

Revision of the Motivational Correlates and Athletes' Perceptions of Coach-Created

Motivational Climate: An Adult American Sport Sample

A Dissertation

Presented in Partial Fulfillment of the Requirements for the

Degree of Doctorate of Philosophy

with a

Major in Exercise Science

in the

College of Graduate Studies

University of Idaho

by

Laura Elaine Jackson

Major Professor: Damon Burton, Ph.D.

Committee Members: Michael A. Pickering, Ph.D.; Sharon Kay Stoll, Ph.D.;

Vanessa Kercher, Ph.D.

Department Administrator: Philip Scruggs, Ph.D.

December 2018

## Authorization to Submit Dissertation

This dissertation of Laura Jackson, submitted for the degree of Doctorate of Philosophy with a Major in Exercise Science and titled “Revision of the Motivational Correlates and Athletes’ Perceptions of Coach-Created Motivational Climate: An Adult American Sport Sample,” has been reviewed in final form. Permission, as indicated by the signatures and dates below, is now granted to submit final copies to the College of Graduate Studies for approval.

Major Professor: \_\_\_\_\_ Date: \_\_\_\_\_  
Damon Burton, Ph.D.

Committee  
Members: \_\_\_\_\_ Date: \_\_\_\_\_  
Michael A. Pickering, Ph.D.

\_\_\_\_\_ Date: \_\_\_\_\_  
Sharon Kay Stoll, Ph.D.

\_\_\_\_\_ Date: \_\_\_\_\_  
Vanessa Kercher, Ph.D.

Department  
Administrator: \_\_\_\_\_ Date: \_\_\_\_\_  
Phillip Scruggs, Ph.D.

## **Abstract**

Motivational Climate (MC) is an important situational factor influencing participation in sport that is largely coach-created (Balaguer, Duda, & Crespo, 1999; Duda & Balaguer, 2007; Smith, Smoll, & Cumming, 2007). Two types of MC have been identified, task/mastery or ego/performance, with MC reflecting athletes' perceptions of the sport environment in which they practice and compete (Ntoumanis & Biddle, 1999). Although limited research has been conducted on how coaches can promote a particular type of competitive climate, achievement goal theory (AGT) has hypothesized how either type of MC can be created over time through task- or ego-focused goals (Ames, 1992; Nicholls, 1989).

To date, research investigating how coach-created MC environment is perceived by athletes has been somewhat limited, particularly how this MC perception is affected other motivational correlates in sport (i.e., perfectionism, goal setting styles, and mindsets). The purpose of this dissertation was twofold: (a) to examine the Empowering-Disempowering Motivational Climate Questionnaire – Coach Version that was developed for children and adolescents in the United Kingdom in order to see how well the instrument fits an American collegiate and professional sport population, and (b) in the event that the instrument does not have acceptable fit indices, investigate whether the instrument can be revised so fit is acceptable and provide preliminary construct validity for the revised instrument.

The objective of Study 1 was to validate the EDMCQ-C scale using an American population of adult athletes. However, the EDMCQ-C did not provide acceptable fit indices for an adult population, prompting a revised EDMCQ to be developed for adult American athletes labeled the EDMCQ-Adult Collegiate Sample (EDMCQ-ACS) that had three

subscales (i.e. task involvement, ego involvement and controlling coaching) and demonstrated strong CFA fit indices.

Study 2 used cluster analysis of the three MC subscales to create four MC profile groups, and then multivariate analysis of variance (MANOVA) to identify differences between profile groups on motivational correlate variables (i.e., mindsets, perfectionism, and GSSs subscales). Finally, canonical correlation analysis was used to examine the relationships between the three MC subscales in one variable set and separate analyses examining their relationship with: (a) mindsets, (b) perfectionism, (c) goal setting styles, and (d) all motivational correlate variables as one set.

Results showed support for the emerging hypotheses whereby empowering motivational climates correlated significantly with functional psychological variables. Further support was shown whereby disempowering motivational climates correlated with dysfunctional psychological variables. Results were discussed in light of limitations and future directions.

## Acknowledgements

I would like to express the deepest appreciation to my committee chair Professor Damon Burton who continued to support my goal in this academic adventure, through two coaching positions, and a move across the country. Without his guidance and persistence to help and push me along the way this dissertation would not have been possible.

I would first like to thank my committee members, Dr. Pickering, and Dr. Kercher whose work demonstrated that even a student with no previous statistics background could become proficient at using SPSS and AMOS, no small feat. Their engagement and valuable time helped me understand areas of this dissertation that I previously thought impossible.

In addition, a thank you to my committee member Dr. Stoll who encouraged my thinking on ethics, not only as an outsider looking in, but as a coach who has an impact within sport. Her teachings on such an important subject, as well as how to write correctly will have a lasting effect on me, for the rest of my career.

In addition, I thank the University of Idaho for five and a half years as a student here in beautiful Moscow, ID. I have received a master's degree and now a doctorate from an institution not only prestigious, but a place I feel is home. Lastly, I want to thank Vandal Athletics for helping me pursue my dreams as a both a coach and a scholar.

## **Dedication**

The bottom line is that those who have been with me on this journey know who they are. Those that housed me, and fed me, who consoled me and supported me, I hope you know how thankful I am, and that I will be forever in your debt. Without the support of loved ones, I wouldn't be where I am today, and in a career I can call my own. I hope that each and every person knows that for each small step I take in my career, and for each athlete that I am able to help, I'm only able to do so because of you.

Then of course, I would like to dedicate this dissertation to my family, especially my parents. I don't think they thought this day would ever come, there has been so many ups and downs, so many setbacks, but I made it! Although thousands of miles away, every day you motivate me to be the best version of me.

# Table of Contents

<b>Authorization to Submit Dissertation</b> .....	<b>ii</b>
<b>Abstract</b> .....	<b>iii</b>
<b>Acknowledgements</b> .....	<b>v</b>
<b>Dedication</b> .....	<b>vi</b>
<b>Table of Contents</b> .....	<b>vii</b>
<b>Table of Tables</b> .....	<b>x</b>
<b>Table of Figures</b> .....	<b>xi</b>
<b>Dissertation Overview</b> .....	<b>1</b>
<b>Manuscript 1: Examining Model Fit of the Empowering Disempowering Motivation Climate Questionnaire-Coach for an American Collegiate Sample</b> .....	<b>4</b>
<b>Measuring Motivational Climate</b> .....	<b>6</b>
Coach-Athlete Relationship Questionnaire (CART-Q).....	7
Multi-Dimensional Motivational Climate Observation System (MMCOS) .....	8
Motivational Climate Scale for Youth Sports (MCSYS) .....	9
Empowering and Disempowering Motivational Climate Questionnaire- Coach Version (EDMCQ-C).....	9
<b>Method</b> .....	<b>12</b>
Design and Participants .....	12
<b>Instrumentation</b> .....	<b>12</b>
Empowering Disempowering Motivational Climate Questionnaire - Coach (EDMCQ-C). 12	
Competitive Sports Background and Demographic Questionnaire (CSBDQ).....	13
<b>Procedure</b> .....	<b>13</b>
Data Analysis Plan .....	14
Confirmatory factor analysis (CFA).....	14
Exploratory factor analysis (EFA). .....	14
Exploratory covariance structure modeling.....	15
<b>Results</b> .....	<b>15</b>
Preliminary Analyses and Data Cleaning .....	15

Confirmatory Factor Analysis.....	16
Initial fit of the EDMCQ-C.....	16
Revision of the EDMCQ-C.....	16
Exploratory covariance structure modeling (ECSM).....	17
Second Confirmatory Factor Analysis .....	18
<b>Instrument Refinement and Development of the EDMCQ-ACS .....</b>	<b>18</b>
<b>Discussion .....</b>	<b>19</b>
<b>Future Directions for Research .....</b>	<b>22</b>
<b>Conclusion .....</b>	<b>23</b>
<b>Manuscript 2 – EDMCQ-ACS Construct Validity: Motivational Climate Profiles Differences and Canonical Correlation Relationships for Correlate Variables .....</b>	<b>35</b>
<b>Empowering and Disempowering Climates: Role of Autonomy Supportive, Social Supportive and Controlling Coach Motivational Strategies.....</b>	<b>39</b>
<b>Motivational Climate Correlate Variables.....</b>	<b>42</b>
Perfectionism .....	42
Goal Setting Styles.....	43
Mindsets.....	45
<b>Motivational Climate Profile Differences across Correlate Variables .....</b>	<b>47</b>
<b>Method.....</b>	<b>48</b>
Design and Participants .....	48
<b>Instrumentation.....</b>	<b>49</b>
Empowering Disempowering Motivational Climate Questionnaire – American College Sample (EDMCQ-ACS).....	49
Dispositional Perfectionism Short Scale (DPSS).....	50
Conceptions of the Nature of Athletic Ability Questionnaire-2 (CNAAQ-2).....	50
Competitive Goal Setting Style Questionnaire (CGSSQ).....	51
Competitive Sports Background and Demographic Questionnaire (CSBDQ).....	51
<b>Procedure.....</b>	<b>51</b>
Data Analysis .....	52
<b>Results.....</b>	<b>53</b>
Cluster Analysis Results .....	53
Multivariate Analysis of Variance (MANOVA) Results .....	54
<b>Discussion .....</b>	<b>59</b>



<b>Future Directions for Research .....</b>	<b>65</b>
<b>Conclusion .....</b>	<b>67</b>
<b>Appendix A.....</b>	<b>81</b>
Empowering Disempowering Motivational Climate Questionnaire – Coach .....	81
<b>Appendix B.....</b>	<b>84</b>
Dispositional Perfectionism Short Scale (DPSS).....	84
<b>Appendix C.....</b>	<b>85</b>
Conceptions of the Nature of Athletic Ability Questionnaire Version 2 (CNAAQ-2_ .....	85
<b>Appendix D.....</b>	<b>86</b>
Competitive Motivational Styles Questionnaire (CMSQ).....	86
<b>Appendix E.....</b>	<b>87</b>
Competitive Sports Background and Demographic Questionnaire (CSBDQ).....	87
<b>Appendix F.....</b>	<b>89</b>
Institutional Review Board (IRB) Application .....	89
<b>Appendix G.....</b>	<b>91</b>
Request for participation and consent Form – Online Consent .....	91
<b>Appendix H.....</b>	<b>92</b>
<b>Appendix I.....</b>	<b>93</b>

## Table of Tables

Table 1.1: Sample Frequency Statistics for Demographic and Playing Experience	
Variables of Study 1 .....	30
Table 1.2: EDMCQ-ACS Summary Item Statistics..... 31	
Table 1.3: Factor Correlation Matrix of EDMCQ-ACS Subscales..... 32	
Table 2.1: Multivariate Analysis of Variance Comparisons of EDMCQ-ACS Clusters on Two Perfectionism Subscales, Four Goal Setting Style Subscales and Two Mindset Subscales .....	
	75
Table 2.2 Canonical Correlation Values between Four CMSQ Subscales and Three EDMCQ-ACS .....	
	76
Table 2.3 Canonical Correlation Values between Two CNAAQ-2 Subscales and Three EDMCQ-ACS .....	
	77
Table 2.4 Canonical Correlation Values between Two DPSS Subscales and Three EDMCQ- ACS.....	
	78
Table 2.5 Canonical Correlation Values between all Motivational Correlate Subscales and Three EDMCQ-ACS.....	
	79

## Table of Figures

Figure 1.1: CFA of Empowering Disempowering Motivational Climate Questionnaire – C .....	33
Figure 1.2: Confirmatory Factor Analysis with Sample 2 of Empowering Disempowering Motivational Climate Questionnaire – American College Sample. ....	34
Figure 2.1 Cluster Analysis Results for EDMCQ-ACS 79. ....	80

## **Dissertation Overview**

Motivational Climate (MC) is an important situational factor influencing participation in sport that is largely coach-created (Balaguer, Duda, & Crespo, 1999; Duda & Balaguer, 2007; Smith, Smoll, & Cumming, 2007). Two types of MC have been identified, task/mastery or ego/performance, with MC reflecting athletes' perceptions of the sport environment in which they practice and compete (Ntoumanis & Biddle, 1999). Although limited research has been conducted on how coaches can promote a particular type of competitive climate, achievement goal theory (AGT) has hypothesized how either type of MC can be created over time through task- or ego-focused goals (Ames, 1992; Nicholls, 1989). In addition, self-determination theory (SDT) explains the motivation behind choices people make without external influence and interference, particularly the degree to which competence, autonomy and relatedness needs are met (Ryan & Deci, 2017). The framework of SDT and AGT emphasize social-contextual determinations associated with changeability of athletes' motivation levels. The crux of motivational differences are due to the intentions of individuals to participate in specific activities and the quality of their behaviors (Deci & Ryan, 2000).

To date, research investigating how coach-created MC environment is perceived by athletes has been somewhat limited, particularly how this MC perception is affected other motivational correlates in sport (i.e., perfectionism, goal setting styles, and mindsets). The purpose of this dissertation was twofold: (a) to examine the Empowering-Disempowering Motivational Climate Questionnaire – Coach Version that was developed for children and adolescents in the United Kingdom in order to see how well the instrument fits an American collegiate and professional sport population, and (b) in the event that the instrument does not have acceptable fit indices, investigate whether the instrument can be revised so fit is

acceptable and provide preliminary construct validity for the revised instrument. This research question (RQ) was examined through two separate, but related, studies that investigated measurement, prevalence, antecedents, and consequences of MC in a large sample of adult athletes.

Before inquiries about MC could be conducted, a psychologically-sound MC instrument that reliably and validly assessed factors affecting MC in adult athletes was needed. Previous MC research had used the Perceived Motivational Climate Questionnaire (PMCQ-2; Walling, Duda, & Chi, 1993) which measures two subscales, task/mastery and ego/performance climates. More recently, the Empowering and Disempowering Motivational Climate Questionnaire - Coach (EDMCQ-C; Appleton, Ntoumanis, Quested, Viladrich, & Duda, 2016) was developed to measure empowering and disempowering dimensions of MC based on a model that was created utilizing a conceptual framework that combines AGT and SDT. The EDMCQ-C is comprised of five subscales, including three empowering, (i.e., task-involving, autonomy-supportive, and socially-supportive) and two disempowering (i.e., ego-involving, and controlling coaching) subscales. The EDMCQ-C incorporates more coach-created MC factors than does the PMCQ-2, but it was developed primarily for use with youth and adolescent populations. Furthermore, developmental work was conducted with non-North American populations, suggesting additional confirmatory work seems warranted to establish the instrument for use with an American sample of collegiate and professional athletes. Thus, the purpose of Study 1 was to validate the EDMCQ-C scale using an American population of adult athletes.

The EDMCQ-C did not provide acceptable fit indices for an adult population, therefore exploratory factor analysis (EFA) was used to revise the EDMCQ for adult American

athletes labeled the EDMCQ-Adult Collegiate Sample (EDMCQ-ACS) that had three subscales (i.e. task involvement, ego involvement and controlling coaching subscales and demonstrate strong CFA fit indices. Study 2 used cluster analysis of the three MC subscales to create four MC profile groups, and then multivariate analysis of variance (MANOVA) was conducted to identify differences between profile groups on motivational correlate variables (i.e., mindsets, perfectionism, and GSSs subscales) in order to determine EDMCQ-ACS dimensions that are most critical to discriminating between profiles. Finally, canonical correlation analysis was used to examine the relationships between the three MC subscales in one variable set and four other variable sets comprised of: (a) mindsets, (b) perfectionism, (c) goal setting styles, and (d) a combination of all psychological variables.

# **Manuscript 1: Examining Model Fit of the Empowering Disempowering Motivation Climate Questionnaire-Coach for an American Collegiate Sample**

Over the last three decades, sport psychology research has focused on the influence of coach-related factors in sport (Appleton, Ntoumanis, Quested, Viladrich, & Duda, 2016). More specifically, Duda & Balaguer (2007) suggest that athletes' relationships with their coach can affect their experiences within sport, and further influence actual performance, particularly because interpersonal relationship variables such as mutual trust and respect are thought to be major contributors to positive or negative coach-athlete relationships (Jowett & Cockerill, 2003; Jowett & Poczwardowski, 2007; Poczwardowski, Barott, & Peregoy, 2002).

Early research on motivational climate (MC) was framed upon Nicholls' (1989) achievement goal theory (AGT) that focuses on understanding how individuals' motivational levels could be optimized in achievement settings. Athlete behaviors are viewed as a combination of the influences of both their personality and the environment in which they practice and compete. Nicholls (1989) believed that one key to maximizing motivation was to create a climate that helps individuals define success based on their own effort and improvement (i.e., task orientation), versus success based on their normative comparison to peers (i.e., ego orientation). Thus, Nicholls (1989) hypothesized that if coaches could emphasize task-involvement in the athletic achievement environment, every athlete could feel successful and have positive experiences because the focus would be on high effort and self-improvement.

Grounded in the AGT framework (Ames, 1992), ego-involving (or performance) and task-involving (or mastery) climates are hypothesized to exist in sport as well as other achievement domains, and sport research conducted by Newton, Duda, & Yin (2000) supported this belief. An ego/performance climate (EPC) is characterized by interpersonal competition, social comparison and public evaluation. In contrast, task/mastery climate (TMC) focuses on learning, effort exertion, and personal improvement (Ames, 1992; Newton et al., 2000). According to research (i.e., Duda & Ntoumanis, 2005; Reinboth & Duda, 2004; Smith, Cumming, & Smoll, 2008) MC promotes the differential occurrences of task or ego states of involvement within the person. When task-involved, athletes try to demonstrate mastery of the task rather than being focused on showing normatively high ability. In this case, ability is perceived by the athletes themselves, and they feel competent when learning, improving, and mastering a skill with high effort expenditure. In contrast, within an EPC, improvement, understanding and learning are seen more as a means to an end rather than outcomes in their own right. According to Nicholls (1989), individuals in a more EPC try to demonstrate superiority and are therefore concerned about how able they are compared to other competitors.

