THE COACH-ATHLETE RELATIONSHIP AND ATHLETE PSYCHOLOGICAL OUTCOMES

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ABSTRACT

Victoria McGee: The Coach-Athlete Relationship and Athlete Psychological Outcomes

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Athletes' relationships with their coaches have important implications for outcomes of psychological health. Further examination of these associations is needed to identify the aspects of the coach-athlete relationship most linked to athlete burnout and engagement. This study examined associations among athlete perceptions of the coach-athlete relationship and burnout and engagement across a competitive season. We hypothesized that athlete endorsement of higher levels of markers of the coach-athlete relationship (closeness, commitment, and complementarity) would be negatively associated with perceptions of burnout and positively associated with perceptions of engagement. Participants were female collegiate rowers ($N=37$; $M_{\text{age}}=19.3$ years, $SD=1.18$) who completed online self-report assessments of study variables across four seasonal survey waves. Multilevel linear modeling analyses revealed closeness, one of the coach-athlete relationship markers, to be a significant predictor of seasonal global burnout and engagement. Study findings inform the design of interventions to promote engagement and deter burnout via improving coach-athlete closeness perceptions.

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CHAPTER 1

The athletic coach is one of the most influential social actors when it comes to athletes' motivation and subsequent performance (Mageau & Vallerand, 2003). In a given season, the NCAA allows teams to practice and compete for 20 hours maximum per week (NCAA, 2009). However, a 2008 report by the NCAA found that the average hours spent per week in-season on athletic activities by Division 1 student-athletes in women's sports ranges from 29.3 to 37.1 hours (NCAA, 2008). Accordingly, for the duration of a season on a team of 30 to 50 athletes, a coach could have up to 10,000 hours of combined influence on his/her athletes. As a result of these continuous coach-athlete interactions, the athlete can potentially learn strategies to enhance performance and have social experiences which promote psychological outcomes such as stress, motivation, and self-efficacy (Jowett & Wylleman, 2006). Moreover, athletes' social perceptions, including those of the coach, within the dynamic and demanding environment of competitive sport are associated with both adaptive and maladaptive outcomes of athlete psychological health and well-being including burnout and engagement (Mageau & Vallerand, 2003; Udry et al, 1997; Hodge, Lonsdale, Jackson, 2009).

Across all collegiate levels, women's rowing has an average roster of 50.2 participants and has grown from only being offered at 6.9% of schools in 1977 to being offered at 16.2% of schools in 2014 (Acosta & Carpenter, 2014). Despite these numbers, rowing is a sport typically associated with high attrition rates within their rosters each season (Macur, 2004). Thus, efforts to prevent dropout via improved athlete motivation and outcomes of psychological health are warranted.

Additionally, research investigations of these outcomes (e.g. burnout, engagement) will further inform practice efforts to promote athlete well-being in women's rowing via positive experiences in the social sport environment. Accordingly, the coach-athlete relationship may be particularly important to understanding this because of the impact coaching practices can have on rowers' continuation in the sport (Coon, 2015).

The coach-athlete relationship (CAR) is described as the situation in which coaches' and athletes' emotions, thoughts, and behaviors are mutually and causally interconnected (Jowett & Ntoumanis, 2004). Specifically, this relationship is conceptualized to be reflected by perceptions of its three components of closeness, commitment, and complementarity, which are representative of the affective, cognitive, and behavioral aspects, respectively, of interactions between coaches and athletes. Closeness is defined as how the coach and athlete feel emotionally close to each other in the relationship. Commitment refers to individuals' intentions to maintain their coach-athlete relationship over time. Complementarity reflects the extent that coaches and athletes work co-operatively. Higher levels of these three components are associated with a stronger, more adaptive coach-athlete relationship.

