ACHIEVEMENT GOALS AND MOTIVATIONAL CLIMATE IN COMPETITIVE GYMNASTICS CLASSES

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Abstract

This paper is a preliminary investigation into the motivational climate of competitive gymnastics classes. Motivational climate can be described as the gymnast's relatively persistent collective perceptions of the achievement goal structure of their class. Twenty-eight male and 180 female competitive gymnasts from six metropolitan and four regional competitive gymnastics clubs in Queensland, Australia were surveyed with a draft of the Sports Class Environment Scale (SCES). Using the revised SCES subscales as dependent variables, multivariate analyses of variance were conducted to compare club type, gender, and competitive level. The low training hours and the high training hours classes were significantly different in their perceptions of the Ego Involvement of their motivational climate ($p<0.01$). Male gymnasts were significantly different to female gymnasts in perceptions of Ego Involvement ($p<0.01$), Affiliation ($p<0.01$) and Effort, Order & Organization ($p<0.01$) aspects of their class climates. This study demonstrates the potential value of creating class motivational climates high in both task mastery (Task Involvement) and comparative competence (Ego Involvement) for competitive gymnastics clubs. Because motivational climate is easier to manipulate than individual achievement goal dispositions, it is an important variable that should be better understood, described, developed, and manipulated by gymnastic coaches.

Keywords: *achievement goals, motivational climate, competitive gymnastics*

INTRODUCTION

Competitive gymnastic class standards have risen dramatically over the last 30 years. A "user-pays" proviso for participation is a pervasive development requiring positive results for clients. Both participants and parents have expectations of effective and motivational gymnastic classes. Understanding and enhancing motivation is a central concern in the sports context (Roberts, 2001). The coach is often in a position to influence the creation and maintenance of the sports class motivational climate.

Benefits of this study for practice

If the motivational investment of participants in sport settings is to be understood, then motivational climate is a factor to consider. Particular motivational climates may influence the effort,

persistence, and emotions of participants in their sports context (Roberts, 1992). Sporting organizations appreciate participants and coaches with adaptive behaviours such as exerting appropriate effort, valuing, persisting with, and enjoying the task at hand. Such sports participants may be more likely to have a life-long love of sport and physical activity that has personal (including health) benefits for them and for society at large.

In spite of the current growth in motivational climate research in sport and the development of the underlying research methodology, only one study (Goudas & Biddle, 1994) has attempted to consolidate the field of classroom learning climate research and physical education motivational climate studies. This current investigation was embedded in the development and initial validation of the Sports Class Environment Scale (SCES). The SCES has provided the missing framework for integration of class learning climate measures and class motivational climate instruments.

Sports class motivational climate

Sports class motivational climate has been defined as the environment created by coaches that affects participant's behaviour and achievement strategies (Boixad'os, Cruz, Torregrosa, & Valiente, 2004), or the perceived situational achievement goal structure (Ames, 1988, 1992, 1995).

The study of motivational climate in physical education and sports settings has its foundation in the social-cognitive concepts of achievement goal theory (Roberts, 1992, 2001). Achievement goal theories are social-cognitive perspectives since they examine how individuals cognitively and affectively process and develop their views about achievement in various social settings and under a variety of influences (Ntoumanis & Biddle, 1999). Achievement goal theory can be said to apply to persons who have a personal or socially constructed goal in an achievement context, such as a sports class. This theory attempts to explain why a person strives in their particular achievement context, and argues that the overarching reason is to demonstrate competence (Roberts, 2001).