As the study of MC has progressed, research (Ntoumanis, 2001; Reinboth & Duda, 2004; Sarrazin, Guillet, & Cury, 2001) suggests that the fundamental motivational needs of athletes are created and nurtured by the coach. Coaches design practice sessions, group athletes, give them recognition, evaluate their performance, share authority and decision-making with them, and shape the sport environment. In doing so, they create a MC which can have an important impact on athletes' motivation. Seifriz, Duda, & Chi (1992) suggest that the coach also has a major influence on athletes' stress responses, enjoyment, and feelings of



self-efficacy in sport settings, thus affecting the overall MC. Therefore, the purpose of this line of research is to further investigate how athletes perceive the motivational climate that coaches create, and how internal psychological factors (i.e., motivation) can affect how that environment can be perceived, which may influence their sport careers.

### **Measuring Motivational Climate**

Several instruments have been developed to measure MC within sport. The majority of work that has incorporated coach-created TMC and EPC has used the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2; Newton et al., 2000). The PMCSQ-2 was originally developed by Walling, Duda, & Chi (PMCQ; 1993), and then revised by Newton, Duda, & Yin (2000) to measure athlete perceptions to what degree their team's MC was characterized by task/mastery and ego/performance goals. Psychometric work on the PMSCQ-2 performed by Newton and colleagues (2000) found it to have adequate factorial validity. The PMCSQ-2 is comprised of 21-items representing two dimensions of MC, including a 9-item TMC and a 12-item EPC subscale. Items are rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with strong alpha reliability coefficients calculated for each of the two subscales (i.e., .82 and .80 for TMC and EPC, respectively). Confirmatory factor analysis reported acceptable fit indices, and the correlation between the two MC subscales was -.26. (Walling, Duda, & Chi, 1993). The development of the PMCSQ-2, and research following its conception (Duda, 2012; Hassan & Morgan, 2015; Horn, Byrd, Martin, & Young, 2012), has resulted in strong support for the benefits of a task-involving, coach-created MC for sport participants, as well as the negative outcomes associated with participating in a sport climate marked by ego-involving characteristics (Duda & Balaguer, 2007; Roberts, 2012).

### **Coach-Athlete Relationship Questionnaire (CART-Q)**

Since the development and revision of the PMCSQ-2, other instruments have been developed to further understand and measure aspects of MC. Jowett & Ntoumanis (2004) developed the 11-item Coach-Athlete Relationship Questionnaire (CART-Q) used to explain a number of sporting experiences, including motivation. This instrument was used to measure athletes' direct perceptions and meta-perceptions (i.e., judgements made by self about what others think about self) of the quality of the coach-athlete relationship, with three subscales measuring 'closeness' (4 items; e.g., "I trust my coach"), 'commitment' (3 items; e.g., "I am committed to my coach"), and 'complementarity' (4 items; e.g., "When I am coached by my coach, I am at ease"). Responses were made on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The direct perceptions version of the CART-Q demonstrated high internal consistency scores, including: .87 for Closeness, .81 for Commitment, and .85 for Complementarity. Correspondingly, the internal consistency scores for the meta-perception version of the CART-Q were of similar magnitude, including: .84 for meta-Closeness, .79 for meta-Commitment, and .87 for meta-Complementarity. Confirmatory Factor Analysis (CFA) was also conducted to assess the construct validity of both versions of the CART-Q (i.e., perceptions versus meta-perceptions), the loadings for meta-closeness, meta-commitment, and meta-complementarity onto the higher order factor were .97, .98, and .99 respectively.

The goal of internal consistency analysis is to corroborate the reliability of an instrument, and for scores on similar items to be strongly related, but for each to contribute unique information (Peters, 2014). High internal consistency scores can represent items that are closely related to each other when defining a construct, although Taylor (2013) suggests

that Cronbach alpha scores above .9 can represent items that are in perfect agreement with each other, meaning not all items should be included in the scale because they may be redundant. However, Rhine and Jowett (2010), and Jowett and Ntoumanis (2004) support the adequacy and appropriateness of both versions of the CART-Q in terms of content, construct, and criterion validity.

### **Multi-Dimensional Motivational Climate Observation System (MMCOS)**

In addition, drawing from the research of Ames (1992), further questionnaires measuring MC were developed to test specific populations. Smith et al. (2015) developed and demonstrated initial validation of the Multi-Dimensional Motivational Climate Observation System (MMCOS) within a youth sport sample. The MMCOS integrates features of the environment relevant to AGT and SDT to assess psychological meaning (i.e., the pervasiveness, intensity, and expression), of the coach-created environment operating in the sport setting. Coaching behaviors were rated according to the influence of the environmental dimensions, namely the extent to which they were autonomy supportive, controlling, task-involving, ego-involving and relatedness-supportive. Within the MMCOS, six strategies informed whether the coach emphasized an autonomy supportive environment (e.g., “provides meaningful choices”); six strategies for the controlling dimension (e.g., “uses extrinsic rewards”); four strategies for the task-involving dimension (e.g., “emphasizes effort and improvement”); three strategies for the ego-involving dimension (e.g., “punishes mistakes”); and five strategies for the relatedness/supportive dimension (e.g., “ensures all athletes are included in drills, activities and exercises”). Based on the frequency, intensity and pervasiveness of the behavioral strategies, coders rated the five dimensions on a 4- point potency scale ranging from 0 (not at all) to 3 (strong potency). All five dimensions of the

environment were coded to a moderate to good degree of reliability; autonomy support = 0.85; controlling = 0.90; task-involving = 0.75; ego-involving = 0.73; relatedness supportive = 0.80 (Smith, et al., 2015). Further research conducted by Smith et al. (2007) illustrates that MC in youth sports also relates to other aspects of performance, predicting correctly that a TMC was related to low athlete anxiety.

### **Motivational Climate Scale for Youth Sports (MCSYS)**

Researchers used the Motivational Climate Scale for Youth Sports (MCSYS; Smith, Cumming, & Smoll, 2008) to examine the effects of their mastery-involving climate intervention. Smith et al. (2007) developed an age-appropriate measurement instrument (i.e., MCSYS) based on the (Tucker & Lewis, 1973) content of the PMCSQ-2 for athletes down to 9 years old (Newton, Duda, & Yin, 2000). The Sport Anxiety Scale-2 (SAS-2) was used in conjunction with the MCSYS, linking low anxiety scores on the SAS-2 to low EPC scores on the MCSYS. Results revealed that athletes who perceived their coaches as more mastery-involving on the MC scale had significantly lower anxiety. These results supported the predicted link between a mastery-initiating motivational climate and lowered anxiety, previously demonstrated only in correlational research (McArdle & Duda, 2002; Vazou, Ntoumanis, & Duda, 2006).

**Empowering and Disempowering Motivational Climate Questionnaire- Coach Version (EDMCQ-C).** Additional work has given insight into the underlying dimensions comprising TMCs and EPCs in sport. Mageau & Vallerand (2003) suggest that a coaches' personal orientation towards coaching, the context within which they operate, and their perceptions of their athletes' behavior and motivation influence coaches' MC behaviors. Therefore, in an attempt to measure the underlying dimensions of 'empowering' and

'disempowering' coach-created MCs in sport without relying on numerous multi-item instruments, the Empowering and Disempowering Motivational Climate Questionnaire (EDMCQ; Duda J., 2013) was created, specifically to assess MC for youth and adolescent sport populations. Appleton et al.'s (2016) most recent MC instrument, the Empowering and Disempowering Motivational Climate Questionnaire-Coach Version (EDMCQ-C) identified five MC dimensions. The EDMCQ-C measures the empowering climate dimension through task-involving (e.g., "My coach encouraged athletes to try new skills."), autonomy-supportive (e.g., "My coach gave athletes choices and options.") and socially-supportive (e.g., "My coach really appreciated athletes as people, not just as a sport participant.") subscales. The disempowering climate dimension includes two subscales measuring ego-involving (e.g., "My coach yelled at athletes for messing up.") and controlling coach (e.g., "My coach paid less attention to athletes if they displeased him or her.") dimensions. Responses were measured on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Initial evidence regarding the psychometrics of the EDMCQ-C include Cronbach's alphas between 0.48 and 0.81 (i.e., task-involving =0.81; autonomy-supportive =0.64; socially-supportive = 0.48; ego-involving =0.80; controlling =0.73) and for the higher-order dimensions were 0.87 and 0.86 for empowering and disempowering climates, respectively (Appleton & Duda, 2016). In addition, the final fit indices for the model was .95. Goodness-of-fit indices and information criteria included the comparative fit index (CFI), the Tucker Lewis index (TLI), and root mean square error of approximation (RMSEA), with its 90% confidence interval. CFI and TLI values > 0.95 and RMSEA values < 0.06, were considered as indicators of excellent fit. CFI and TLI values > 0.90 and RMSEA <0.08 considered indicators of acceptable fit (Marsh, Hau, & Wen, 2004; Steiger, 1990; Tucker & Lewis, 1973).

Establishing the validity of a psychometric instrument is an ongoing process involving the accumulation of many types of evidence (Schutz & Gessaroli, 1993). Confirmatory Factor Analysis (CFA) is a widely accepted tool to examine patterns among constructs, and a strong test of factorial validity (Raykov & Marcoulides, 2000). Schutz and Gessaroli (1993) illustrated that CFA enables the researcher to specify a factor model in advance and subsequently force items to load on specific factors, using a strong theoretical foundation. In this case, the objective of CFA is to examine whether data from a different population fits the hypothesized measurement model, which is based on theory and previous analytic research. The EDMCQ-C has predominately been used in youth and non-American populations which leads to this study examining its factorial validity within an adult American athlete population.

In light of the literature on MCs, positive coach-created climates are hypothesized to be comprised of high scores on task-involving, socially-supportive, and autonomy-supportive subscales, and low scores on controlling-coaching, and ego-involving subscales. The inverse is hypothesized in negative coach-created MCs. The primary research question of this study was to examine whether the EDMCQ-C demonstrates strong fit indices that warrant its use to investigate MC and its correlates for American adult athlete samples. Therefore, Hypothesis 1.1 predicted the EDMCQ-C would have acceptable fit indices and parsimony with an adult American athlete population. Alternatively, Hypothesis 1.2 predicted that if the model fit was poor, a modified instrument could be created that would assess MC more effectively with the current population, demonstrating acceptable fit indices and parsimony.

## **Method**

### **Design and Participants**

The sample research population consisted of 723 current and former collegiate and adult athletes who have competed in sports within the last three years. Participants were recruited through two major sampling strategies, both utilizing convenience samples. The first major strategy was to recruit using ResearchMatch, an online system that connects researchers with willing research participants. The second major strategy was to utilize convenient samples obtained through coaching colleagues. Coaches who are currently working in sport settings were contacted and asked to disperse a survey including the EDMCQ-C and selected demographic variables through a number of methods (i.e., text, email, social media, and word of mouth).

### **Instrumentation**

**Empowering Disempowering Motivational Climate Questionnaire - Coach (EDMCQ-C).** The EDMCQ-C (Appendix A) was developed by Appleton, Ntoumanis, Quested, Viladrich, & Duda, (2016) to measure empowering and disempowering MCs. The EDMCQ-C was loosely based on Smith et al.'s (2015) Multi-Dimensional Motivational Climate Observational System (MMCOS) for youth sport populations. Participants' perceptions of coach-created empowering (i.e., 19 items; i.e., "My coach thought that it is important for players to play this sport because they (the players) enjoy it.") and disempowering (i.e., 17 items; i.e., "My coach favored some players more than others.") dimensions of the MC was assessed with the 34-item EDMCQ-C (Appleton et al., 2016). Empowering subscales included; autonomy supportive (5 items), socially supportive (5 items), and task-involving climate (9 items) subscales, whereas disempowering subscales

included: ego-involving (7 items), and controlling coaching (10 items). Participants were instructed to “Think about what it has usually been like on this team/club during the last 3–4 weeks” when providing their responses. Appleton and colleagues (2016) calculated alpha reliability at .81, .64, .48, .80, and .73 for task-involving, autonomy-supportive, socially-supportive, ego-involving, and controlling coaching subscales, respectively. The fit of the data to the final model was calculated at CFI=0.95, TLI=0.95, RMSEA=0.03, with its 90% confidence interval. Researchers (e.g., Marsh, Hau, & Wen, 2004; Steiger, 1990; Tucker & Lewis, 1973) acknowledge CFI and TLI values > 0.95 and RMSEA values < 0.06, as indicators of excellent fit, with CFI and TLI values > 0.90 and RMSEA < 0.08 indicating acceptable fit.

**Competitive Sports Background and Demographic Questionnaire (CSBDQ).** The CSBDQ (see Appendix E) is an 8-item instrument developed to assess key demographic variables of interest for this study (i.e., gender, age, race), and previous experience playing sport (i.e., main sport, years participated in sport, last time competed, highest competitive level, and location of participation).

## **Procedure**

Once the University of Idaho Institutional Review Board (IRB) approval was obtained (see Appendix F), an electronic survey was designed on Qualtrics, incorporating the EDMCQ-C and CSBDQ. This study used a survey design protocol to examine the generalizability and fit for the EDMCQ-C (Appendix A) in other geographical regions and with adult athletes different than the youth and adolescent populations previously examined by Appleton et al., (2016). Because the EDMCQ-C has primarily been used in youth populations outside the United States, the aim of this study was to examine the factor



structure using Confirmatory Factor Analysis (CFA) to identify whether the EDMCQ-C would remain viable for a population of 723 adult athletes competing within the U.S.

### **Data Analysis Plan**

**Confirmatory factor analysis (CFA).** The purpose of this data analysis plan is to confirm the factorial validity of the EDMCQ-C established by previous studies, using an American adult athlete population. AMOS – V-22 (IBM, 2017) was used to conduct CFA on the EDMCQ-C. This data analysis examined whether the data from this study’s population fit the hypothesized measurement model. This hypothesized model is based on previous analytic research by Appleton et al. (2016). Modification indices were used to examine how fit could be improved, and alternative specifications and factor structures were explored to identify a measurement model with maximal fit, parsimony, and construct validity.

Prior to analysis, all data were examined for missing values, and cases with missing values were excluded from subsequent analyses. Data were also examined to ensure all values were within range to ensure all cases were from the target populations (i.e., respondents had competed within the last 3 years, and were over the age of 18). Univariate and multivariate outliers were identified using descriptive statistics and Mahalanobis distances, respectively. Finally, to assess the extent to which the assumption of normality had been satisfactorily met, skewness and kurtosis values were examined.

**Exploratory factor analysis (EFA).** If the EDMCQ-C did not have at least adequate fit for our American collegiate sample, the plan was to create a revised instrument that better fit the data using EFA to identify initial factor structure. Because CFA indicated that the new data did not have adequate fit with the EDMCQ-C model, an EFA was conducted using maximum likelihood (ML) extraction and direct oblimin rotation to allow for potential

correlations among factors. This data analysis approach allowed a model with greater fit and parsimony to be created from the EDMCQ-C data collected. Factors with eigenvalues greater than or equal to 1.0 were retained in the solution. Following estimation, the measurement model was respecified, eliminating items that (a) had no substantial loadings on any factor (i.e., loadings  $\leq 0.40$ ), (b) had simultaneous, substantial loadings on multiple factors (i.e., loadings  $\geq 0.40$  on more than one factor), or (c) did not fit conceptually with the other factor items. Cronbach's alpha was then calculated to assess internal consistency of the items in each derived factor.

**Exploratory covariance structure modeling.** Finally, Version 22.0 of the Analysis of Moment Structures (AMOS – V-22, IBM, 2017) was used to assess the fit of a model in which all cross-loadings were constrained to zero (i.e., exploratory covariance structure modeling; ECSM). The first item of each factor was set to 1.0 to define the metric of the latent factor, and the remaining items were freely estimated. The covariance between factors was freely estimated, and all covariances between error terms were set to zero. Maximum likelihood estimation (MLE) was used to generate parameter estimates. The likelihood chi-square statistic, CFI (Bentler, 1990), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA;  $\epsilon$ ) were used to assess model fit.

## **Results**

### **Preliminary Analyses and Data Cleaning**

Over 1100 responses were collected, and the data file was downloaded from Qualtrics for analysis in SPSS and AMOS. Any responses from individuals who did not meet the inclusion criteria for the target population were removed, and missing data were removed

from the file. Other responses were removed due to incomplete responses on the EDMCQ-C portion of the survey. Data was then checked for univariate and multivariate outliers and checked for skewness and kurtosis before moving forward with the final testing population (n=723).

### **Confirmatory Factor Analysis**

Initial fit of the EDMCQ-C measurement model was poor (CFI = 0.85; RMSEA = 0.072;  $\chi^2 = 2437.934$ ,  $p < 0.001$ ). Even though the modification indices suggested model fit could be substantially improved with the specification of covariances between multiple items, the theoretical similarity of the items (i.e., items originating from AGT and SDT theory), EFA was considered a better option to produce a better model fitting model. Therefore, EFA was conducted on the data set in order to create an instrument with an acceptable fit indices and parsimony.

### **Revision of the EDMCQ-C**

In order to create a viable instrument that worked for the American collegiate/professional sample population, EFA and CFA were conducted. Therefore, the original response pool was randomly split into two populations, of 362 and 361 participants each. Using Sample 1 of 362 participants, exploratory factor analysis was conducted to attempt to find a modified version of the instrument that fit current data, and this revised instrument was renamed the EDMCQ-ACS (Empowering Disempowering Motivational Climate Questionnaire-American College Sample).

**Motivational Climate exploratory factor analysis to revise the item pool.** Thirty-four items assessing perceived motivational climate in the EDMCQ-C were factor analyzed using data from Sample 1. A three-factor solution emerged that accounted for 58.15% of the total

variance among 12 the motivational climate items that were retained. Based on item content, the three factors were labeled as (a) Task-Involving (TI), (b) Ego-Involving (EI), and (c) Controlling Coaching (CC), with the TI subscale being the lone empowering dimension and EI and CC subscales comprising the disempowering dimension. Items were selected through three different strategies, (a) EFA, (b) modification indices, and (c) assessing conceptual and theoretical differences. Using these three techniques items that aligned with the model, as well as the specific population, were selected. Specific item content, pattern coefficients and structure coefficients are displayed in Table 1.2.