Relationships perceived as close and significant, as coach-athlete relationships often are, affect one's views about oneself. Indeed, the coach-athlete relationship has been shown to be positively associated with fulfillment of psychological needs, therefore impacting the motivational processes and subsequent psychological outcomes, as described by self-determination theory

(SDT) (Riley & Smith, 2011; Hodge, Lonsdale, Jackson, 2009). Self-determination theory, a prominent theory of sport motivation and psychological health, proposes that social factors within an environment influence an individual's level of satisfaction of the psychological needs of autonomy, competence, and relatedness. It has been found that satisfaction of these needs positively correlates with higher endorsement of positive aspects of the coach-athlete relationship levels by athletes (Riley & Smith, 2011). Needs satisfaction has also been positively associated with athlete engagement, which is a positive psychological outcome, and negatively associated with burnout, a negative psychological outcome (Hodge, Lonsdale, Jackson, 2009). Therefore, guided by this theory, the coach, a key actor in the social environment of the athlete, has great potential to impact the athletes' psychological outcomes, including experience of athlete burnout or engagement.

Motivation is a key antecedent of burnout, and SDT, a prominent motivational theory, is one way to understand both psychological experiences (Li et al, 2013; Goodger et al, 2007). Intrinsic motivation has been deemed a more positive motivational trend, while extrinsic motivation leads to maladaptive outcomes such as athlete burnout (Pelletier et al, 1995). Based on the motivation continuum formed as a part of the SDT, athletes with more intrinsic motivation, as it is the most self-determined form of motivation, were more likely to freely experience and self-endorse an activity, therefore leading to lower levels of athlete burnout than athletes experiencing more extrinsic motivation (Lemyre, Treasure, Roberts, 2006). Athlete engagement may be developed via an alternative motivational pathway characterized by more intrinsic or self-determined forms of motivation. Ultimately,

an understanding of sport motivation is central to the understanding of athlete burnout and engagement experiences within the social environment of sport.

Athlete burnout is a cognitive-affective syndrome of physical/emotional exhaustion, sport devaluation, and reduced athletic accomplishment (Raedeke, 1997). Physical/emotional exhaustion is characterized by mental and physical fatigues resulting from intense training and/or competition. Sport devaluation refers to the loss of interest in sport including resentment towards participating. An athlete feeling unable to achieve personal goals or perform up to individual expectations characterizes reduced accomplishment. Though not a dimension of burnout, perceptions of psychological stress have been supported as an important antecedent to the burnout experience. For example, an event, such as an intense training load, may produce athlete perceptions of the event as a stressor and create a behavioral response that leads to burnout (Smith, 1986; Udry et al, 1997). As a result of this well-studied positive association between sport stress and burnout (Goodger et al., 2007), it should be accounted for in studies examining athlete psychological health outcomes.

Beyond athlete burnout, the distinct, yet related athlete psychological outcome of athlete engagement also may be impacted by the coach-athlete relationship. Athlete engagement is the persistent, positive, cognitive-affective experience in sport that is characterized by vigor, confidence, dedication, and enthusiasm (Hodge, Lonsdale, Jackson, 2009). Vigor is a sense of liveliness. Confidence is a belief in one's own ability to achieve a high level of performance and success in respect to one's goals. Dedication is a desire to invest in one's goals.

Enthusiasm is described as excitement and enjoyment. Global athlete engagement has been linked to lower levels of burnout (DeFreese & Smith, 2014). Athlete burnout and engagement are two distinct, yet related constructs; athlete engagement is important to look at because it is the more positive, adaptive athlete psychological health outcome. Therefore, coaches should look to promote athlete engagement as a way to improve the overall health and wellbeing of athletes as opposed to only identifying burnout in their athletes.

After a review of the current literature, a clear limitation is a lack of studies that look at the impact of the coach-athlete relationship on athlete psychological outcomes over the course of an entire season. Furthermore, minimal studies have been conducted with populations of collegiate female rowing teams, which have been shown to have a high attrition rate (Coon, 2015), making the psychological outcomes of burnout and engagement particularly salient. To address these important knowledge gaps, the purpose of the following study was to examine the association of athlete perceptions of the coach-athlete relationship (closeness, commitment, and complementarity) with athlete burnout and engagement in a sample of collegiate female rowers over the course of a competitive season. We hypothesized that

- A) Athlete endorsement of higher levels of markers of the coach-athlete relationship (i.e. closeness, commitment, complementarity) would be negatively associated with athlete burnout perceptions across the competitive season.