According to achievement goal theory, self-perceptions of achievement (perceived competence) are influenced by personal goal dispositions and perceived social climate factors in that particular achievement goal setting (Ntoumanis & Biddle, 1999). The primary goal in achievement contexts, such as sports training and competition, is the demonstration of competence (Nicholls, 1984). Two primary conceptions of competence and, therefore, two types of achievement goals are suggested by Nicholls. When a participant aims to learn, improve, or perfect a skill, then the participant is using a task oriented conception of competence to achieve task mastery. In the second conception of competence, the participant performs skills in a direct social comparison with others, or judges their skill capacity solely relative to others. When the focus of attention is on the self compared to others, the participant is using an ego or performance oriented conception of competence to achieve ego involved goals. A proposed addition to the classic achievement goal theory approach is to apply an approach-avoidance construct to distinguish the dichotomous achievement goals (Elliot, 1999). A valence (approach-avoidance) has been added to the basic mastery-performance dichotomy. The 2x2 achievement goal model comprises mastery-approach, mastery-avoidance, performance-approach and performance-avoidance goals. (Elliot, 1999; Elliot & McGregor, 2001). The value of this more comprehensive model has been recognized (Conroy, Elliot & Hofer, 2003) but the case for these additional constructs has not been fully supported in the sports setting (Duda, 2007).

Coaches, who have the key leadership role in class settings, play a major part in the creation of the motivational climate and, in turn, are affected by it (Fraser, 1994). The coaches in the participant's achievement setting (e.g. gymnastics class) create task involved or

ego involved goal structures by their choice of either task oriented or ego oriented conceptions of competence. In this way, the created goal structures can produce a motivational climate that makes one or the other conceptions of competence conspicuous. The participant recognizes that their competency is thus assessed in a task involved or ego involved manner and they develop context-specific goals of achievement consistent with the achievement goal structure created in that setting (Treasure, 2001; Treasure & Roberts, 2001).

Task-involved individuals who hold the conception that competence is an acquirable skill tend to express greater confidence even when starting with lower perceived competence than individuals who perform the same task in an ego-involving condition (i.e., under the conception that competence is inherent capacity) (Chi, 1993; Hall, 1990). Research has shown that perceived competence does not moderate the positive relationship between task involvement and perceptions of success in physical education classes (Vlachopoulas & Biddle, 1997). Ego-involved basketball players with low perceived competence had lower success expectations than ego-involved players with higher perceived competence, or task-involved players regardless of their perceived competence (Cury, Biddle, Sarrazin & Famose, 1997). Using task involved conceptions of achievement to judge personal competence in physical activity settings can strengthen the resilience of the individuals' perceived competence (Roberts, 2001).

When participants hold ego oriented goal dispositions, they view achievement striving as a means to an end; that end being the demonstration of superior competence (Roberts, 2001). For task oriented participants, task mastery is an end in itself. This contrast is especially true when the two goal perspectives are compared as sources of satisfaction. A consistent pattern of this effect has been demonstrated in research with children and adolescents (Nyheim, Kavussanu, Roberts & Treasure, 1996; Treasure & Roberts, 1994) and elite athletes (Roberts & Ommundsen, 1996). Ego oriented participants mainly gain satisfaction when they demonstrate success in a normative comparison with their peers, or please their coach and parents. On the other hand, task oriented participants' find skill learning, task mastery and improvement as signs of accomplishment, and sources of satisfaction.

Studies of the relationship between achievement goal orientations, perceived competence and the attendant achievement behaviours (adaptive or maladaptive) provide meaningful findings for coaches and their conduct of classes (Dweck & Leggett, 1988; Kavussanu & Roberts, 1996; Roberts, Treasure, & Kavussanu, 1997). Adaptive behaviours such as choosing moderately challenging tasks, exerting effort, persistence in the face of obstacles or failure seem to result when a participant is task oriented or when the participant is ego oriented and has a high perception of their competence. However, an ego orientation coupled with a perception of low competence is associated with maladaptive behaviours such as choosing easy or very difficult tasks, and lack of effort in the face of difficulty. In a study of the link between achievement goal orientation and task choice among university athletes, those high in task orientation reported that they were more likely to choose activities that offer the opportunity to learn, but that were also somewhat challenging (Kavussanu & Roberts, 1996). Variations in the effort young people exert in physical activity and sport can be attributed in part to the individual differences in achievement goal orientations (Cury, et al., 1997; Duda, Chi, Newton, Walling & Catley, 1995; Kavussanu & Roberts, 1996; Sarrazin, Roberts, Cury, Biddle & Famose, 2002). Research has shown a significant positive relationship between task orientation and reported exerted effort, and a non-significant relationship between ego orientation and exerted effort (Duda, et al., 1995; Sarrazin et al., 2002).