**Exploratory covariance structure modeling (ECSM).** Three factors emerged from the EFA (Figure 1.2), and factor structure was consistent across each of the extraction techniques. The first factor included seven items and was labeled “Task-Involving” (TI), with the primary loadings on this factor ranging from 0.54 to 0.83. The second factor was comprised of three items and was labeled “Ego Involving” (EI), with loadings on this factor ranging from 0.77 to 0.92. The third factor included three items and was labeled “Controlling Coaching” (CC), with primary loadings on this factor ranging from 0.71 to 0.82. The follow-up Exploratory Covariance Structure Modeling (ECSM) was used to assess the fit of the new factor structure of the of the revised EDMCQ-ACS. Initial fit of the EDMCQ-ACS was acceptable (RMSEA = 0.065; *CFI* = 0.957;  $\chi^2 = 155.24$ ; *TLI* = 0.946;  $p < 0.001$ ). Modification indices were consulted in combination with substantive conceptual considerations to adjust the final factor structure in order to improve fit for the American collegiate and professional population. Values between observed and unobserved variables varied with correlations as high as .87 and as low as .19.

## **Second Confirmatory Factor Analysis**

After the EFA and follow-up ECSM of Sample 1 (n=362) produced a modified instrument by eliminating 21 of the 34 EDMCQ-C items, with 13 items remaining in the EDMCQ-ACS. A second CFA was then conducted to assess model fit of the EDMCQ-ACS. Sample 2 of 361 participants was used to conduct the new CFA, and results confirmed an excellent initial fit of the EDMCQ-ACS measurement model (CFI = 0.978; RMSEA = 0.047;  $\chi^2 = 111.528$ ,  $p < 0.001$ ; TLI = 0.973). Table 1.3 presents the correlations underlying this model along with descriptives as well as Skewness and Kurtosis values for the 13-item instrument. Table 1.4 shows results of the pattern matrix loadings for the 13-item EDMCQ-ACS on Sample 2. Thus, the CFA demonstrated that the modified EDMCQ-ACS had excellent fit with a more parsimonious 13 item pool.

### **Instrument Refinement and Development of the EDMCQ-ACS**

An exploratory examination of the EDMCQ-C revealed poor model fit with a population of American collegiate and professional athletes. Due to the poor fit, an EFA was conducted to produce a model that created better model fit and parsimony. A new 13-item instrument was developed through; (a) EFA, (b) modification indices, and (c) assessment of conceptual and theoretical item differences. The new instrument was labeled the EDMCQ-ACS and demonstrated excellent model fit with the current population based on CFA results. Three latent factors held up under both unrestricted (i.e., EFA) and restricted (i.e., ECSM) examinations of model fit. The first latent factor, “Task Involving” (TI), dealt with the coach’s ability to create feelings of success and competence by creating an environment that values exerting effort, learning, task mastery, and achieving personal bests (Ames, 1992). The second latent factor, “Ego Involving” (EI), reflected the coach’s emphasis on

demonstrating that they are better than others and possess superior talent and skill (Ames, 1992). The third latent factor, “Controlling Coaching” (CC), emphasized the coach’s need for control and ways that they usurp athlete autonomy. All items had factor loadings greater than 0.50 on their respective factors, which indicates that the latent factors explained more than 25% of the variability in how participants responded to the items; thus, items were meaningful indicators of their respective latent constructs. The subscales also had acceptable internal consistency, as demonstrated by Cronbach alpha values greater than 0.70. Furthermore, because an alternative factor structure emerged (i.e., EI, TI, CC), these results for this adult American sample suggest some of the originally hypothesized dimensions did not seem relevant. Autonomy Support and Social Support were not perceived as crucial dimensions of competitive motivational climate for an American collegiate sample or were not different enough from task involvement to warrant unique dimensions.. Interestingly, these were the two original dimensions that had alpha reliability values below .70 (i.e., AS = .64 and SS = .48).

## **Discussion**

The purpose of the present study was to assess the psychometric fit of the EDMCQ-C for an American collegiate/professional athlete population, and if the fit was poor, to use EFA to revise the instrument to better fit collegiate American athletes. CFA results from the current population showed poor fit for the 34-item EDMCQ-C model, which had initially been developed for child and youth populations from the United Kingdom. Therefore, splitting the population into two large samples, each exceeding 360 participants, two major analyses were conducted, including: (a) an EFA with ECSM follow-up were conducted to finalize the 13-

item EDMCQ-ACS and (b) CFA was also performed to confirm strong model fit. A three-factor (i.e., Task-Involving, Ego-Involving, and Controlling Coaching), 13-item instrument emerged from exploratory and confirmatory factor analyses, and Cronbach's alpha reliability analyses that had good fit indices and was more parsimonious than the EDMCQ-C.

Because the EDMCQ-C was constructed for a British youth and adolescent sample, this study was designed to examine whether the instrument would demonstrate strong model fit for an American collegiate and professional sample. Results of this study demonstrated that the EDMCQ-C factor structure did not yield a strong model fit for an American collegiate sample, prompting rejection of our primary hypothesis. Through EFA, modification indices, and assessment conceptual and theoretical item differences a revised instrument was developed for this sample that provided good model fit, supporting the alternate hypothesis. The empowering motivational climate subscale included 7 items from the original EDMCQ-C whereby autonomy supportive and socially supportive items emerged within the TI subscale as those subscales were deleted through the EFA. The two disempowering motivational climate subscales, EI and CC, yielded 6 items (3 in each) consisting of two CC items, and four EI items from the EDMCQ-C (Table 1.2). Although the model fit was strong, it appeared that the functional disempowering items that emerged for the current population consisted of only two distinctive items. The emerging ego involving items focused primarily on coach favoritism, one suggested area of ego-involvement., whereas the controlling coaching items focused primarily on coaching communication, perceived as "yelling" and consisted of both EI and CC items from the original EDMCQ-C. While the 6 items that emerged were broadly labeled within the subscales of EI and CC, it is not suggested that those items solely describe ego-involving and controlling-coaching environments. However, it is suggested that for the

current population, the selected items represented most accurately their perception of EI and CC climates, from the items that originally in the EDMCQ-C, even though the instrument may benefit from further instrument development to broaden the scope of these subscales and dimensions.. Additionally, the instrument would benefit from examination of several less than ideal aspects of its current content, including: (a) adding items to make all subscales at least four items, reduce redundancy across items and broaden the focus to make subscales and dimensions more robust indicators of the constructs they are measuring, (b) examine the supplemented item pool again to identify the stability of subscales and dimensions (i.e., empowering versus disempowering), and (c) check the invariance of the instrument across critical demographic variables such as gender, age, competitive level, and sport..

Previous research supports the new instrument whereby Nicholls (1989) believed that one key to maximizing motivation was to create a climate that helps individuals define success based on their own effort and improvement (i.e., task orientation), versus success based on their normative comparison to peers (i.e., ego orientation). With research suggesting that task-involving and ego-involving subscales provide important insight into MC, it wasn't surprising that both emerged in the EDMCQ-ACS. Further, Newton, Duda, & Yin (2000) supported the importance of an ego/performance climate and task/mastery climate in assessing MC, adding other psychological variables such as competence, effort, and social comparison. Lastly, the third subscale that emerged within the EDMCQ-ACS was supported through research (Ntoumanis, 2001; Reinboth & Duda, 2004; Sarrazin, Guillet, & Cury, 2001) suggesting that the fundamental role of a coach in a sporting environment is to create a functional MC. Coaches design practice sessions, group athletes, give them recognition, evaluate their performance, share authority and decision-making with them, and shape the



sport environment. In doing so, they create a MC which can have an important impact on athletes' motivation depending on how the athlete perceives the coaching (i.e., controlling or encouraging). Overall findings from this study suggest that the items of the EDMCQ-ACS need to be further refined and invariance testing performed across gender, age, nationality and perhaps sport types. In order to fully develop the validity of this new instrument, further construct validation is warranted if significant revisions are made to the EDMCQ-ACS.

### **Future Directions for Research**

This study suggests that the revised EDMCQ-ACS is a viable MC instrument to be used with adult American samples. However, the instrument probably needs further developmental work followed by more construct validation work. Regardless of how much the instrument is revised, it does need further testing with additional samples. Through EFA, autonomy supportive and socially supportive subscales were deleted but certain items from each subscale remained within the TI subscale. These results do not suggest that autonomy supportive and socially supportive subscales are not individual factors contributing to motivational climate, but rather that the items found in the EDMCQ-C do not properly represent those subscales for the current population. The subscales that emerged through the EFA and remained part of the EDMCQ-ACS represent a narrow focus on empowering and disempowering climates, but a focus that this population of athletes understood and found important as a function of their environment, compared to other items that were removed. Future research needs to focus on finding the items within subscales that represent motivational climate accurately. In addition, both the disempowering MC subscales resulted in 3 items each, however on further analysis of the subscales the main focus of each were very

specific. The EI subscale items selected focused on how coaches treat their “favorite” athletes, whereas the major focus of the CC subscale items were on athlete perceived coaching communication, namely coaches yelling at their athletes. The 6 items in the disempowering MC subscales showed excellent fit for this specific population, however further testing of the EDMCQ-ACS may help identify other important areas within disempowering motivational climate. It is not suggested that TI, EI and CC solely describe motivational climate, or that the items involved in each subscale fully describe either empowering or disempowering MC. However, for this study the items that emerged from the EDMCQ-C through the EFA, and confirmed via CFA, suggest excellent model fit for the current population of college aged, American athletes.

### **Conclusion**

An EFA and CFA supported the three-factor structure of the EDMCQ-ACS after poor model fit of the EDMCQ-C was found within the current population of collegiate and professional American athletes. The original 34-item, 5 subscale model was revised into a more efficient 13-item, 3 subscale model, whereby 2 disempowering and one empowering subscales were retained in modified form. The new model showed excellent model fit, even though construct validation and eventually invariance testing are needed as part of the instrument development process.

## References

- Ames, C. (1992). Achievement goals, motivational climate, and motivational processes. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161-176). Champaign, IL: Human Kinetics.
- Appleton, P. R., & Duda, J. L. (2016). Examining the interactive effects of coach-created empowering and disempowering climate dimensions on athletes' health and functioning. *Psychology of Sport and Exercise, 26*(1), 61-70.
- Appleton, P. R., Ntoumanis, N., Quested, E., Viladrich, C., & Duda, J. L. (2016). Initial validation of the coach-created Empowering and Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C). *Psychology of Sport and Exercise, 22*(1), 53-65.
- Balaguer, I., Duda, J., & Crespo, M. (1999). Motivational climate and goal orientations as predictors of perceptions of improvement, satisfaction, and coach ratings among tennis players. *Scandinavian Journal of Medicine and Science in Sports, 9*, 381-388.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238-246.
- Deci, E., & Ryan, R. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.
- Duda, J. (2012). The coach-created motivational climate, young athletes' well-being, and intentions to continue participation. *Journal of Clinical Sport Psychology, 6*(1), 166-179.

- Duda, J. L., & Balaguer, I. (2007). Coach-created motivational climate. In S. Jowett, & D. Lavallee (Eds.), *Social psychology in sport* (pp. 117-130). Champaign, IL: Human Kinetics.
- Duda, J., & Ntoumanis, N. (2005). After-school sport for children: Implications of a task-involving motivational climate. In J. L. Mahoney, R. Larson, & J. S. Eccles (Eds.), *Organized activities as contexts of development: Extracurricular activities, after school, and community programs* (pp. 311-330). Mahwah, NJ: Erlbaum.
- Hassan, M., & Morgan, K. (2015). Effects of a mastery intervention programme on the motivational climate in sport coaching. *International Journal of Sport Science and Coaching*, *10*(1), 487-503.
- Horn, T., Byrd, M., Martin, E., & Young, C. (2012). Perceived motivational climate and team cohesion in adolescent athletes. *Journal of the National Institute for Sport Research*, *21*(3-4), 25-49.
- IBM. (2017). IBM SPSS Statistics. v24.
- Jowett, S., & Cockerill, I. M. (2003). Olympic medalists' perspective of the athlete-coach relationship. *Psychology of Sport and Exercise*, *1*(4), 313-331.
- Jowett, S., & Ntoumanis, N. (2004). The Coach–Athlete Relationship Questionnaire (CART-Q): Development and initial validation. *Scandinavian Journal of Medicine and Science in Sport*, *14*(4), 245–257.
- Jowett, S., & Poczwardowski, A. (2007). Understanding the coach-athlete relationship. In S. Jowett, & D. Lavallee (Eds.), *Social psychology in sport* (pp. 3-14). Champaign, IL: Human Kinetics.

- Mageau, G. A., & Vallerand, R. J. (2003). The coach–athlete relationship: A motivational model. *Journal of Sports Sciences, 21*(11), 883-904.
- Marsh, H., Hau, K., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's findings. *Structural Equation Modeling, 11*(3), 320-341.
- McArdle, S., & Duda, J. (2002). Implications of the motivational climate in youth sports. In F. Smoll, & R. Smith (Eds.), *Children and youth in sport: A biopsychosocial perspective* (pp. 409-434). Dubuque, IA: Kendall/Hunt.
- Newton, M., & Duda, J. L. (2000). The interaction of motivational climate, dispositional goal orientations, and perceived ability in predicting indices of motivation. *International Journal of Sport Psychology, 30*(1), 63-82.
- Newton, M., Duda, J. L., & Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes. *Journal of Sports Science, 18*(4), 275-290.
- Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
- Ntoumanis, N. (2001). Empirical links between achievement goal theory and self-determination theory in sport. *Journal of Sports Sciences, 19*, 397-409.
- Ntoumanis, N., & Biddle, S. J. (1999). Affect and achievement goals in physical activity: A meta-analysis. *Scandinavian Journal of Medicine and Science in Sports, 9*, 315-332.
- Peters, G. (2014). The alpha and the omega of scale reliability and validity. *European Health Psychologist, 16*(2), 56-69.

- Poczwardowski, A., Barott, J. E., & Peregoy, J. J. (2002). The athlete and coach: Their relationship and its meaning. Methodological concerns and research progress. *International Journal of Sport Psychology*, 33(1), 98-115.
- Raykov, T., & Marcoulides, G. A. (2000). *A first course in structural equation modeling*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Reinboth, M., & Duda, J. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *The Sport Psychologist*, 18(3), 237-251.
- Rhine, D. J., & Jowett, S. (2010). Initial evidence for the criterion-related and structural validity of the long versions of the Coach–Athlete Relationship Questionnaire. *European Journal of Sport Science*, 10(6), 359-370.
- Roberts, G. C. (2012). Motivation in sport and exercise from an Achievement Goal Theory perspective: After 30 years, where are we? In G. C. Roberts, & D. Treasure (Eds.), *Advances in motivation in sport and exercise* (pp. 5-58). Champaign, IL: Human Kinetics.
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York: Guilford Publishing.
- Sarrazin, P., Guillet, E., & Cury, F. (2001). The effect of coach's task-and ego-involving climate on the changes in perceived competence, relatedness, and autonomy among girl handballers. *European Journal of Sport Science*, 1(4), 1-9.
- Schutz, R. W., & Gessaroli, M. E. (1993). Use, misuse, and disuse of psychometrics in sport psychology research. In R. Singer, M. Murphey, & L. Tennant (Eds.), *Handbook of research on sport psychology* (pp. 901-921). New York: Macmillan.

- Seifriz, J. J., Duda, J. L., & Chi, L. (1992). The relationship of perceived motivational climate to intrinsic motivation and beliefs about success in basketball. *Journal of Sport and Exercise Psychology, 14*, 375-391.
- Smith, N., Tessier, D., Tzioumakis, Y., Quested, E., Appleton, P., Sarrazin, P., . . . Duda, J. L. (2015). Development and validation of the Multidimensional Motivational Climate Observation System. *Journal of Sport and Exercise Psychology, 37*(1), 4-22.
- Smith, R., Cumming, S., & Smoll, F. (2008). Development and validation of the Motivational Climate Scale for Youth Sports. *Journal of Applied Sport Psychology, 20*(2), 116-136.
- Smith, R., Smoll, F., & Cumming, S. (2007). Effects of a motivational climate intervention for coaches on young athletes' sport performance anxiety. *Journal of Sport and Exercise Psychology, 29*, 39-59.
- Steiger, J. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research, 25*(1), 173-180.
- Taylor, J. (2013). *Confusing stats terms explained: Internal consistency*. Retrieved from Stats make me cry consulting: <http://www.statsmakemecry.com/smmctheblog/confusing-stats-terms-explained-internal-consistency.html>
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*, 1-10.
- Vazou, S., Ntoumanis, N., & Duda, J. (2006). Predicting young athletes' motivational indices as a function of their perceptions of the coach- and peer-created climate. *Psychology of Sport and Exercise, 7*(1), 215-233.

Walling, M. D., Duda, J. L., & Chi, L. (1993). The perceived motivational climate in sport questionnaire: Construct and predictive validity. *Journal of Sport and Exercise Psychology, 15*, 172-183.



