33$, $p = .06$, $\eta^2 = .03$. However, because this main effect was close to significance, the parameter estimates and univariate F-values for the four dependent variables were examined. None of them were significant (all $p > .12$). Finally, the multivariate main effect for gender was significant, *Pillai's V* = .08, $F(4, 344) = 7.46$, $p < .00$, $\eta^2 = .08$, indicating that males and females did differ significantly in their perceptions of their team's cohesiveness. Given these significant gender differences, the main group comparisons analysis was conducted with the inclusion of gender as a main factor.

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Table 1. Descriptive Data, Alpha Coefficients and Correlations for all Study Variables

Variable	Mean (SD)	Alpha coeff.	1	2	3	4	5	6	7	8	9	10	11	12
1. GEQ: IndTsk	6.15 (1.64)	.73	-											
2. GEQ: IndSoc	6.06 (1.32)	.57	.46**	-										
3. GEQ: GrpTsk	5.11 (1.63)	.78	.61**	.47**	-									
4. GEQ: GrpSoc	5.10 (1.67)	.75	.42**	.46**	.62**	-								
5. PMCSQ: TskCoop	3.67 (.89)	.81	.54**	.44**	.65**	.56**	-							
6. PMCSQ: TskRole	3.54 (.96)	.87	.51**	.32**	.58**	.43**	.73**	-						
7. PMCSQ: TskImp	3.99 (.74)	.87	.53**	.38**	.50**	.36**	.74**	.70**	-					
8. PMCSQ: EgoPun	2.90 (.86)	.80	-.30**	-.19**	-.27**	-.22**	-.33**	-.37**	-.36**	-				
9. PMCSQ: EgoUneq	2.96 (1.03)	.91	-.41**	-.25**	-.36**	-.29**	-.46**	-.57**	-.55**	.64**	-			
10. PMCSQ: EgoRiv	2.81 (.82)	.49	-.20**	-.22**	-.18**	-.12*	-.20**	-.24**	-.21**	.46**	.51**	-		
11. PMCSQ: TaskClim	3.73 (.78)	.94	.59**	.42**	.64**	.50**	.91**	.91**	.89**	-.39**	-.58**	-.24**	-	
12. PMCSQ: EgoClim	2.89 (.75)	.91	-.37**	-.27**	-.33**	-.26**	-.40**	-.49**	-.46**	.84**	.88**	.77**	-.50**	-

N/%. GEQ=Group Environment Questionnaire; IndTsk=Attraction to the Group - Task; IndSoc=Attraction to the Group - Social; GrpTsk=Group Integration - Task; GrpSoc=Group Integration - Social; PMCSQ=Perceived Motivational Climate Questionnaire-2; TskCoop=Task (Cooperative Learning); TskRole = Task (Important Role); TskImp=Task (Effort and Improvement); EgoPun=Ego (Punishment); EgoUneq=Ego (Unequal Recognition); EgoRiv=Ego (Intra-Team Rivalry); TaskClim=Task-Involving Climate; EgoClim=Ego-Involving Climate.

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

Table 2. Follow-Up Motivational Climate Type Comparisons

Dependent Variable	ClimType 1 (LoTsk/LoEgo) (n = 51)	ClimType 2 (LoTsk/HiEgo) (n = 129)	ClimType 3 (HiTsk/LoEgo) (n = 120)	ClimType 4 (HiTsk/HiEgo) (n = 51)	Univ F-value (df = 3, 343)	r^2	Post-hoc Means Comparison Results
GEQ:IndTsk	5.63 (1.82)	5.38 (1.65)	7.10 (.96)	6.35 (1.54)	30.59**	.21	3 > 1,2** 3 > 4* 4 > 2**
GEQ:IndSoc	5.65 (1.23)	5.56 (1.37)	6.58 (1.06)	6.52 (1.20)	16.63**	.13	3,4 > 1,2**
GEQ:GrpTsk	4.36 (1.33)	4.26 (1.48)	6.00 (1.37)	5.88 (1.32)	41.00**	.26	3,4 > 1,2**
GEQ:GrpSoc	4.32 (1.40)	4.44 (1.65)	5.76 (1.50)	6.01 (1.25)	27.28**	.19	3,4 > 1,2**

*p < .05; **p < .01

Table 3. Canonical Results Showing Relationship between Perceived Motivational Climate and Perceived Team Cohesion

	Function 1		Function 1		
	Str Coef (r)	r_s^2 (%)	Str Coef (r)	r_s^2 (%)	h^2 (%)
Set 1 Variables					
GEQ:IndTsk	-.80	64.00	-.52	27.04	91.04
GEQ:IndSoc	-.60	36.00	-.27	7.29	43.29
GEQ:GrpTsk	-.92	84.64	.13	1.69	86.33
GEQ:GrpSoc	-.77	59.29	.47	22.09	81.38
Set 2 Variables					
PMCSQ:TskCoop	-.98	96.04	.09	.81	96.85
PMCSQ:TskRole	-.84	70.56	-.13	1.69	72.25
PMCSQ:TskEff	-.78	60.84	-.56	31.36	92.20
PMCSQ:EgoPun	.43	18.49	.27	7.29	25.78
PMCSQ:EgoUnq	.58	33.64	.38	14.44	48.08
PMCSQ:Riv	.29	8.41	.38	14.44	22.85

Note: str coef=canonical structure coefficient (canonical loading); r_s^2 =squared structure coefficient; h^2 =communality coefficient

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