Whether these adaptive behaviours occur because task involved participants adopt adaptive behaviour or because task goal orientations directly lead to these more positive behaviours is unclear. Being task involved in the sport and physical activity setting seems to lead to more appropriate achievement strategies by the participants, irrespective of the participant's achievement goal orientation. Individuals who are ego-involved and have high-perceived competence can show adaptive achievement behaviours as well, but are vulnerable to decreasing motivation when they perceive their competence deteriorating (Dweck & Leggett, 1988).

Competitive gymnastics has been the subject of study in the field of motivational climate. A survey of 93 gymnasts and 15 coaches examined the relationships between gymnast's perceptions of their class motivational climate and their goal orientations (Lattimore, 2000). Task orientation and perceptions of a task involved climate were associated with adaptive motivational responses such as preference to be challenged, having fun and trying hard. The same responses of preferring challenging tasks, having fun and trying hard were not as evident with ego orientations. Results suggested that both goal orientations and perceptions of motivational climate play important roles in the adaptive motivational responses of gymnasts.

A further study (Halliburton & Weiss, 2002) of the motivational climate in gymnastics investigated gymnasts by competitive level. This investigation surveyed 103 adolescent Level 5-10 female gymnasts and considered whether perceptions of motivational climate vary by skill level, if sources of competence information vary by skill level, and whether sources of competence information and motivational climate are related. The study found that perceptions of motivational climate did not differ across lower to higher competitive levels; however, gymnasts at lower levels used their perceptions of effort rather than perceived competence to judge their achievement. Significant relationships emerged between sources of competence and motivational climate. Perceptions of task involved climate were associated with use of self-referenced sources of information. Use of practice performance information as a source of competence was positively related to a task involved climate. Learning and improving skills were also positively related to a performance (ego involved) climate.

METHOD

Participants

A club cohort of convenience, with at least two clubs from each of the eight gymnastics regions of Queensland, was invited to participate in the draft SCES survey. This group of clubs included 11 metropolitan clubs and 18 regional clubs. Thirteen clubs formally agreed to participate representing a potential cohort of 238 female gymnasts and 62 male gymnasts. Of the 13 clubs, eleven clubs were in the top twelve competitive club rankings in the State of Queensland. The clubs in the study cohort were grouped under one of two types, "low training hours" or "high training hours", based on their weekly number of training hours in comparison with the average number of training hours for all clubs. Clubs designated "low training hours" had weekly training hours lower than the "All Clubs" mean training hours, while clubs in the "high training hours" group had weekly training hours that exceeded the "All clubs" training hours mean.

Instrument and Data Analysis

This study of achievement goals and motivational climate in competitive gymnastics classers progressed during the development and validation of a new learning climate scale - the Sports Class Environment Scale (SCES). Participant's initial class climate perceptions were gathered using a draft SCES scale. The returned draft SCES surveys were coded for each participant, their gender, their gymnastic level, their club membership, and

their club type. Participants' responses to each item were scored 1 ('Not at all like my class'), 2 ('Not much like my class'), 3 ('A bit like my class') or 4 ('Very much like my class') with 4 being the 'highest' score and 1 being "lowest". Each participant's results were entered for each item under a subscale, and a total and average for the set of subscale items were computed.

The survey data from the revised SCES subscales were used as dependant variables using multivariate analysis of variance (MANOVA) to compare the effect of the two clubs types (low training hours and high training hours), gender and competitive level. This process was achieved in two steps, because the first club type (high training hours) consisted of one gender only – female gymnasts. The first MANOVA examined the effect of club type on the revised SCES subscales, while the second MANOVA tested the effect of gender and gymnastics level of the "low training hours" clubs.