Table 1.1 *Sample Frequency Statistics for Demographic and Playing Experience Variables of Study*

Variable	Frequency (%)	Variable	Frequency (%)
<b>Gender</b>		<b>Gender</b>	
Males	147 (16.5%)	Sport Type	
Females	576 (79.7%)	Team	595 (78.1%)
<b>Race/ethnicity</b>		Individual	132 (18.3%)
American Indian/Alaska Native	10 (1.4%)	<b>Years Participated</b>	
Asian	16 (2.2%)	0-5	41 (5.9%)
Black/African American	63 (8.7%)	6-10	156 (22.5%)
White	601 (83.1%)	11-15	303 (43.6%)
Other	50 (6.9%)	16+	194 (28.0%)
<b>Age</b>		<b>Level(s) Competed at</b>	
18-22	596 (86.3%)	Full-team International	22 (3.0%)
23-25	45 (6.5%)	Professional – Club Level	76 (10.5%)
26-30	27 (3.9%)	Youth-team International	84 (11.6%)
31-35	5 (0.7%)	NCAA Division I	316 (43.7%)
36+	18 (2.6%)	NCAA Division II	267 (36.9%)
<b>Last Competed</b>		NCAA Division III	39 (5.4%)
Currently	492 (68.0%)	NAIA	14 (1.9%)
Within the last year	160 (22.1%)	College – Other	14 (1.9%)
Within the last 2 years	23 (3.2%)	College – Community or Junior	36 (5.0%)
Within the last 3 years	20 (2.7%)	Junior Club Level	286 (39.6%)
		High School	512 (70.8%)
		Middle School	356 (49.2%)

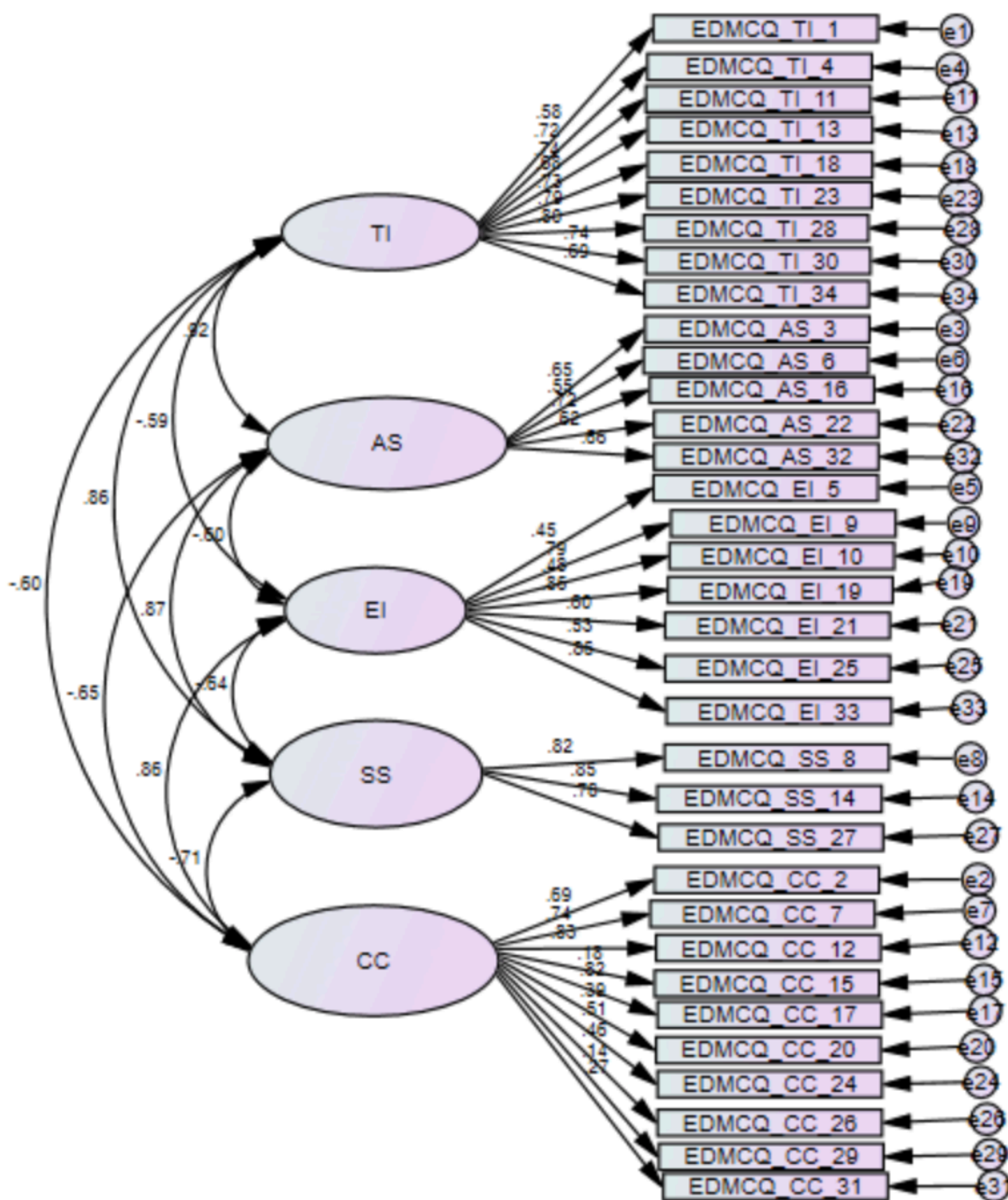
Table 1.2 *EDMCQ-ACS Summary Item Statistics*

	Task Involving	Ego Involving	Controlling Coaching
My coach encouraged players to really work together as a team (EDMCQ_TI_34)	-0.78	-	-
My coach really appreciated players as people, not just as athletes (EDMCQ_SS_14)	-0.74	-	-
My coach made sure players felt successful when they improved (EDMCQ_TI_11)	-0.71	-	-
My coach answered players' questions fully and carefully (EDMCQ_AS_16)	-0.68	-	-
My coach listened openly and did not judge players' personal feelings (EDMCQ_SS_27)	-0.67	-	-
My coach made sure that each player contributed in some important way (EDMCQ_TI_18)	-0.64	-	-
My coach encouraged players to try new skills (EDMCQ_TI_1)	-0.57	-	-
My coach had his or her favorite players (EDMCQ_EI_19)	-	0.92	-
My coach favored some players more than others (EDMCQ_EI_33)	-	0.92	-
My coach gave most attention to the best players (EDMCQ_EI_9)	-	0.66	-
My coach shouts at players in front of others to make them do certain things (EDMCQ_CC_24)	-	-	0.86
My coach yelled at players for messing up (EDMCQ_EI_10)	-	-	0.76
My coach threatened to punish players to keep them in line during training (EDMCQ_CC_26)	-	-	0.66

Table 1.3 *Factor Correlation Matrix of EDMCQ-ACS Subscales.*

	<b>Task Involving</b>	<b>Ego Involving</b>	<b>Controlling Coaching</b>
<b>Task Involving</b>	1.00	-	-
<b>Ego Involving</b>	0.53	1.00	-
<b>Controlling Coaching</b>	0.42	0.49	1.00
<i>Mean</i>	<i>5.67</i>	<i>4.88</i>	<i>3.94</i>
<i>Standard Deviation</i>	<i>1.23</i>	<i>1.67</i>	<i>1.84</i>
<i>Cronbach's Alpha</i>	<i>0.42</i>		

Figure 1.1. CFA of Empowering Disempowering Motivational Climate Questionnaire – C



**Chi-square** = 2437.93

**df** = 517

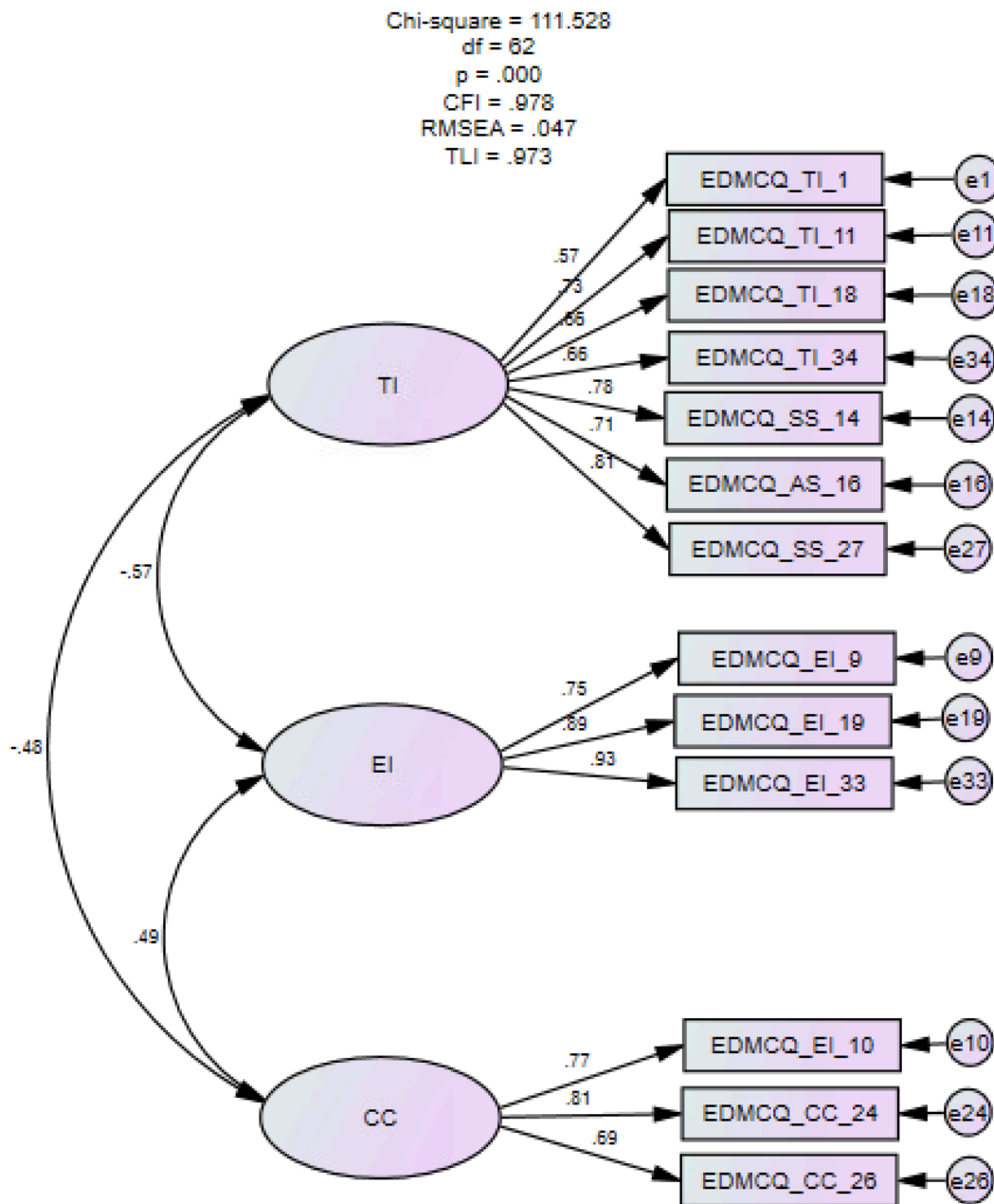
**p** = 0.000

**CFI** = 0.85

**TLI** = 0.84

**$\epsilon$**  = 0.072

Figure 1.2. Confirmatory Factor Analysis with Sample 2 of Empowering Disempowering Motivational Climate Questionnaire – American College Sample.



Chi-square = 111.528  
df = 62  
p = 0.000  
CFI = .978  
TLI = .973  
ε = 0.047

**Manuscript 2 – EDMCQ-ACS Construct Validity: Motivational Climate  
Profiles Differences and Canonical Correlation Relationships  
for Correlate Variables**

The extensive body of research (i.e., Ommundsen, Roberts, Lemyre, & Miller, 2005; Smith, Smoll, & Cumming, 2007; Walling, Duda, & Chi, 1993) examining the correlates of perceived motivational climate (MC) has contributed meaningfully to the understanding of how perceptions are associated with psychosocial functioning in sport and physical activity settings. However, findings can often be inconsistent between studies, and the broad pattern of associations has not been examined systematically or investigated extensively (Harwood, 2015). Even though MC is an important situational factor influencing participation in sport (Balaguer, Duda, & Crespo, 1999; Duda & Balaguer, 2007; Smith, Smoll, & Cumming, 2007), and within the competitive environment, what the coach says, does, and how they instruct, both in games and in training, are all contributors to team climate (Reinboth & Duda, 2004). The purpose of Manuscript 2 is to examine the construct validity of the EDMCQ-ACS, while expanding the knowledge about relationships between MC and three important motivational correlate variables (i.e., mindsets, perfectionism and goal setting styles). This study proposes hypotheses for relationships between MC and these three correlate variables, and then these hypotheses are examined using cluster analysis/multivariate analysis of variance and canonical correlation analysis. AGT has hypothesized how either a task/mastery climate (TMC), or an ego/performance climate (EPC) can be created (Ames, 1992; Nicholls, 1989). However, limited research has examined how coaches can best foster a particular type of competitive environment to help the psychological growth and development of their athletes. Research (e.g., Duda & Balaguer, 2007; Grossbard, Cumming, Standage, Smith, &

Smoll, 2007; MacDonald, Côté, Eys, & Deakin, 2011) confirms the benefit to coaches to try and develop a TMC from a young age, in hopes that overall development within sport will increase over time. Many factors are involved in athlete development, with research aiming to provide a clearer picture of which factors are most important (e.g. Abraham, Collins, & Martindale, 2006; Gilbert, Côté, & Mallett, 2006; Martindale, Collins, & Abraham, 2007; Rhine & Jowett, 2010). MC has also been found to be an important factor promoting constructive athlete psychological profiles.

Duda and Balaguer (2007) and Ntoumanis and Biddle (1999) conducted sport studies on naturally-occurring MC created by the coach and found that a perceived TMC is positively correlated with intrinsic motivation, whereas a perceived EPC either is not correlated, or is negatively correlated, with autonomous forms of behavioral regulation. Smith, Smoll, and Cumming (2007) suggest that a TMC is created when the focus is on personal skill development regardless of how others perform. Coaches define success in terms of self-improvement, task mastery, and exhibiting maximum effort and persistence. In such a climate, athletes are positively reinforced for selecting challenging tasks, giving maximum effort, persisting in the face of setbacks, encouraging and supporting teammates, and demonstrating personal improvement. Within this environment, Ames (1992) emphasized that mistakes be viewed as a potentially valuable source of feedback that can facilitate improvement. Mistakes are regarded as a natural part of the learning process, not as something to be dreaded and avoided because of fear of punishment from the coach. According to Duda's (2013) conceptualization, the coach-created MC should be considered as multidimensional in nature and can be more or less 'empowering' and 'disempowering.'

Alternatively, Smith, Smoll, and Cumming (2007) believe an EPC is formed when the focus is on demonstrating superior ability over others, therefore focusing on external factors over which performers have less control. When coaches create an EPC, they tend to give differential attention and focus to positive reinforcement on athletes who are most competent and instrumental to winning, the importance of which is emphasized. For coaches who create this type of environmental focus on outperforming others rather than personal improvement, mistakes typically result in disciplinary action by the coach (Chi, 2004; Duda & Ntoumanis, 2005). This type of environment can cause athletes to be afraid to make mistakes and motivated to perform based on fear rather than a desire for personal development.

Duda and Balaguer (2007) suggest that a TMC has a positive effect on athletes, while an EPC results in more negative sport experiences. Smith et al. (2007) examined the effects of a coaches' MC intervention on athletes' anxiety levels. Results revealed that athletes who played for coaches who promoted TMC had decreased anxiety as the season progressed, whereas performers who played for coaches who did not receive any constructive MC training demonstrated increased anxiety levels over the same timeframe. Furthermore, research conducted by Jaakkola, Ntoumanis, and Liukkonen (2015) additionally supports this finding by revealing positive correlations between EPC and ego-approach and ego-avoidance goals. These findings suggested that MC emphasizing social comparison, competition, performance outcomes, and outperforming others fosters both types of ego goals. Also, previous studies within youth sports suggest that ego-orientation is related to lowered self-esteem (Castillo, Duda, Balaguer, & Tomás, 2009), reduced moral functioning (Kavussanu & Ntoumanis, 2003) self-handicapping (Ntoumanis, Thøgersen, & Smith, 2009), and detrimental perfectionism (Flett & Hewitt, 2005).



Grossbard, Cumming, Standage, Smith, and Smoll's (2007) research found positive correlations between EPC and performance anxiety, and the inverse relationship with TMC. In addition, social desirability was negatively related to ego orientation and positively related to task orientation in females, but not males. Performance anxiety was also negatively related to social desirability in females, but not males. Although a large amount of MC research was conducted in classrooms and in youth populations (Ames, 1992; Castillo, Duda, Balaguer, & Tomás, 2009; MacDonald, Côté, Eys, & Deakin, 2011), Gardner (1996) utilized the Leadership Scale for Sports (LSS) within a sport setting to identify more global leadership styles that relate to MCs. Gardner's results found that participants who perceived their coach as providing more training, instruction and positive feedback were more likely to perceive a TMC.

In additional studies with female athletes, Smith, Fry, Ethington, and Li (2005) found perceptions of coaches who provided positive and encouraging feedback, both after successful and unsuccessful performances as well as "not ignoring mistakes," was associated with athletes perceiving a TMC. In this study, specific-positive feedback comments were recorded and included: "Good play!," "Excellent work in practice today," "That's O.K. Keep working at it," and "Hang in there! You'll do better next time". The athletes perceived those comments as the coach valuing their hard work, realizing that mistakes are part of learning, and the belief that their high effort will lead to improved performance over time; all aspects of a task-involving climate as described by Newton and Duda (2000).

In contrast, when athletes perceived that their coaches gave less positive feedback, but greater amounts of punishment feedback, they were more likely to perceive an EPC. The punishment feedback included comments such as "That was a really stupid play.", "How

many times have I told you to extend your elbow?", "Your technique looks lousy!", and "That play stunk" (Smith, Fry, Ethington, & Li, 2005). Correspondingly, perceptions of an EPC are associated with negative outcomes such as peer conflict (Ommundsen, Roberts, Lemyre, & Miller, 2005) and increased anxiety (Pensgaard & Roberts, 2002). Overall, results of these studies suggest that a TMC is beneficial for sport participation, while an EPC can reduce participation (MacDonald, Côté, Eys, & Deakin, 2011).

### **Empowering and Disempowering Climates: Role of Autonomy Supportive, Social Supportive and Controlling Coach Motivational Strategies**

Other coach behaviors that have motivational relevance have been identified with Self-Determination Theory (SDT; Deci & Ryan, 1985). A central hypothesis within SDT is the degree to which optimal or diminished functioning and well- and ill-being is dependent on the extent to which the psychosocial environment supports or blocks the fulfilment of three innate psychological needs. The three psychological needs proposed by SDT include: competence, autonomy and relatedness. Greater need satisfaction is associated with more autonomous striving (i.e., participating in an activity for enjoyment and/or personally-valued benefits of the activity), and adaptive, healthful engagement which encourages continued participation within the activity (Ryan & Deci, 2000). Motivated behavior, specifically, can be separated into two broad categories that are characterized by varying degrees of self-determination. Controlled forms of motivated behavior are regulated by non-self-determined forces, whereas autonomous forms of motivated behavior are regulated by internal self-determined processes.

Deci and Ryan (2008) emphasize that when athletes are autonomously motivated, they experience choice, or a self-endorsement of their actions. Controlled motivation, in contrast, consists of both external regulation, in which one's behavior is a function of external contingencies of reward or punishment, and introjected regulation in which the regulation of action has been partially internalized and is energized by factors such as an approval motive, avoidance of shame, contingent self-esteem, and ego-involvement. When people are controlled, they experience pressure to think, feel, or behave in particular ways. Both autonomous and controlled motivation energize and direct behavior, and they stand in contrast to amotivation, which refers to a lack of intention and motivation.