RESULTS

Participants

Thirteen competitive gymnastics clubs returned completed SCES surveys, however, two of these clubs have a competitive class in common and were considered as one club for the purposes of the data analysis. Of the twelve clubs with reportable data, two clubs returned a very small number of completed surveys (n = 4 and 7 respectively) most of which were by non-competitive Level 2 gymnasts. Consequently, their club results were removed from the study. The final cohort consisted of 208 gymnasts (180 females and 28 males competing in National Levels 3 - 10) from ten clubs. Nine of the remaining 10 clubs were ranked in the top ten competitive clubs in the state, however, clubs in this group differed in the amount of gymnastics training participated in per week and in the gender of their gymnasts. A description of the gymnasts by gender, competitive level and training hours per week (ranges and means) for all clubs and club types (low and high training hours) is shown in Table 1.

Table 1. *Description of cohort by gender, competitive level and training hours.*

Cohort Description		All clubs n = 10	Low training hours Clubs n = 7	High training hours clubs n = 3
Male Gymnasts		28	28	0
Female Gymnasts		180	130	50
Level 3-5 (Junior gymnasts)		150	121	29
Level 6-10 (Senior gymnasts)		58	37	21
Training Hours /wk Level 3-5	Range	9 – 18	9 - 12	14 - 18
	Mean	12.6	11.7	14.7
Training Hours /wk Level 6-10	Range	12 – 21.5	12 - 18	20 – 21.5
	Mean	17.7	16.1	21.2

Results of the SCES survey

Descriptive statistics for subscale scores are shown in Table 2. Subscale mean scores are above 19 (out of a possible 24) for all subscales with the exception of Ego Orientation. The mean scores for the Task Oriented and Ego Orientation subscales are 22.4 and 12.1 respectively. These are the

highest and lowest of the subscale mean scores, however, the largest range of scores is for the Ego Orientation subscale, 6.0 - 22.5 and this range of mean scores is further reflected in the largest standard deviation (*SD* = 3.5) of all the subscale mean scores.

Table 2. *Descriptive statistics of draft SCES survey sub-scale scores.*

Sub-scale item	Mean score	Standard Deviation	Minimum score	Maximum score
Involvement	19.6	2.6	9	24
Affiliation	21.9	2.3	14	24
Coach Support	19.6	2.3	11	24
Task Orientation	22.4	1.7	17	24
Ego Orientation	12.1	3.5	6	22.5
Rule Clarity, Order and Organization	20	2.6	12	24

Club type, competitive level and learning climate

MANOVA was used to test the effect of club type (Low and High training hours) and competitive level on motivational climate as measured by the revised SCES. The summary results (see Table 3) show only a significant main effect at the .01 level for club type $F(5,200) = 6,62$, $p = .00$. Effect size is in the moderate to high range ($d = 0.72$).

Tests of between subject effects are summarised in Table 4 and indicate that there was a significant difference at the .01 level between club types only on the Ego Involvement subscale.

The subscale means for each club type and all clubs (shown in Table 5) indicate the direction of these effects. The SCES subscale climate dimension of Ego Involvement identified and separated competitive gymnastics club types. The clubs with high training hours had a higher overall mean Ego Involvement score (*M* = 2.22, *SD* = 0.51) than the low training hour clubs (*M* = 1.68, *SD* = 0.17). Club 3, club 8, club 9, club 7 and club 2 had the highest Ego Involvement scores respectively.

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Table 3.*Multivariate tests of club type and gymnastics level.*

Effect	Hypothesis df	Error df	F	Sig	Effect Size
Club type (Low training hours - High training hours)	5.000	200.000	6.62	.00**	0.72
Competitive Level	5.000	200.000	1.82	.11	
Club type . Level	5.000	200.000	1.7	.14	

* p<.05 ** p<.01

Table 4.*Tests of between-subjects effects club type and competitive level*

Source	Scale Mean	df	Mean Square	F	Significance
Club type -Low training hours -High training hours	Task Involvement	1	.007	.051	.82
	Ego Involvement	1	6.257	17.573	.00**
	Communication	1	.011	.031	.86
	Effort, Order & Org	1	.088	.315	.56
	Affiliation	1	.332	1.972	.16
Competitive Level -Level 3-5 -Level 6-10	Task Involvement	1	.134	.973	.33
	Ego Involvement	1	1.137	3.192	.08
	Communication	1	.513	1.465	.23
	Effort, Order & Org	1	.001	.005	.94
	Affiliation	1	.058	.347	.56
Club type . Level	Task Involvement	1	.099	.715	.40
	Ego Involvement	1	.867	2.436	.12
	Communication	1	.323	.921	.34
	Effort, Order & Org	1	.720	2.583	.11
	Affiliation	1	.007	.041	.84

* p<.05 ** p<.01

Table 5. *Ego and Task Involvement subscale mean scores for club types and all clubs.*

Club Type	Club	Ego Involvement score	Ego Involvement- all clubs mean score
High Training hours	Club 3	2.76	2.22
	Club 8	2.13	
	Club 10	1.76	
Low Training hours	Club 1	1.44	1.68
	Club 2	1.80	
	Club 4	1.65	
	Club 5	1.44	
	Club 6	1.73	
	Club 7	1.81	
	Club 9	1.89	

Gender, competitive level and learning climate

The second MANOVA tested the effect of gender and competitive levels in the low training hour clubs which include male and female gymnasts. The summarized results (Table 6) show a significant main effect at the .01 level for gender F(5, 198) = 8.18, p = .00.

Table 6. *Multivariate tests of gender and competitive level.*

Effect	F	Hypothesis df	Error df	Sig.
Gender	8.18	5.000	198.000	.00**
Competitive Level	1.52	5.000	198.000	.18
Gender . Level	2.12	5.000	198.000	.06

(* p<.05) (** p<.01)

Tests of between subject effects for gender are summarised in Table 7 and indicate that there are significant effects for gender at the .01 level on Task Involvement, Ego Involvement, Effort, Order and Organization, and Affiliation.

Table 7. *Tests of between-subjects effects of gender.*

Source	Dependent Variable Means	df	Mean Square	F	Sig.
Gender	Task Involvement	1	1.821	14.051	.00**
	Ego Involvement	1	4.516	13.394	.00**
	Communication	1	.150	.426	.52
	Effort, Order & Org	1	7.161	29.199	.00**
	Affiliation	1	2.942	18.989	.00**

(* p<.05) (** p<.01)

The SCES subscale means for gender indicate the directionality of these effects. The SCES subscale means scores for gender in the low training hour cohort are displayed in Table 8. The means for males were lower than for females on Task Involvement, Effort, Order and Organization, and Affiliation, but higher on Ego Involvement.