Intrinsic motivation (IM) is the most self-determined form of behavioral regulation and exists when individuals participate because of interest or enjoyment in the activity itself. Deci and Ryan (1985) viewed IM as a unitary construct, and intrinsic motivation refers to participation in an activity for its own sake. According to Deci and Ryan (2008), individuals who are extrinsically motivated participate to obtain separable outcomes.

Numerous studies (e.g., Deci, Koestner, & Ryan, 1999; Deci & Ryan, 1985, 2008) have reported that social contexts that are controlling such as giving rewards, and using deadlines, undermine IM while increasing non-self-determined forms of regulation. Autonomously supportive contexts such as offering choices facilitate IM and self-determination. The effects of these two coaching styles bring about different environments within sport, and therefore influence athlete growth. The controlling style is described as authoritarian, and acts in a coercive, pressuring way, whereas autonomy-supportive coaching styles support freedom, encourage autonomy, and involve individuals in the decision-making

process (Bartholomew, Ntoumanis, & Thøgersen-Ntoumanis, 2010; Pelletier, Fortier, Vallerand, & Brie, 2001).

Blanchard and Vallerand's (1996) research on basketball players revealed that the more coaches were perceived as autonomy-supportive by their athletes, the more autonomous the athletes felt. These findings were supported by Standage, Duda, and Ntoumanis (2003) who demonstrated that perceptions of an autonomy-supportive climate were strong positive predictors of students' perceptions of autonomy.

More recent research (Amorose & Anderson-Butcher, 2015) examined the independent and interactive effects of perceived autonomy-supportive and controlling-coaching behaviors on the motivational response of adolescent athletes. Results found that autonomy-supportive and controlling-coaching behaviors are each related to athletes' motivational responses. Amorose et al. (2015) predicted that autonomy-supportive behaviors would more strongly relate to adaptive motivational responses, whereas perceived controlling behaviors would demonstrate a relatively stronger effect on maladaptive outcomes. Consistent with previous research (e.g., Bartholomew et al., 2011; Pelletier et al., 2001; Smith et al., 2010), correlations supported these hypotheses.

Drawing from SDT, a third aspect of the environment that is assumed to be particularly relevant to the relatedness psychological need is the level and quality of social support, or interpersonal involvement (Skinner & Edge, 2002). In a socially-supportive environment, every athlete feels cared for, empathized with, and valued as athletes and as people (Mageau & Vallerand, 2003; Reinboth & Duda, 2004). Reinboth & Duda (2004) describe the social environment as an important feature of present research because it tests the proposed social environment, need satisfaction, and outcomes with respect to other facets of

the social context besides autonomy support; namely the degree to which the social agent of concern centers on mastery/task goals and provides social support.

### **Motivational Climate Correlate Variables**

Three MC correlate variables are of particular interest in this study, including: perfectionism, goal setting styles and mindsets.

#### **Perfectionism**

Cox, Ennis, and Clara (2002) defined perfectionism as a multidimensional, dispositional variable representing the propensity to strive for unrealistically high and rigid performance standards, to fear failure and mistakes, and to be overly self-critical. Gaudreau and Thompson (2010) hypothesized two broad dimensions of perfectionism: personal standards perfectionism (PSP) and evaluative concerns perfectionism (ECP). PSP is a positive, or adaptive, form of perfectionism that represents the propensity to set high standards for oneself (Gaudreau & Thompson, 2010). ECP is a negative, or maladaptive, form of perfectionism that represents the likelihood to perceive pressure from others to be perfect, to evaluate oneself critically and unforgivingly, and to doubt one's ability to successfully reach high standards (Gaudreau & Thompson, 2010).

Ommundsen, Roberts, Lemyre, & Miller (2005) examined the link between motivational climate and perfectionism and found that youth athletes who perceived an EPC scored high on maladaptive perfectionism, or evaluative concerns perfectionism, and reported negative relationships with peers in the sport setting. The aim of their study was to examine the role of perceived motivational climate, achievement goals and perfectionism on young soccer players' peer relationships. The findings suggested that these motivational qualities

had a systematic relationship with peer acceptance, coach relationships and the quality of friendship in male and female youth soccer player, supporting claims that ECP may have links to negative MCs as a whole.

More recently, Nordin-Bates, Hill, Cumming, Aujla, & Redding (2014) found that a group of teenage dancers reported that perceptions of a task-involving climate in training/performance environments may encourage striving for excellence and perfection without promoting excessive concerns regarding their attainment. In the same study, negative perfectionism was found to be significantly higher in athletes who thought their coaches deemed mistakes as unacceptable and only superior performance was valued.

In light of the literature on MCs and perfectionism, cluster profiles were created based on the three subscales of the EDMCQ-ACS , and Hypothesis 2.1 predicts that PSP would be more strongly related to positive empowering climates than would ECP. Furthermore, Hypothesis 2.1 also predicts that PSP would be less strongly related to negative disempowering climates than would ECP. Conversely, Hypothesis 2.2 predicts that ECP would be more strongly related to negative disempowering MCs than would PSP, and ECP would be less strongly related to positive empowering climates than would PSP.

### **Goal Setting Styles**

According to Gillham, Burton, & Gillham (2017), GSSs are based on involvement states determined by the combination of motivational orientation and perceived competence, and they provide a personality preference to set specific types of goals and use particular goal strategies. Four types of GSSs have been identified, including: development-focused (DF), win-fixated (WF), doubt-oriented (DO) and failure-evader (FE). For the intrinsic/task driven development-focused GSS, athletes typically report higher levels of sport and social

performance and enjoyment compared to the other three more ego-oriented GSSs (Deci & Ryan, 1985; Scanlan, Simons, Carpenter, Schmidt, & Keeler, 1993; Wankel, 1993). According to Gillham et al. (2017), development-focused GSS individuals are task/mastery oriented, view success from a self-referenced lens emphasizing learning and improving, whereas the other three styles are more ego/performance-oriented with success based primarily on social comparison and outperforming others. DF athletes set challenging goals and exhibit high effort and persistence in the face of adversity, whereas win-fixated (WF) individuals typically view success or talent as fixed and measure success based on comparing well against others. Because WF performers win frequently, they typically have high competence that promotes adopting moderately challenging goals.

Doubt-oriented (DO) athletes also compare themselves with others, with success stemming from upholding positive perceptions from others and developing a strong public image (Gillham et al., 2017). However, they doubt their ability and develop lower perceived ability because they lose with moderate frequency. DO athletes' goals depend on contextual factors and the threat of failure, with greater failure creating more self-doubt. Finally, failure-evaders develop low perceived competence because they often lose and compare poorly to others, prompting them to refocus motivation on avoiding failure rather than striving for success (Gillham et al., 2017). A number of studies (Birrer & Morgan, 2010; Cohn, Rotella, & Lloyd, 1990; Gould, Guinan, Greenleaf, Medbery, & Peterson, 1999; Masters, 2014) have demonstrated the impact athletes' GSS can have on the effectiveness of season-long MST interventions, and these findings suggest that it is important to understand participants' GSS to individualize interventions to each athlete in order to maximize goal effectiveness.

Research (Brunel, 1999; Gillham, Burton & Gillham, 2017; Deci & Ryan, 2008; Ntoumanis, 2001) on GSSs and related constructs has been suggested to be related to MC. Consequently, athletes who score highly on the positive GSSs (DF, and possibly WF) subscales should be more readily view MCs as empowering, whereas athletes with more dysfunctional GSSs (i.e., DO and FE) should perceive more disempowering MCs.

In light of the literature on MC and GSSs, Hypothesis 2.1 predicts that DF, and possibly WF, GSS athletes would be more strongly related to positive empowering MCs than would DO and FEs GSSs. Further, Hypothesis 2.1 predicts that DF, and possibly WF, athletes would be less strongly related to negative, disempowering climates than would DO and FE GSSs. Conversely, Hypothesis 2.2 predicts that DO and FE GSS would be more strongly related to negative disempowering MCs than would DF, and possibly WF, GSS athletes. Also, Hypothesis 2.2 predicts that DO and FE GSSs would be less strongly related to positive empowering climates than would DF, and possibly WF, GSS athletes.

### **Mindsets**

According to Dweck (2000), two perceptions of abilities, or mindsets, are prevalent in sport, commonly termed, fixed/capacity versus growth/learning mindsets. Fixed mindsets are displayed when individuals believe that they cannot change their innate ability. This perception suggests that they have a certain amount of talent, and regardless of whether they learn a new skill or train extensively, the talent level will not increase significantly. Conversely, growth mindset performers believe that they can grow and consistently develop their abilities. That through hard work, learning, practice, and persistence, they can become more competitive by improving their ability. Growth-minded participants believe that even



though they have natural talent for a specific activity, there is always the possibility to cultivate and improve one's ability if sufficient effort is put into the process .

Dweck (2000) summarized several studies that suggest mindsets have a significant effect upon persistence, particularly in the face of challenges. Bandura (1997) emphasized that people who regard ability as inherent tend to regard performance levels as an indicator of their capacity. Therefore, such individuals tend to avoid difficult tasks and take on easier ones, ensuring that they demonstrate their ability and avoid showing deficiencies. These individuals do not put forth high levels of effort, even though this comes at the expense of real learning. For fixed mindset athletes, these thought processes highlight performance-based approaches to learning that have many potentially negative consequences, such as shallow learning and avoidance of challenges or risks.

Dweck (2008) emphasizes that individuals with a growth mindset believe intelligence and most domain-specific abilities, though naturally different across the population, can be improved through learning. This mindset is also called incremental theory (Dweck, 2007). In this growth-focused mindset, high effort is not indicative of compensating for low ability; rather it indicates a desire for individual growth and improvement. The successes or setbacks of others do not factor into one's persistence or level of effort because only the individual's personal progress matters. Bandura (1997) adds that people who regard ability as an acquirable skill also tend to frame mistakes and setbacks “not as personal failures but as learning experiences indicating that greater effort or better strategies are needed to succeed” (p. 118).

Dweck (2008) suggested parallels between mindsets and MCs, emphasizing that growth-minded athletes utilize development-based learning, whereas fixed minded athletes'

base success on performance-based approaches to learning, which potentially produce positive and negative consequences, respectively. Furthermore, growth mindsets have been associated with TMCs, whereas athletes adopt mastery goals versus athletes with a fixed mindset who perceive EPC and adopt performance goals (Reeve, 2014). In addition, Dweck and Leggett (1988) illustrated that people with fixed mindsets are more likely to exhibit a helpless response to challenges, while those with growth mindsets welcomed them. Athletes with growth mindsets see challenging situations as a learning opportunity, promoting a mastery response, whereas athletes with fixed mindsets struggled to stay motivated, typically displaying performance-focused responses.

Due to the nature of positive coach-created MCs, where task involving goals are subscales of a positive empowering MC, Hypothesis 2.1 predicted that growth minded athletes would be more strongly related to the positive empowering climate subscale of the EDMCQ-ACS than would fixed mindsets. Also, it is predicted in Hypothesis 2.1 that growth minded athletes would be less strongly related to negative disempowering climate subscales than would fixed mindset athletes. Additionally, it is predicted in Hypothesis 2.2 that fixed mindset athletes would be more strongly related to negative disempowering climate subscales than would athletes with growth mindsets. Also, it is predicted in Hypothesis 2.2 that fixed minded athletes would be less strongly related to positive empowering climates than would growth minded athletes.

### **Motivational Climate Profile Differences across Correlate Variables**

This study examined the construct validity of the EDMCQ-ACS using three major strategies, including: (a) cluster analysis to form MC profiles from the three proposed

EDMCQ-ACS subscales, (b) profile differences were examined across three types of motivational correlate variables (i.e., perfectionism, mindsets, and GSSs), and (c) canonical correlation analysis investigate relationships between the three subscales of the EDMCQ-ACS and (a) the two mindset subscales, (b) two perfectionism subscales, (c) four GSS subscales, and (d) all psychological variable subscales as one set. This study assumes that there are variations in individuals' levels of GSSs, perfectionism, and mindsets. Many investigations have studied such constructs in isolation, or merely compared one construct with another, whereas it seems that while each one presents a distinct way of viewing motivation, a more complete picture could be obtained by studying the variables in combination and examine the differences among clusters for these three motivational correlate variables. The purpose of this study, therefore, was to examine the instrument's construct validity by identifying subgroup profiles based on EDMCQ-ACS subscales and investigate how distinct MC profiles differ on these important motivation correlate variables as well as identify relationships between MC subscales and three correlate variable's subscales.

## **Method**

### **Design and Participants**

The sample for this study was 723 current and former collegiate and/or professional athletes, over the age of 18. Convenience samples were used via ResearchMatch, and dispersion via colleagues currently working within collegiate and professional sport environments. Qualtrics was used as the survey platform to distribute the survey based on invitations provided via text, email, social media, and word of mouth. The mean of the participants' age was 21.18 years, with a standard deviation of 5, with the majority of

participants between the ages of 18-22 (86.3%). Further, female athletes were also in the majority (i.e., 79.7%). In addition, the majority of the respondents competed within NCAA Division I sports (43.7%), competed within their sport for an average of 13.1 years, and were Caucasian (83.1%).

## **Instrumentation**

**Empowering Disempowering Motivational Climate Questionnaire – American College Sample (EDMCQ-ACS).** The EDMCQ-ACS was created during analyses of hypotheses in Manuscript 1. Using the original EDMCQ-C, participants were asked their perceptions of their current coach-created MC. The dimensions of the EDMCQ-C (Appendix A; Appleton et al., 2016) include: empowering (19 items), and disempowering (17 items). Empowering subscales include; autonomy supportive (5 items), socially supportive (5 items), and task-involving climate (9 items), whereas disempowering subscales include: ego-involving (7 items) and controlling coaching (10 items) subscales. Through Exploratory Factor Analysis (EFA), EFSM, and Confirmatory Factor Analysis (CFA), a revised instrument was created from the EDMCQ-C and named the EDMCA-ACS. The revised instrument demonstrated good model fit and parsimony with the current population, narrowing down on areas that the current population understood when relating to empowering and disempowering environments. Three factors emerged from the EFA (Figure 1.3), and factor structure was consistent across each of the extraction techniques. The first factor included seven items and was labeled “Task-Involving” (TI), with the primary loadings on this factor ranging from 0.54 to 0.83. The second factor was comprised of three items and was labeled “Ego Involving” (EI), with loadings on this factor ranging from 0.77 to 0.92. The third factor included three items and was labeled “Controlling Coaching” (CC), with primary

loadings on this factor ranging from 0.71 to 0.82. The initial fit of the exploratory covariance structure modeling analysis of the EDMCQ-American College Sample (EDMCQ-ACS) was excellent ( $CFI = 0.978$ ;  $RMSEA = 0.047$ ;  $\chi^2 = 111.528$ ,  $p < 0.001$ ;  $TLI = 0.973$ ). The EDMCQ-ACS demonstrates an excellent model for measurement of MC, as research (Marsh, Hau, & Wen, 2004; Steiger, 1990; Tucker & Lewis, 1973) indicates ‘excellent’ model fit with  $CFI$  and  $TLI$  values  $> 0.95$ ;  $RMSEA$  values  $< 0.06$ .

**Dispositional Perfectionism Short Scale (DPSS).** The DPSS is an 8-item, 2 subscale instrument. Rice, Richardson, & Tueller’s (2014) Short Almost Perfect Scale (SAPS) instrument was used to create the PSP subscale. Dunn, Dunn, and Syrotuik’s (2002) Concern Over Mistakes (COM) subscale was used to create the ECP subscales. A 7-point Likert scale was used to assess item magnitude ranging from 1 (strongly disagree) to 7 (strongly agree). A PSP subscale item example is: “I expect the best from myself”, whereas an ECP subscale item example includes: “If I do not do well all the time., I feel that people will not respect me as an athlete”. Initial fit of the first-order, 8-item model was good ( $CFI = 0.983$ ;  $\chi^2(19) = 45.461$ ,  $p < 0.05$ ;  $\varepsilon = 0.044$  [90% CI: 0.028-0.060]).

**Conceptions of the Nature of Athletic Ability Questionnaire-2 (CNAAQ-2).** The CNAAQ-2 (Biddle et al., 2003; Wang & Biddle, 2001) was the second version of the CNAAQ instrument, developed to examine growth and fixed mindsets in sport. Both growth and fixed mindsets were assessed through two 3-item subscales each; learning and improvement for growth, and stable and gift for fixed. An example of a growth item is “To be successful in sport you need to learn techniques and skills, and practice them regularly”, whereas a fixed item example is “It is difficult to change how good you are in sport”. Each of the items were evaluated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5

(strongly agree). Wang and Biddle (2001) demonstrated good model fit ( $CFI = 0.973$ ;  $TLI = 0.965$ ;  $\chi^2 = 262.85$ ;  $p < 0.05$ ;  $\varepsilon = 0.038$ ;  $df = 51$ ), reliable Cronbach alpha coefficients (i.e., above 0.70, with reliability for the incremental/growth dimension demonstrating an alpha coefficient of .97, and entity/fixed beliefs dimension alpha of .75).

**Competitive Goal Setting Style Questionnaire (CGSSQ).** The CGSSQ (Burton & Gillham, 2017) includes 20 items and 4 subscales, including: Development Focused (DF; 5-items; e.g., “I work hard in every practice.”), Win Fixated (WF; 4-items; e.g., “Winning is more important than how I perform.”), Doubt Oriented (DO; 6-items; “I doubt my ability”), and Failure Evader (FE; 5-items; “Goals don’t work for me.”). Each of the items were rated on a 6-point Likert scale from 1 (strongly disagree) to 6 (strongly agree). Alpha coefficients demonstrated strong internal consistency with all values greater than .67, and a mean of .74. A CFA for the 20-item CGSSQ produced a good fitting model, including  $RMSEA = .06$ ;  $NNFI = .93$ ;  $CFI = .94$ ; and  $SRMR = .06$ .