Table 8. *SCES subscale means scores for club type (low hour clubs) and gender.*

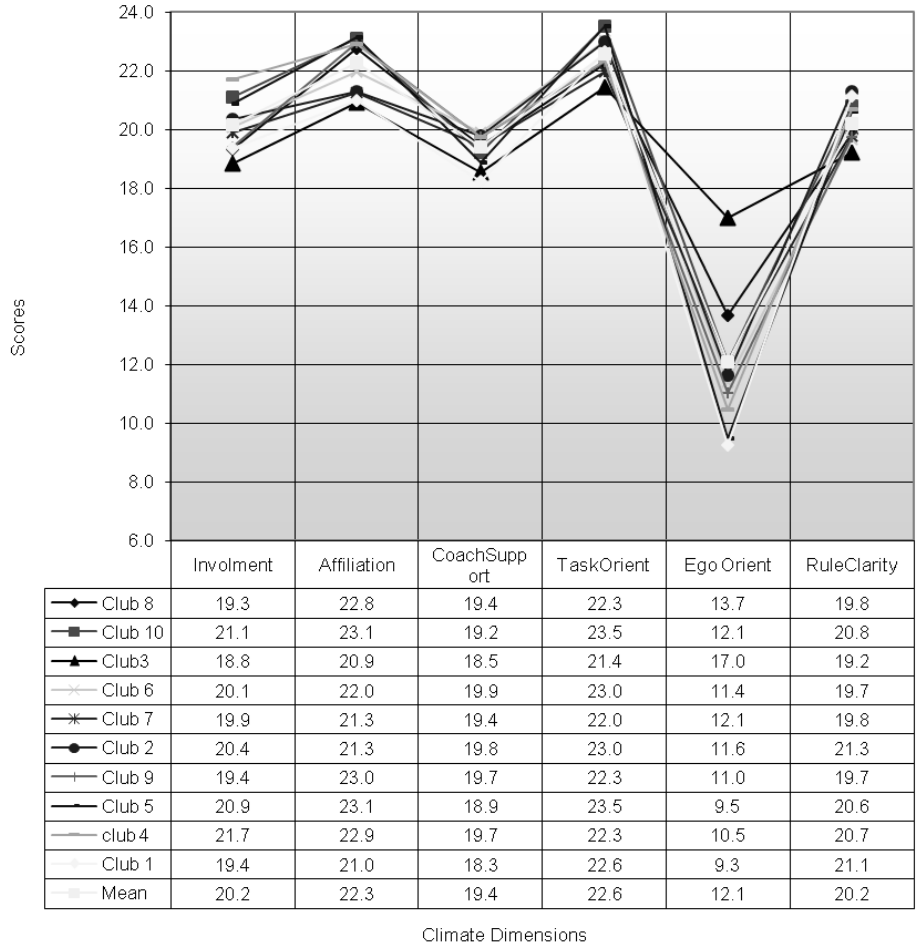
	SCES subscale				
Source	Task Involvement	Ego Involvement	Coach-athlete communicate	Effort, Order Organization	Affiliation
Male gymnasts	3.34	2.15	3.26	2.61	3.30
Female gymnasts	3.64	1.92	3.33	3.20	3.72

DISCUSSION

Class motivational climate profiles

Differences in class motivational climate were found across different clubs. Figure 1 shows the average class climate subscale score, as measured by the draft SCES for classes in each of the 10 clubs. The results are illustrative only for the purpose of visually displaying motivational class climate across all the competitive classes in the clubs in this study. This graphical approach can be a valuable tool for coaches, and can give the target class and their coach timely information about the motivational climate of their class as perceived by participants in that class.

*Club type and motivational climate*The differences between SCES responses on the subscales of Ego Orientation are related to club type. In this study, the revised SCES identified significant differences between perceptions of class climate in the competitive gymnastics high training hours versus low training hours clubs. The high training hour clubs had a combination of a high task involved climate score (M = 3.61) and a moderate to high ego involved climate score (M = 2.22) at the same time. Four clubs from the lower training hour group also demonstrated this characteristic. This may be due to the fact that these clubs, like the high training hours clubs, employ professional teachers and/or tertiary educated coach practitioners.



	Involment	Affiliation	CoachSupport	TaskOrient	Ego Orient	RuleClarity
Club 8	19.3	22.8	19.4	22.3	13.7	19.8
Club 10	21.1	23.1	19.2	23.5	12.1	20.8
Club3	18.8	20.9	18.5	21.4	17.0	19.2
Club 6	20.1	22.0	19.9	23.0	11.4	19.7
Club 7	19.9	21.3	19.4	22.0	12.1	19.8
Club 2	20.4	21.3	19.8	23.0	11.6	21.3
Club 9	19.4	23.0	19.7	22.3	11.0	19.7
Club 5	20.9	23.1	18.9	23.5	9.5	20.6
club 4	21.7	22.9	19.7	22.3	10.5	20.7
Club 1	19.4	21.0	18.3	22.6	9.3	21.1
Mean	20.2	22.3	19.4	22.6	12.1	20.2

Figure 1. *Graphical presentation of Club Motivational Climate Scores.*

There is some evidence that elite level athletes seem to function better when a high task mastery orientation or a high ego goal orientation is tempered with a high task involved class climate (Pensgaard & Roberts, 2000). It may be that highly competent athletes with either a high task mastery orientation or a high ego goal orientation are motivated in any perceived class climate, but when in a situation that threatens their perceived competence, they perform better in a task involved sports class climate (Duda, 2001). Researchers in physical activity and sport suggest that when one is learning physical skills, being more task involved (as opposed to ego involved) is motivationally conducive to learning (Ommundsen, 2001; Roberts, 2001; Standage, Treasure, Hooper, & Kuczka, 2007; Xiang, Bruene, & McBride, 2004). This may result in greater intrinsic motivation for the participant, discourage non-adaptive behaviours such as self-handicapping and encourage adaptive behaviours, such as persistence in the face of difficulty by the participant while in their sports class (Ommundsen, 2001; Roberts, 2001; Standage, Treasure, Hooper, & Kuczka, 2007; Xiang, Bruene, & McBride, 2004).

Gymnast competitive level and motivational climate

Perceptions of gymnastic class motivational climate did not differ between the junior competitive levels (Levels 3-5) and the senior competitive levels (Levels 6-10) in the gymnastics clubs surveyed. This finding is consistent with Halliburton and Weiss (2002), who found that the

perceptions of class motivational climate did not differ across the U.S.A. competitive gymnastic levels.

Gymnast gender and motivational climate

This study indicated that the perceptions of the motivational climate in gymnastics classes as measured by Task Mastery, Ego Orientation, Effort, Order and Organization, and Affiliation scales are gender-related. Competitive artistic gymnastics is primarily based on learning complex skills that are then performed sequentially in an individual routine to achieve a competitive result. It might be expected that all gymnasts, irrespective of gender, would perceive their training class climates as more task (skill) involved and less ego involved. In this study, this was not the case. Moreover, there was a result approaching significance at the .05 level for gender and competitive level. While not of significance here, further investigation into motivational climate in gymnastics classes needs to consider competition level as well as gender. The finding that male gymnasts perceived their class climate to be less task involved and more ego involved than did female gymnasts agrees with the findings of sport climate surveys with University-aged tennis players (Kavussanu & Roberts, 1996) and with a mixed group of adolescent-aged athletes (White, Duda, & Hart, 1992). The gender differences in perceptions of task involved and ego involved climate found in these gymnastics classes may reflect a gender-biased view of effort and outcome. A gender biased result has been found in a study of the relationship of achievement motivation and anxiety in elite handball players (Abrahamsen, Roberts, Pensgaard & Ronglan, 2008). These authors found a positive relationship between a perceived ego-oriented performance climate and anxiety, but only for females.

CONCLUSION

Class motivational climate can be easier to manipulate than individual achievement goal dispositions (Whitehead, Andree, & Lee, 1997). Because of this, motivational climate is an important variable that should be understood, described and manipulated by gymnastics coaches.

In this investigation, perceptions of class motivational climate did not differ between the junior competitive levels (Levels 3-5) and the senior competitive levels (Levels 6-10), however, the study identified significant differences between perceptions of class climate in the competitive gymnastics club types (high training hours versus low training hours). The high training hour clubs had, at the same time, a combination of a high task involved climate score and a moderate to high ego involved climate score.

This study indicated that the perceptions of the motivational climate in gymnastics classes as measured by Task Mastery, Ego Orientation, Effort, Order and Organization, and Affiliation are gender-related. Male gymnasts perceived their class climate to be less task involved and more ego involved than did female gymnasts. Further tests of the SCES along with measures of personal goal dispositions, such as the Task and Ego Orientation in Sport Questionnaire (TEOSQ) (Duda, 1989), used on much larger numbers of male versus female gymnasts, may shed light on gender differences in perceptions of gymnastics class motivational climate.

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