**Competitive Sports Background and Demographic Questionnaire (CSBDQ).** The CSBDQ is an 8-item instrument developed to assess key demographic variables (i.e., gender, age, race), and previous experience playing sport (main sport, years participated in sport, last time competed, highest competitive level, and location of participation).

## **Procedure**

Once approval by the University of Idaho IRB was obtained, the survey containing the EDMCQ-ACS, CGSSQ, DPSS, CNAAQ-2, and CSBDQ (Appendices A through E) was distributed to all participants. Over 1100 participants were recruited to participate in the study. A survey was created on Qualtrics and distributed through ResearchMatch, an online database that connects researchers with willing research participants, as well as utilizing convenient

samples through colleagues who are currently working in collegiate and professional sport settings. Surveys were also distributed to athletes through text, email, social media, and word of mouth in order to collect a robust sample.

### **Data Analysis**

Nonhierarchical clustering was used to examine cluster solutions that ranged from two to five. This process formed clusters with high internal consistency and external homogeneities (Hair & Black, 2000). Prior to conducting the cluster analysis, EDMCQ-ACS subscale scores were transformed into z-scores. The extracted initial cluster centers were used as non-random starting points in an iterative k-means clustering procedure. The 4-cluster solution was chosen that yielded the most interesting range of cluster composition while maintaining a similar number of participants across clusters.

Multivariate analysis of variance (MANOVA) was used to compare MC clusters for the subscales of the three motivational correlate variables and key demographic variables. MANOVA analyses examined differences across profile clusters for subscale scores on perfectionism (DPSS), GSSs (CGSSQ-2), and mindsets (CNAAQ-2) in order to test study hypotheses. Follow up ANOVAs were examined if the multivariate Wilks lambda was significant. For all significant ANOVAs, Bonferroni post-hoc tests were performed. All analyses were conducted using a significance level set at  $p < 0.05$ .

To further examine the hypotheses of this study, canonical correlation (CC) analysis was used to assess relationships hypothesized in 2.1 and 2.2. This multivariate CC analysis was used to analyze latent variables, which are not directly observed, that represent multiple variables, which were directly observed.

## Results

The study did a preliminary examination of the EDMCQ-ACS by examining hypotheses by first investigating the formation of cluster profiles based on MC subscales followed up with MANOVA to compare profile differences on the three motivational correlate variables. Additionally, canonical correlation analysis was used to examine the relationship between the three EDMCQ-ACS subscales and (a) the four CGSSQ subscales (b) two CNAAQ-2 subscales, (c) the two DPSS subscales, and (d) all psychological variables as one set.

### Cluster Analysis Results

Using SPSS K-means cluster analysis, four cluster groups were identified based on the three EDMCQ-ACS subscale scores (see Figure 2.1). The first profile (n=149) was labelled as “High Disempowerment” (HD) due to participants within that profile scoring lowest on task-involving at over 1.5 standard deviations below the mean, and equally high on both EI and CC disempowering subscales, at approximately 0.8 standard deviations above the mean. The second profile (n=227) was labelled as “High Controlling Coach” due to participants in this cluster scoring second highest on controlling coaching overall at approximately 0.8 standard deviations above the mean, and low, but positive, on TI and EI at around 0.3 standard deviations above the mean. The third profile (n=178) was subsequently labelled as “High Empowerment” (HE) due to participants within this cluster scoring on average the highest on TI at approximately 0.8 standard deviations above the mean and low on both EI and CC, at 1.3 and 0.8 standard deviations below the mean respectively. Finally, the fourth profile (n=169) was labelled as “Low Controlling-Coach” (LCC) due to the low scores recorded on



CC, as well as low but positive scores on the EI and CC, at less than 0.5 standard deviations above the mean.

Hypotheses for subsequent MANOVA results predicted that the relationship to positive motivational correlate subscales would be strongest for the empowering motivational profile and weakest for the disempowering-related profile. The opposite pattern was hypothesized for negative motivational correlate subscales. Specifically, from most to least empowering profiles, HE was expected to be highest, LCC next, then HCC and finally HD.

### **Multivariate Analysis of Variance (MANOVA) Results**

The motivational climate profiles derived from cluster analysis were analyzed using multivariate analysis of variance (MANOVA) to determine differences between clusters for the four GSSs, two perfectionism, and two mindset subscales (Table 2.1). MANOVA results comparing mindsets, GSSs and perfectionism profiles revealed significant multivariate group difference, Wilks' Lambda = 0.066,  $F(11, 683) = 92.51$ ;  $p < 0.05$ ;  $\eta^2 = 0.04$ .

Follow-up ANOVA results indicated that the 4 GSSs, the 2 mindsets, and the 2 perfectionism subscales all differed significantly across motivational climate profiles, with all  $p$  values significant at the  $p < 0.05$  level, although  $\eta^2$  values were low but consistent with hypotheses, ranging from 0.01 to 0.09 (see Table 2.1). Significant ANOVA results were followed-up with post-hoc pair-wise comparisons between motivational climate profiles using Tukey's post hoc test to maintain a family-wise alpha level below 0.05 for each ANOVA.

**Perfectionism ANOVA results.** Post-hoc statistical analysis for PSP revealed that the two most disempowering clusters (i.e., HD and HCC) were the only groups that significantly differed from each other (see Table 2.1). Consistent with hypothesis, HD was significantly lower on PSP than was HCC, but only accounting for one percent of the variance. For ECP,

significant differences were found between HE and the other 3 clusters, and consistent with hypotheses the HE cluster was significantly lower on ECP than the other three clusters, accounting for 9% of the variance.

**Mindset ANOVA results.** Post hoc statistical analysis of growth mindset data demonstrated generally consistent results with hypothesized relationship that the HD cluster showed the lowest growth score and was significantly lower than both the HCC and HE clusters, even though it accounted for a modest 4% of variance (see Table 2.1). In terms of fixed mindset results and consistent with predictions, the HE cluster was again significantly lower than were the other 3 groups, and again accounting for a modest 4% of variance across groups. Overall, the high empowerment group was higher on growth and lower on fixed mindsets than any of the other 3 clusters, whereas the HD group was highest on fixed and lowest on growth subscales compared to the other three clusters.

**Goal setting style results.** Post hoc analysis of goal setting style subscale data revealed significant cluster differences for all four subscales that were generally consistent with hypotheses and accounted for a modest 3-5% of the variance between clusters (see Table 2.1). The HE cluster demonstrated the highest score on DF and the lowest scores on WF, DO and FE, whereas HD performers had the highest scores on DO and FE and the lowest DF scores. The WF subscales revealed significant differences between HE and HD, HE and HCC and HCC and LCC. For DF, HD and HE were significantly different, whereas for DO and FE, the HE cluster differed significantly from the other 3 clusters, accounting for 4 and 5% of the variance respectively.

## Canonical Correlation Results

To further examine the hypotheses of this study, Canonical correlation (CC) analyses were used to assess relationships between the three MC subscales and the two mindset, two perfectionism and four GSS subscales and the consistency of these findings with study hypotheses.

**Motivational climate and goal setting styles results.** Canonical correlation analysis was conducted to investigate different hypotheses. First, CC was performed to examine the relationship between a set of four GSS subscales (i.e., WF, DF, FE, and DO) and three MC subscales (i.e., TI, EI, and CC). Canonical correlation results demonstrated two interpretable correlations, with the first correlational variate of .35 between MCs and Perfectionism and .29 for the second variate (between Mindsets and MCs;  $p < .001$  for both). Two GSS subscales loaded positively on the first variable set and two MC subscales loaded positively on the second variable set. Two dysfunctional GSS subscales (i.e., DO and WF) were positively related to the two disempowering MC subscales (i.e., EI and CC). These results suggest support for Hypotheses 2.2 based on alignment between the more disempowering MC subscales and more dysfunctional GSSs.

For the second variate, two GSS subscales loaded negatively (i.e., DO and FE) and DF loaded positively on the first variable set, whereas TI loaded positively and EI loaded negatively on the second variable set. Two dysfunctional GSS subscales (i.e., DO and FE) revealed moderate positive relationships to EI and slightly larger negative relationships to TI, while the lone empowering GSS subscale was strongly and positively related to the TI MC subscale and demonstrated a moderate negative relationship with EI. These results suggest support for Hypotheses 2.1 based on alignment between the more empowering and

disempowering MC subscales that were moderately to strongly supportive of study hypotheses.

**Motivational climate and mindsets results.** Canonical correlation analysis was also conducted to examine correlations between the three motivational climate subscales and two mindset dimensions.). Table 2.3 provides results for this analysis for the lone CC variate that demonstrated a significant correlation of .29 ( $p < .001$ ) between the two variable sets. While the results for this single variate were significant, the correlation is relatively modest, but generally consistent with study hypotheses.

Both mindset subscales loaded on the first variable set, one positively and one negatively, and two MC subscales loaded on the second variable set, again one positively and the other negatively. Consistent with study hypotheses, the more dysfunctional fixed mindset subscale demonstrated a moderate positive relationship to EI, and the more functional growth mindset subscale revealed a strong positive relationship with TI. These results suggest support for Hypotheses 2.1 based on the positive alignment of growth mindsets and TI, and fixed mindsets and EI across the two variables sets. These results provide support that this variate is more focused on both the empowering and disempowering aspects of MC and its congruence with corresponding functional and dysfunctional aspects of mindsets, although the magnitude of the functional relationship was somewhat stronger than its dysfunctional counterpart.

**Motivational climate and perfectionism results.** Canonical correlational analysis was also conducted to investigate the relationship between a set of three MC subscales and two perfectionism subscales (i.e., evaluative concerns and personal standards). Table 2.4 provides results for this analysis for the lone CC variate that demonstrated a significant

correlation of .36 ( $p < .001$ ) between the two variable sets. Not only were the results for this single variate strong, but the results are generally consistent with study hypotheses.

Only the EC perfectionism subscale loaded positively on the first variable set, whereas both disempowering MC subscales loaded positively, and the empowering MC subscale (i.e., TI) loaded negatively, on the second variable set (see Table 2.4). These results suggest that the dysfunction ECP subscale is positively related to the disempowering aspects of MC and negatively to MC's empowering subscale (i.e., TI), with the dysfunctional positive relationship quite strong compared to the more modest negative relationship with the more functional TI subscale. These data again support the more negative, rather than positive, relationship of ECP perfectionism and dysfunctional MC subscales compared to its negative relationship with TI. These results suggest moderately consistent support for Hypotheses 2.2 based on the alignment relationships between perfectionism and MCs. Overall, solid preliminary construct validity was identified for the revised EDMCQ-ACS.

**Motivational climate and all motivational correlate subscale results.** Canonical correlational analysis was also conducted to investigate the relationship between the set of three MC subscales and all subscales previously tested as one set (i.e., perfectionism, goal setting styles, and mindset subscales). Table 2.5 provides results for this analysis for the two CC variate that demonstrated a significant correlation of .40 ( $p < .001$ ) between the two variable sets on the first variate and a significant correlation of .35 ( $p < .001$ ) for the second variate. Not only were the results for these variates strong, but the results are generally consistent with study hypotheses. The first canonical variate demonstrated significantly positive relationships, in the negative direction, between evaluative concerns perfectionism, and WF and DO goal setting styles, with ego involving and controlling coaching MC variates.

The second canonical variate also demonstrated significantly positive correlations, between the empowering motivational climate variable subscales (i.e., TI) the positive motivational correlate variables of growth mindset and DF GSS, whereas the disempowering subscale of EI demonstrated a positive but negative relationship with fixed mindsets and DO and FE GSSs. The first variate clearly was focused on both disempowering MC subscales and their positive relationship with more dysfunctional correlate variables of ECP and WF and DO GSSs, whereas variate 2 was more targeted to empowerment relationships with TI positively related to growth mindsets and DF GSSs and EI positively related in the opposite direction to fixed mindsets and DO and FE GSSs.. These results suggest moderately consistent support for both Hypotheses 2.1 and 2.2 based on the alignment of these multiple types of correlate variables..

## **Discussion**

This discussion summarizes the level of support for the initial construct validity of the EDMCQ-ACS by examining study hypotheses across two types of analyses, including: (a) cluster analysis/MANOVA follow-up and (b) canonical correlation analysis. The current manuscript proposed two hypotheses (Appendix I); Hypothesis 2.1 predicts that more empowering clusters should be higher on growth mindsets, DF, and possibly WF, GSSs, and PSP than disempowering clusters. Further, empowering clusters should be lower on fixed mindsets, DO and FE GSSs, and ECP than disempowering clusters. Hypotheses 2.2 predicts that more disempowering clusters should be higher on fixed mindsets, FE and DO GSSs, and ECP than empowering clusters. Further, disempowering clusters should be lower on growth mindsets, DF, and possibly WF, GSSs, and PSP than empowering clusters.

Overall, results were generally consistent with hypotheses, although not all variables of interest supported study predictions and the amount of variance accounted for by these analyses was low to moderate. Nevertheless, this study did provide initial construct validity for the revised EDMCQ-ACS.

### **Creation of Meaningful Motivational Cluster Profiles**

Cluster analysis inductively created four meaningful MC cluster profiles using the one empowering and two disempowering subscales of the EDMCQ-ACS. Cluster analysis produced an interesting and viable 4-cluster solution, with all cluster profiles having sample sizes ranging from 149 to 227 participants (i.e., ‘high empowering (n = 178),’ ‘high disempowering (n = 149),’ ‘high controlling coach (n = 227),’ and ‘low controlling coach (n = 169).’ It is interesting that 3 of 4 clusters for this population of collegiate and professional athletes were defined predominantly by disempowering subscales. For this more elite athlete sample, winning is highly important and coaching tends to be more controlling and demanding, so these findings are consistent with the somewhat disempowering focus of the sport context of the population chosen. This type of environment creates an EPC, whereby coaches tend to give differential attention and focus to positive reinforcement on athletes who are most competent and instrumental to winning, the importance of which is emphasized (Smith, Smoll, and Cumming, 2007). The fourth cluster (HE) defined predominantly by the empowering subscale aligns with Duda and Balaguer (2007) who suggest that a task environment has a positive effect on athletes, decreasing anxiety, decreasing ego-approach and avoidance goals, and increasing self-esteem (Castillo, Duda, Balaguer, & Tomás, 2009; Jaakkola, Ntoumanis, and Liukkonen, 2015; Smith et al., 2007).

## **Consistency of Empowering Motivational Climate Hypotheses with Correlate Variable Relationships**

Hypothesis 2.1 predicts more empowering clusters should be higher on growth mindsets, DF, and perhaps WF, goal setting styles, and personal standards perfectionism than would more disempowering clusters. The current hypotheses predict that empowering clusters should be lower on fixed mindsets, DO and FE goal setting styles, and evaluative concerns perfectionism. MANOVA results not only revealed a significant multivariate main effect for each of the three sets of correlate variable subscales, but all follow-up ANOVAs revealed significant profile differences for each individual subscale. For Hypothesis 2.1 the high empowerment cluster demonstrated the highest scores for growth mindsets and DF GSS, but the HE cluster was lowest on WF GSS and second lowest on personal standards perfectionism, providing partial support for H-2.2. Results were then further supported using canonical correlation analysis, whereby two significant and interpretable relationships were demonstrated between the three MC subscale variable set and the GSS variable set, with the first correlation focusing on the positive relationship between the two disempowering MC subscales and the two most dysfunctional GSS subscales (i.e., DO and WF) and ECP. The first canonical correlation results again emphasized the positive link between disempowering MCs and dysfunctional GSSs. Interestingly, the second canonical variate, included relationships between both functional and dysfunctional GSS and empowering and disempowering MC subscales, and consistent with hypotheses highlighting a strong positive relationship between the empowering MC subscale of TI growth mindsets and DF, the most functional GSS, while also revealing a moderate positive relationship between the EI disempowering MC subscale and the two most dysfunctional GSSs (i.e., DO and FE). The



consistency of these multiple relationships provides strong support for study hypotheses. For the relationship between mindset and MC subscales, canonical correlation results between the two mindset subscales and the three MC subscales again supported the positive link between growth mindsets and the empowering MC subscale as well as the negative relationship between fixed mindsets and the EI disempowering subscale of MC identified in Hypothesis 2.1. Further, an additional CC analysis was performed whereby all motivational climate subscales were in one set, and all psychological subscales in the other in order to examine variate scores that are linear combinations of observed scores, giving insights into individual profiles as a whole. The results from the second canonical variate showed support for Hypothesis 2.1 whereby growth mindsets, DF and WF goal setting styles, and personal standards perfectionism loaded significantly with the empowering motivational climate subscale.

The current hypothesis is consistent with research whereby these results suggest that an Empowering MC is created when the focus is on personal skill development regardless of how others perform. Conditions where coaches and/or teammates encourage athletes to give their best effort in attaining difficult, but realistic goals (Smith, Smoll, & Cumming, 2007). Such definitions which correspond with the attributes of intrinsically driven DF athletes (Burton & Gillham, 2017). Further, Newton, Duda, and Zin (2000) suggest that when adopting a task-involved criterion, emphasis is placed on effort, personal mastery and/or individual improvement. A task-involved criterion of competence is assumed to be fostered by a task-involving climate, which is characterized by athletes perceiving that trying hard, skill development and cooperative learning are valued by the coach, all attributes linked to athletes with growth mindsets. Lastly, in terms of perfectionism, the development of a positive

perfectionism trait was suggested within an environment where mistakes are embraced as part of the learning and performing process, with an emphasis on effort and personal progression above that of normative ability (Carr, Phil, and Wyon, 2015). Within a positive motivational climate, environments are created whereby mistakes are accepted as part of the learning environment which therefore links to the creation of positive perfectionism, or PSP.

### **Consistency of Disempowering Motivational Climate Hypotheses with Correlate Variable Relationships**

Hypotheses 2.2 predicts the inverse, that more empowering clusters should be lower on dysfunctional correlates (i.e., fixed mindsets, DO, FE, goal setting styles), and evaluative concerns perfectionism than more disempowering clusters. MANOVA results comparing correlate variables between clusters supported this prediction. revealed significant multivariate main effects for the eight correlate variable subscales, and ANOVAs revealed significant profile differences for each individual subscale that were generally supportive of study hypotheses. High empowerment clusters demonstrated the lowest scores for fixed mindsets, and DO, WF, and FE goal setting styles. Further the HE cluster was lowest on evaluative concerns perfectionism. Canonical correlation analyses confirmed MANOVA results with the empowering subscale loading positively only for growth mindsets, but the two disempowering MC subscales demonstrating significant relationships with fixed mindset, EC perfectionism and DO and WF GSSs. Canonical correlation results were moderately related to study hypotheses, although the expected relationship between PSP and TI motivational climate was nonsignificant and demonstrated an inverse relationship. However, ECP did correlate significantly and positively with EI and CC motivational climates. Further, an

additional CC analysis was performed with all motivational climate variables in one set, and all dimensions of the psychological variables in the other. The results of the first canonical correlation showed consistent support of Hypothesis 2.2 whereby both disempowering MC subscales loaded in the same direction as all subscales, with evaluative concerns perfectionism, DO, and WF loading significantly. These results were able to support and further link athletes who perceive disempowering motivational climates and the likelihood that they would also have negative GSSs, dysfunctional perfectionism, and mindsets. Conversely, empowering MCs were generally supportive with study hypotheses, particularly positive relationships with growth mindsets and DF GSSs. The findings were able to produce moderate support, with significant results, for each of the hypotheses.

The current hypothesis is consistent with research within the field of mindsets, GSSs, and perfectionism whereby results affirm common assumptions. Research and current results both suggest that collegiate and professional MCs are more disempowering because athletes who perceive disempowering MC can't deal with failure effectively, similar to FE and DO, and highlight performance-based approaches to learning that have many potentially negative consequences, such as shallow learning and avoidance of challenges or risks (Dweck, , 2000). Further these negative associations can produce negative outcomes such as peer conflict (Ommundsen,et al., 2005), negative perceptions of the coach competency (Smith, Fry, Ethington, & Li, 2005), and increased anxiety (Pensgaard & Roberts, 2002) which add to a negative motivational climate.

Further, Deci and Ryan (2008) argued that factors which satisfy the needs for autonomy, competence and relatedness will promote self-determined types of motivation, relating to growth mindsets, whereas individuals who are extrinsically motivated, and more

aligned with fixed mindsets, participate to obtain separable outcomes. Newton, Duda, and Zin (2000) suggest Conversely, when an ego-involved conception of competence is adopted, the individual values 'being the best' compared to others. This conception of competence is assumed to be facilitated in a coach-created climate that is strongly ego-involving, a trait shared with fixed minded athletes. Ego-involving climates are characterized by athletes perceiving that mistakes result in punishment, the coach providing differential treatment based on the ability level of the athletes, and that intra-team member rivalry is encouraged on the team (Newton et al., 2000).

In terms of perfectionism and its link with motivational climate, there is an existing conceptual argument. Carr, Phil, and Wyon (2015) suggest that there may be a link between negative perfectionist dispositions, characterized by the setting of excessively high standards, fear of failure, and a reticence to embrace personal mistakes with exposure to learning and/or performing environments. Those athletes who show ECP struggle within environments where they must accept mistakes as part of the developmental process.

### **Future Directions for Research**

This study suggests that the revised EDMCQ-ACS is a viable MC instrument to be used with adult American samples. However, the instrument needs further developmental work with additional samples to create more robust and conceptually relevant items and dimensions. Preliminary construct validity was promising, but additional work on the item pool is indicated to revise the instrument further, and once that is finalized, new construct validity work is needed. This is particularly critical to fully examine a topic as complex as

MC, particularly providing a wider range of cognitive, affective and most importantly performance variables.

Another obvious next step would be to do invariance testing. Due to the great diversity of athletes included in the study, the first future direction would be to compare how the instrument works across gender, sport (team versus individual), and competitive level, whereby results could show if different groups interpret the items in the same way, and if not, how much bias is reflected in each item. Furthermore, Structural Equation Modelling should be employed to show more detailed results of how Perfectionism, GSSs, Motivational Climate and Mindsets are relate, and which variables are viable antecedents and consequences. Modeling with other antecedent and consequence variables should also be a priority.

Additionally, due to the participant population answering questions on anonymous coaches, future research should also focus on pin pointing which coaches the athletes are describing and collect profiles on the coaches themselves to see if there are any links between how the athlete perceives the coach, and how the coaches themselves perceive their own coaching style. Furthermore, a skill assessment, coach's performance notes, and/or the identification of athletes who are on each team should be collected in order to see the profiles of the athletes who are more successful, have different profiles than those who are not starters.

In addition, other potential demographic variables need to be looked at due to the EDMCQ-C working with youth and adolescent populations but not adults. The EDMCQ-ACS worked well for the population tested, with 80% of participants being female. If the population was split by gender, different results may be evident between the two groups. Other demographic variables could also be identified as the reasons why the modified instrument worked with the college-aged American athletes but not athletes from Britain.

Also, due to the time constraints of the study SEM was not conducted linking GSSs, Mindsets, Perfectionism, and Motivational Climates. Future studies should focus on how each of the variables link, whether athletes having a certain type of mindset determines the type of perfectionism an athlete is pre-disposed to, or the opposite.

Lastly, in order to hypothesize how motivational climate relates to certain psychological variables it would be more accurate to investigate if MC is comprised of additional subscales, outside of SDT and AGT. In order to investigate this fully more research needs to be done researching the potential areas of MC, perhaps strengthening the EI and CC whereby the subscales consist of items outside of those that emerged in the EDMCQ-ACS. Through this research items and subscales could be created and tested with multiple populations in order to develop an instrument that thoroughly describes motivational climate.

### **Conclusion**

This study contributes to the body of knowledge surrounding MCs, mindsets, GSSs, and perfectionism, it demonstrates solid initial construct validity for the EDMCQ-ACS. Although as a whole, the results were only moderately significant, it appears that for the most part the data supported the emerging hypotheses of the study. It also appears that growth mindsets are consistently related to empowering motivational climates, with fixed mindsets showing relatedness to the disempowering motivational climate subscales. Furthermore, links were found between empowering MCs and positive perfectionism, and the inverse with negative perfectionism. Lastly, moderate links were found between MCs and GSSs whereby the most constructive GSS showed relationship with task involving motivational climates, and the inverse shown between disempowering subscales and DO and FE GSS subscales.

## References

- Abraham, A., Collins, D., & Martindale, R. (2006). The coaching schematic: Validation through expert coach consensus. *Journal of Sports Science, 24*(6), 549–564.
- Aldenderfer, M., & Blashfield, R. (1984). *Cluster analysis*. Beverly Hills, CA: Sage Press.
- Ames, C. (1992). Achievement goals, motivational climate, and motivational processes. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161-176). Champaign, IL: Human Kinetics.
- Amorose, A. J., & Anderson-Butcher, D. (2015). Exploring the independent and interactive effects of autonomy-supportive and controlling coaching behaviors on adolescent athletes' motivation for sport. *Sport, Exercise, and Performance Psychology, 4*(3), 206-218.
- Balaguer, I., Duda, J., & Crespo, M. (1999). Motivational climate and goal orientations as predictors of perceptions of improvement, satisfaction, and coach ratings among tennis players. *Scandinavian Journal of Medicine and Science in Sports, 9*, 381-388.
- Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2010). The controlling interpersonal style in a coaching context: Development and initial validation of a psychometric scale. *Journal of Sport and Exercise Psychology, 32*(1), 193-216.
- Biddle, S., Wang, C., Chatzisarantis, N., & Spray, C. (2003). Motivation for physical activity in young people: Entity and incremental beliefs about athletic ability. *Journal of Sports Sciences, 21*(12), 973-989.
- Blanchard, C., & Vallerand, R. J. (1996). Perceptions of competence, autonomy, and relatedness as psychological mediators of the social factors-contextual motivation relationship. *Unpublished manuscript*.

- Brunel, P. (1999). Relationship between achievement goal orientations and perceived motivational climate on intrinsic motivation. *Scandinavian Journal of Medicine and Science in Sports*, 9, 365-374.
- Castillo, I., Duda, J. L., Balaguer, I., & Tomás, I. (2009). Cross-domain generality of achievement motivation across sport and the classroom: The case of Spanish adolescents. *Adolescence*, 44(175), 569-580.
- Chi, L. (2004). Achievement goal theory. In T. Morris, & J. Summers, *Sport psychology: Theory, applications, and issues (2nd ed.)* (Vol. 2, pp. 152-174). Milton, Australia: John Wiley & Sons.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology*, 49(3), 182-185.
- Deci, E. L., Koestner, R., & Ryan, R. M. (2000). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125(6), 627-628.
- Duda, J. L. (2013). The conceptual and empirical foundations of empowering coaching: Setting the stage for the PAPA project. *International Journal of Sport and Exercise Psychology*, 11(1), 311-318.
- Duda, J. L., & Balaguer, I. (2007). Coach-created motivational climate. In S. Jowett, & D. Lavallee (Eds.), *Social psychology in sport* (pp. 117-130). Champaign, IL: Human Kinetics.



- Duda, J., & Ntoumanis, N. (2005). After-school sport for children: Implications of a task-involving motivational climate. In J. L. Mahoney, R. Larson, & J. S. Eccles (Eds.), *Organized activities as contexts of development: Extracurricular activities, after school, and community programs* (pp. 311-330). Mahwah, NJ: Erlbaum.
- Dunn, J. G., Dunn, J. C., & Syrotuik, D. G. (2002). Relationship between multidimensional perfectionism and goal orientations in sport. *Journal of Sport and Exercise Psychology, 24*(1), 376-395.
- Dweck, C. S., & Leggett, E. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256–273.
- Flett, G. L., & Hewitt, P. L. (2005). The perils of perfectionism in sports and exercise. *Current Directions in Psychological Science, 14*(1), 14-18.
- Gardner, D., Sheilds, D., Bredemeier, B., & Bostrom, A. (1996). The relationship between perceived coaching behaviors and team cohesion among baseball and softball players. *The Sport Psychologist, 10*(1), 367-381.
- Gilbert, W., Côté, J., & Mallett, C. (2006). Developmental pathways and activities of successful sport coaches. *Journal of Sports Science Coaching, 1*(1), 69–76.
- Gillham, E., Burton, D., & Gillham, A. (2017). Examining the role of personality in sport goal setting: Development and preliminary validation of the competitive goal setting styles questionnaire (CGSSQ). *Submitted to The Sport Psychologist*.
- Grossbard, J., Cumming, S. P., Standage, M., Smith, R. E., & Smoll, F. L. (2007). Social desirability and relations between goal orientations and competitive trait anxiety in young athletes. *Psychology of Sport and Exercise, 8*(4), 491-505.

- Hair, J. F., & Black, W. C. (2000). Cluster analysis. In L. G. Yarnold (Ed.), *Reading and understanding more multivariate statistics* (pp. 147-206). Washington: American Psychological Association.
- Harwood, C. (2015). A systematic review of the intrapersonal correlates of motivational climate perceptions in sport and physical activity. *Psychology of Sport and Exercise*, 9-25.
- Jaakkola, T., Ntoumanis, N., & Liukkonen, J. (2015). Motivational climate, goal orientation, perceived sport ability, and enjoyment within Finnish junior ice hockey players. *Scandinavian Journal of Medicine and Science in Sports*, 26(1), 109-115.
- Kavussanu, M., & Ntoumanis, N. (2003). Participation in sport and moral functioning: Does ego orientation mediate their relationship? *Journal of Sport and Exercise Psychology*, 25(1), 501-518.
- MacDonald, D. J., Côté, J., Eys, M., & Deakin, J. (2011). The role of enjoyment and motivational climate in relation to the personal development of team sport athletes. *The Sport Psychologist*, 25, 32-46.
- Mageau, G. A., & Vallerand, R. J. (2003). The coach–athlete relationship: A motivational model. *Journal of Sports Sciences*, 21(11), 883-904.
- Marsh, H., Hau, K., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's findings. *Structural Equation Modeling*, 11(3), 320-41.
- Martindale, R., Collins, D., & Abraham, A. (2007). Effective talent development: The elite coach perspective in UK sport. *Journal of Applied Sport Psychology*, 19(2), 187–206.

- Newton, M., Duda, J. L., & Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes. *Journal of Sports Science, 18*(4), 275-290.
- Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
- Nordin-Bates, S. M., Hill, A., Cumming, J., Aujla, I. J., & Redding, E. (2014). A longitudinal examination of the relationship between perfectionism and motivational climate in dance. *Journal of Sport and Exercise Psychology, 36*(4), 382-391.
- Ntoumanis, N. (2001). Empirical links between achievement goal theory and self-determination theory in sport. *Journal of Sports Sciences, 19*, 397-409.
- Ntoumanis, N., & Biddle, S. J. (1999). Affect and achievement goals in physical activity: A meta-analysis. *Scandinavian Journal of Medicine and Science in Sports, 9*, 315-332.
- Ntoumanis, N., Thøgersen, E. C., & Smith, A. (2009). Achievement goals, self-handicapping and performance: A 2 x 2 achievement goal perspective. *Journal of Sports Science, 27*(1), 1471-1482.
- Ommundsen, Y., Roberts, G., Lemyre, P., & Miller, B. (2005). Peer relationships in adolescent competitive soccer: Associations to perceived motivational climate, achievement goals and perfectionism. *Journal of Sports Sciences, 23*, 977-989.
- Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Brié, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion, 25*(4), 279-306.

- Pensgaard, A., & Roberts, G. (2002). Elite athletes' experiences of the motivational climate: The coach matters. *Scandinavian Journal of Medicine and Science in Sports, 12*, 54-59.
- Reinboth, M., & Duda, J. (2004). Dimensions of coaching behavior, need satisfaction, and the psychological and physical welfare of young athletes. *The Sport Psychologist, 18*(3), 237-251.
- Rhine, D. J., & Jowett, S. (2010). Initial evidence for the criterion-related and structural validity of the long versions of the Coach–Athlete Relationship Questionnaire. *European Journal of Sport Science, 10*(6), 359-370.
- Rice, K. G., Richardson, C. M., & Tueller, S. (2014). The short form of the Revised Almost Perfect Scale. *Journal of Personality Assessment, 96*(3), 368-379.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67.
- Skinner, E., & Edge, K. (2002). Self-determination, coping, and development. In E. Deci, & R. Ryan (Eds.), *Handbook of self-determination research* (pp. 297-337). Rochester, NY: University of Rochester Press.
- Smith, A., Gustafsson, H., & Hassmen, P. (2010). Peer motivational climate and burnout perceptions of adolescent athletes. *Psychology of Sport and Exercise, 11*(6), 453-460.
- Smith, R., Smoll, F., & Cumming, S. (2007). Effects of a motivational climate intervention for coaches on young athletes' sport performance anxiety. *Journal of Sport and Exercise Psychology, 29*, 39-59.

- Smith, S. L., Fry, M. D., Ethington, C. A., & Li, Y. (2005). The effect of female athletes' perceptions of their coaches' behaviors on their perceptions of the motivational climate. *Journal of Applied Sport Psychology, 17*(1), 170-177.
- Standage, M., Duda, J. L., & Ntoumanis, N. (2003). A model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. *Journal of Educational Psychology, 95*(1), 97-110.
- Steiger, J. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research, 25*(1), 173-180.
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*, 1-10.
- Walling, M. D., Duda, J. L., & Chi, L. (1993). The Perceived Motivational Climate in Sport Questionnaire: Construct and predictive validity. *Journal of Sport and Exercise Psychology, 15*, 172-183.
- Wang, C. K., & Biddle, S. J. (2001). Young people's motivational profiles in physical activity: A cluster analysis. *Journal of Sport and Exercise Psychology, 23*, 1-22.

Table 2.1. Multivariate Analysis of Variance Comparisons of EDMCQ-ACS Clusters on Two Perfectionism Subscales, Four Goal Setting Style Subscales and Two Mindset Subscales.

	High Disempowering		High Controlling Coaching		High Empowering		Low Controlling Coach		F	p	eta <sup>2</sup>
	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
<b>Perfectionism</b>											
Personal Standards	6.22	0.07	6.46	0.05	6.31	0.06	6.35	0.06	2.96	0.03 <sup>a</sup>	0.01
Evaluative Concerns	4.68	0.12	4.63	0.10	3.55	0.11	4.36	0.11	23.88	0.01 <sup>bde</sup>	0.09
<b>Goal Setting Styles</b>											
Win Focused	3.39	0.09	3.60	0.07	3.03	0.08	3.20	0.08	11.55	0.01 <sup>bdf</sup>	0.05
Develop Focused	4.93	0.05	5.08	0.04	5.21	0.04	5.04	0.04	6.30	0.01 <sup>b</sup>	0.03
Doubt Oriented	4.07	0.08	3.98	0.07	3.49	0.07	3.99	0.07	12.86	0.01 <sup>bde</sup>	0.05
Failure Evader	2.48	0.06	2.39	0.05	2.03	0.06	2.30	0.06	10.59	0.01 <sup>bde</sup>	0.04
<b>Mindsets</b>											
Growth	4.34	0.04	4.53	0.03	4.61	0.04	4.45	0.04	9.17	0.01 <sup>ab</sup>	0.04
Fixed	2.68	0.06	2.58	0.05	2.26	0.06	2.64	0.06	10.80	0.01 <sup>bde</sup>	0.04

Key: significant differences a=1vs2 b=1vs3 c=1vs4 d=2vs3 e=3vs4 f=2vs4

Table 2.2 Canonical Correlation Values between Four CMSQ Subscales and Three EDMCQ-ACS

Variable	First Canonical Variate			Second Canonical Variate		
	Correlation/ Loading	Unstandardized Coefficients	Standardized Coefficients	Correlation/ Loading	Unstandardized Coefficients	Standardized Coefficients
<b>Goal Setting Styles Set</b>						
Doubt Oriented	0.70	0.64	0.63	-0.42	-0.33	-0.32
Failure Evader	0.36	0.24	0.18	-0.56	0.13	0.01
Developmental Focus	0.13	0.56	0.32	0.95	1.66	0.96
Win Fixated	0.72	0.62	0.64	0.10	0.09	0.09
<b>Motivational Climate Set</b>						
Task Involvement	-0.17	0.50	0.47	0.98	1.16	1.09
Ego Involvement	0.78	0.50	0.75	-0.43	0.04	0.07
Controlling Coaching	0.78	0.41	0.63	-0.22	0.11	0.17

Table 2.3 Canonical Correlation Values between Two CNAAQ-2 Subscales and Three EDMCQ-ACS

Variable	Correlation>Loading	Canonical Variate	
		Unstandardized Coefficients	Standardized Coefficients
<b>Mindsets Set</b>			
Growth Mindset	-0.91	-1.64	-0.80
Fixed Mindset	0.64	0.56	0.43
<b>Motivational Climate Set</b>			
Task Involvement	-0.90	-1.0	-0.93
Ego Involvement	0.57	0.19	0.29
Controlling Coaching	0.01	-0.32	-0.49



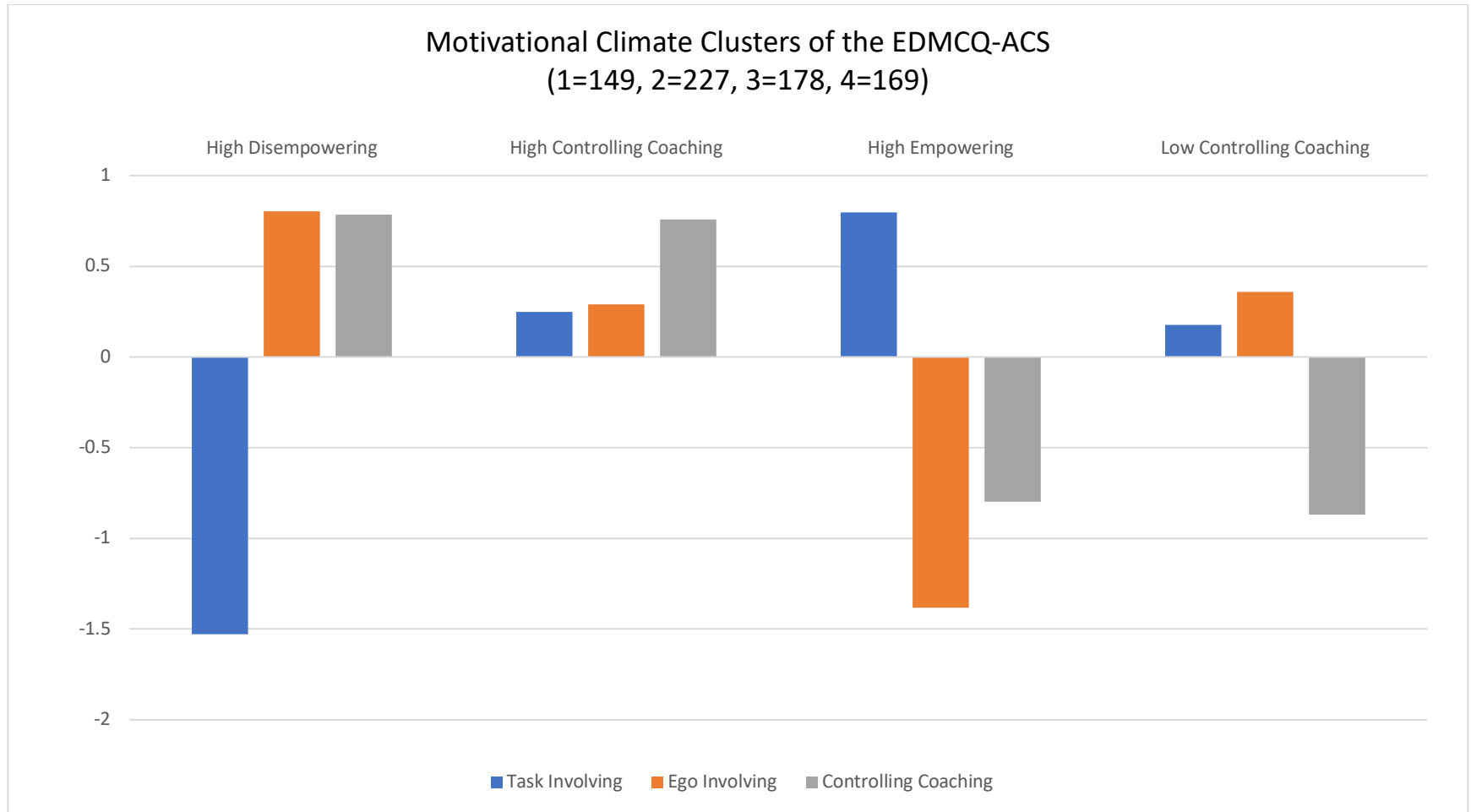
Table 2.4 Canonical Correlation Values between Two DPSS Subscales and Three EDMCQ-ACS

Variable	Correlation/Loading	Canonical Variate	
		Unstandardized Coefficients	Standardized Coefficients
<b>Perfectionism Set</b>			
Personal Standards	0.23	0.09	0.07
Evaluative Concerns	0.99	0.67	0.99
<b>Motivational Climate Set</b>			
Task Involvement	-0.41	0.21	0.20
Ego Involvement	0.88	0.49	0.75
Controlling Coaching	0.79	0.34	0.54

Table 2.5 Canonical Correlation Values between all Motivational Correlate Subscales and Three EDMCQ-ACS

Variable	First Canonical Variate			Second Canonical Variate		
	Correlation /Loading	Unstandardized Coefficients	Standardized Coefficients	Correlation /Loading	Unstandardized Coefficients	Standardized Coefficients
<b>Motivational Correlate Set</b>						
Growth Mindset (CNAAQ-2)	-0.14	-0.20	-0.10	0.77	1.07	0.52
Fixed Mindset (CNAAQ-2)	-0.35	-0.11	-0.09	-0.47	-0.31	-0.24
Doubt Oriented (CMSQ)	-0.61	-0.15	-0.14	-0.40	-0.30	-0.29
Failure Evader (CMSQ)	-0.34	-0.21	-0.16	-0.38	0.32	0.25
Developmental Focus (CMSQ)	-0.06	-0.22	-0.12	0.72	0.93	0.53
Win Fixated (CMSQ)	-0.63	-0.39	-0.40	0.23	0.22	0.22
Personal Standards (DPSS)	-0.26	-0.17	-0.13	0.33	0.04	0.03
Evaluative Concerns (DPSS)	-0.87	-0.41	-0.60	-0.23	-0.07	-0.10
<b>Motivational Climate Set</b>						
Task Involvement (EDMCQ-ACS)	0.24	-0.41	-0.39	0.91	1.05	0.98
Ego Involvement (EDMCQ-ACS)	-0.78	-0.46	-0.70	-0.51	-0.14	-0.20
Controlling Coaching (EDMCQ-ACS)	-0.82	-0.43	-0.67	0.02	0.31	0.48

Figure 2.1 Cluster Analysis Results for EDMCQ-ACS







	Strongly Disagree			Strongly Agree			
	1	2	3	4	5	6	7
33. My coach favored some players more than others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. My coach encouraged players to really work together as a team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Task involving** = 1, 4, 11, 13, 18, 23, 28, 30, 34 (9)

**Autonomy Supportive** = 3, 6, 16, 22, 32 (5)

**Socially Supportive** 8, 14, 27 (3)

**Ego Involving** = 5, 9, 10, 19, 21, 25, 33 (7)

**Controlling Coaching** = 2, 7, 12, 15, 17, 20, 24, 26, 29, 31 (10)

## Appendix B

### Dispositional Perfectionism Short Scale (DPSS)

DPSS items are evaluated on a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree).

	Strongly Disagree		Neutral			Strongly Agree	
	1	2	3	4	5	6	7
1. I have high expectations for myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I set very high standards for myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I expect the best from myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I have a strong need to strive for excellence.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. If I fail as an athlete, I feel like a failure as a person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. People will probably think less of me if I make mistakes as an athlete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. If another athlete performs better than me, I feel like I failed to some degree.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. If I do not do well all the time, I feel that people will not respect me as an athlete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Personal Standards Perfectionism (PSP) = 1, 2, 3, 4**

**Evaluative Concerns Perfectionism (ECP) = 5, 6, 7, 8**

## Appendix C

### Conceptions of the Nature of Athletic Ability Questionnaire Version 2

CNAAQ-2 items are evaluated on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

	Strongly Disagree		Neutral		Strongly Agree
	1	2	3	4	5
<b>1. You have a certain level of ability in sport and you cannot really do much to change that level.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>2. To be successful in sport you need to learn techniques and skills, and practice them regularly.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3. Even if you try, the level you reach in sport will change very little.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>4. You need to have certain “gifts” to be good at sport.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>5. You need to learn and to work hard to be good at sport</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>6. In sport, if you work hard at it, you will always get better.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>7. To be good at sport, you need to be born with the basic qualities which allow you success</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>8. To reach a high level of performance in sport, you must go through periods of learning and training</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>9. How good you are at sport will always improve if you work at it.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>10. It is difficult to change how good you are at sport.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>11. To be good at sport you need to be naturally gifted.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>12. If you put enough effort into it, you will always get better at sport.</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fixed

Stable = 1, 3, 10 (3)

Gift = 4, 7, 11 (3)

Growth

Learning = 2, 5, 8 (3)

Improvement = 6, 9, 12 (3)



## Appendix D

### Competitive Motivational Styles Questionnaire

CMSQ items are evaluated on a 6-point Likert scale (1 = strongly disagree; 6 = strongly agree).

	Strongly Disagree		Neutral		Strongly Agree	
	1	2	3	4	5	6
1. I choose goals that focus on how I perform	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. My most important goal is to always win	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Public failures are hard to handle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I don't like to work on my weaknesses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. After a loss, I want to use practice as a way to improve	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Success to me is winning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I focus too much on the number of mistakes I make	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. After a loss, it is difficult for me to push myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I feel like a failure when others think I am not skilled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. All my effort is focused on winning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I always give my best effort	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Sometimes I try my best, sometimes I don't try at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Winning is more important than how I perform	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I am willing to work a long time to reach my ultimate goal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I avoid setting goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I am not as confident as I used to be	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I work hard in every practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. Goals don't work for me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I worry that I won't perform my best	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I doubt my ability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Doubt Oriented: 3, 7, 9, 16, 19, 20 (6)

Failure Evader: 4, 8, 12, 15, 18 (5)

Development Focused: 1, 5, 11, 14, 17 (5)

Win Fixated: 2, 6, 10, 13 (4)

## Appendix E

### Competitive Sports Background and Demographic Questionnaire (CSBDQ)

1. What is your gender?
  - Male
  - Female
  - I prefer not to answer
  
2. What is your main sport?  
\_\_\_\_\_
  
3. What is your age?  
\_\_\_\_\_ years
  
4. How many years have you participated in your main sport?  
\_\_\_\_\_ years
  
5. How many years did/have you played this sport?  
\_\_\_\_\_ years
  
6. When was the last time you competed in your main sport?
  - Within the last year
  - Within the last 2 years
  - Within the last 3 years
  - Within the last 4 years
  - 5+ years ago
  
7. At which competitive levels have you competed in your main sport?  
*Please check all that apply.*
  - Full-team International
  - Youth-team International (any age group)
  - Professional – Club level
  - College – NCAA Division I or IAA
  - College – NCAA Division II
  - College – NCAA Division III
  - College – NAIA
  - College – Other
  - College – Community or Junior
  - Junior Club Level
  - High school
  - Middle School
  - Other

8. How would you describe yourself?

*Please check all racial/ethnic groups that apply.*

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Pacific Islander
- White

9. Where have you participated in sport?

*Please check all that apply.*

- North America
- South America
- Europe
- Australasia
- Africa
- Other, Please Specify \_\_\_\_\_

## Appendix F

### Institutional Review Board (IRB) Application

Title:	<b>Athlete Perceived Coach-Created Motivational Climate in an American Adult Sport Sample</b>
Status:	<b>Not Yet Submitted</b>
Protocol Type:	<b>IRB: Institutional Review Board</b>
Submission Type:	<b>New Application</b>
Project Type:	<b>Survey</b>
Other Type:	<b>N/A</b>
PI Expertise:	<b>PhD in field of research</b>
Other Expertise:	<b>N/A</b>
Purpose:	<p><b>The purpose of this study is threefold. The first purpose of the study will be to assess and test the validity of the Empowering Disempowering Motivational Climate Questionnaire Coach (EDMCQ-C; Appleton, 2016) in an American sample of adult athletes. Second, this study will examine a newly created working model on motivational climate. This model predicts mindsets as an antecedent, motivational climate as the consequence, and perfectionism and goal setting styles as mediators. Third, the validated instrument will be used to cluster individuals together on the basis of motivational climate. This study will hypothesize which individuals will be similar in regard to perfection, goal setting styles, and mindsets.</b></p> <p>This survey will help our understanding of motivational climates within this specific group of adult competitive athletes. Results could help coaches understand these trends and how best to coach players within this age group. Further, patterns could be identified to help coaches see trends on how their coach-created motivational climate can be affected by athlete's mindsets, perfectionism styles, and goal setting styles. Results can help identify which psychological factors are beneficial to athletes (i.e., personal standards perfectionism, developmental focused goal setting styles).</p>
Design:	<p><b>This study will employ a survey research design. Convenience and snowball samples will be used in this study.</b></p> <p>Potential respondents will be given a URL to access the online Qualtrics survey. Participants will first be asked to provide their informed consent, and then complete the instrument which should require 10-12 minute.</p>
Procedures:	<p><b>Empowering Disempowering Motivational Climate Questionnaire Coach (EDMCQ-C; 34 items), Conceptions of the Nature of Athletic Ability Questionnaire Version 2 (CNAAQ-2; 12 items), Competitive Motivational Styles Questionnaire (CMSQ; 20 items), Dispositional Perfectionism Short Scale (DPSS; 8 items), and Demographic and Background Questionnaire. Completion of the survey will take approximately 10-12 minutes.</b></p> <p><b>Participants will be individuals who are 18 years of age or older. Between 800 and 1000 individuals will be recruited. Two recruitment methods will be used: ResearchMatch, an online database that connects researchers with willing research participants. The second major strategy will utilize convenient samples. Colleagues who are currently working in sport settings will be contacted to disperse research through a number of methods (i.e., text, email, social media, and word of mouth).</b></p>
Research Subjects:	<p><b>ResearchMatch data collection: Recruitment for the study will be done via ResearchMatch, a national health volunteer registry that was created by several academic institutions and supported by the United States National Institutes of Health as part of the Clinical Translational Science Award (CTSA) program. ResearchMatch has a large population of volunteers who have consented to be contacted by researchers about health studies for which they may be eligible.</b></p> <p><b>The co-investigator will search for appropriate matches amongst the non-identifiable ResearchMatch Volunteer profiles in the system. The co-investigator will also enter the study's criteria in the ResearchMatch Search Builder which will yield a list of these potential matches. The co-investigator will then send out IRB-approved consent in an initial recruitment message to these potential matches though ResearchMatch. The secure ResearchMatch clearing house</b></p>

will route the message to each of these potential matches and they will have the option of replying yes, no, or no response.

**Convenient Samples:** Researchers will contact colleagues currently working within sport settings involving athletes 18 years and older. Email invitations to participate in the online survey will be sent to college head and assistant coaches.

Privacy Level: **Anonymous means no one (not even the researcher) will be able to link to the subject's identity with his/her responses.**

Exemption Categories: **N/A**

Category Rationale: **This study fits in exemption Category 2 because it will utilize a survey procedure, will not request personally identifiable information, and will not put respondents at criminal or financial risk.**

Data Collection Methods: **Self-Administered Survey**

Other Data Collection Methods: **N/A**

Experimental Method: **N/A**

Participant Payment: **N/A**

**Additions for Amendment:**

## Appendix G

### Request for participation and consent Form – Online Consent

#### ATHLETE CONSENT STATEMENT

You are invited to participate in a research study, “**Athlete Perceived Motivational Climate in an American Adult Sport Sample**”

The purpose of this study to gain insight into athletes’ motivation and how it influences the perceptions and mental frame-of-mind and performance of competitive athletes, competing in the US, over the age of 18. We have a relatively short survey that should take approximately 8-12 minutes to complete, and there will be no monetary compensation for participation. Participants may find the survey rewarding in that it may promote self-awareness and stimulate thinking about your motivation and how it influences practice and competitive enjoyment and performance. As a result, participation in this study may have implications for helping you and other athletes better understand coach-created motivational climate, which, in turn, may benefit your development and overall sport experience. You may request a copy of our results once all data has been collected. In addition, our findings may benefit you and future athletes to experience greater success and enjoyment in sport and life. None of the survey questions should expose you to any physical and/or emotional risk or discomfort.

The data of the study will be kept **COMPLETELY CONFIDENTIAL** and will be made available only to the primary investigator, and my adviser Dr. Damon Burton. Further, your identity will not be asked over the course of this survey.

If you have any questions about your rights as a participant, you can contact the Institutional Review Board Section of the Office of Research Assurances at 208-885-6162 at the University of Idaho, Moscow, Idaho. Your participation is voluntary and you are free to withdraw your consent and to discontinue participation at any time with no penalty. This study has been approved by the University of Idaho Institutional Review Board.

If you have any questions at any time regarding the procedures of the study, you may contact Damon Burton at [dburton@uidaho.edu](mailto:dburton@uidaho.edu), or me, Laura Jackson at [ljackson@uidaho.edu](mailto:ljackson@uidaho.edu).

**I have read the above information and I agree to participate in this study.**

## Appendix H

### Hypotheses

- *Hypothesis 1.1*: This study predicts that positive coach-created climates are hypothesized to be comprised of high scores on task-involving, socially-supportive, and autonomy-supportive subscales, and low scores on controlling-coaching, and ego-involving subscales. The inverse is hypothesized in negative coach-created MCs.
- *Hypothesis 1.2*: This study predicts that if Hypothesis 1.1 is disproven that a modified instrument will be created that will work with the current population, with acceptable fit indices and parsimony.

## Appendix I

### Hypotheses

- *Hypothesis 2.1:* This study predicts that more empowering clusters should be higher on growth mindsets, DF, and possibly WF, GSSs, and PSP than disempowering clusters. Further, empowering clusters should be lower on fixed mindsets, DO and FE GSSs, and ECP than disempowering clusters.
- *Hypothesis 2.2:* This study predicts that more disempowering clusters should be higher on fixed mindsets, FE and DO GSSs, and ECP than empowering clusters. Further, disempowering clusters should be lower on growth mindsets, DF, and possibly WF, GSSs, and PSP than empowering clusters.