- B) Athlete endorsement of higher levels of the markers of the coach-athlete relationship would be positively associated with athlete engagement perceptions across the competitive season.

Based on current evidence and theory, it is also important to account for sport motivation and psychological stress as important burnout and engagement antecedents in order to examine relationships among focal study variables in the context of key covariates. To further explore the relative importance of coach-athlete relationship variables within the context of common burnout and engagement antecedents, additional, exploratory study hypotheses included

- A) Athlete endorsement of higher levels of markers of the coach-athlete relationship (i.e. closeness, commitment, complementarity) would be negatively associated with athlete burnout perceptions across the competitive season.
- B) Athlete endorsement of higher levels of the markers of the coach-athlete relationship would be positively associated with athlete engagement perceptions across the competitive season.

CHAPTER 2

The Coach-Athlete Relationship

This research study examined the relationships between coaches and athletes and the subsequent effect on athlete burnout and engagement after accounting for sport motivation and perceived stress. The coach-athlete relationship is the situation in which coaches' and athletes' emotions, thoughts, and behaviors are mutually and causally interconnected (Jowett & Ntoumanis, 2004). The relationship is conceptualized by perceptions of its three components: closeness, commitment, and complementarity. Closeness is defined as how the coach and athlete feel emotionally close to each other in the relationship. Commitment refers to the individuals' intentions to maintain their coach-athlete relationship over time. Complementarity reflects the extent that coaches and athletes work co-operatively. Higher levels of these three components are associated with a stronger, more adaptive, coach-athlete relationship, and Jowett and Ntoumanis found that the lack of any of these three components led to conflict in the coach-athlete relationship. The coach-athlete relationship was measured with the Coach-Athlete Relationship Questionnaire (CART-Q) in which both the coach and the athlete can be subjects. Developed by Dr. Sophia Jowett, the CART-Q is a reliable and valid measure of the coach-athlete relationship, particularly to assess the quality of the coach-athlete relationship in student-athletes (Jowett, 2009). Jowett and Ntoumanis did note that future research looking at the CAR and related outcomes was needed.

The coach-athlete relationship is unique in regards to the reciprocal nature of the relationship; athletes' behaviors and motivation affect coaches' behaviors

while coaching behaviors also impact the athlete in a variety of ways (Mageau & Vallerand, 2003). In a review of the literature, Mageau and Vallerand (2003) stated that interactions and feedback between coaches and athletes impact the attitudes and behaviors of the coaches as well as the motivation, behavioral and psychological outcomes of the athletes. For example, coaches' behaviors in the form of autonomy supportive behaviors have a beneficial impact on the psychological needs of the athletes and in turn nurture the intrinsic and self-determined extrinsic motivation of those athletes. Riley and Smith (2011) also found that the nature of the coach-athlete relationship impacts the fulfillment of psychological needs and that social relationships in general impact the motivational process. Smith and Smoll (2014) describe the process of how an athlete's perception and recall of coaching behaviors impacts that athlete's evaluation of his/her sport experiences. Moreover, athletes' perceptions of greater training and instruction, social support, and positive feedback, areas guided by coaches, were associated with more positive outcomes (perceived competence and enjoyment) and fewer negative outcomes (burnout) (Price & Weiss, 2000). Accordingly, coaches' behaviors have been shown to have great potential to impact the behavioral and psychological outcomes of their athletes.

Coaching behaviors are often grouped into one of two coach-created motivational climates: the mastery climate and the performance climate. The coach-promoted mastery climate, which reinforces effort and learning from athletes, positively corresponds with higher levels of confidence, dedication, enthusiasm, and vigor (all aspects of athlete engagement) in athletes (Curran, Hill, Hall, Jowett,

2015). Research has also found that higher levels of closeness, commitment, and complementarity (in the coach-athlete relationship) exist when the coach emphasizes role importance, cooperation, and improvement (Olympiou, Jowett, and Duda, 2008). Role importance, cooperation, and improvement are characteristic of task involving features of the coach-created environment as opposed to the ego involving features such as punitive responses to mistakes, rivalry, and unequal recognition. These features of the coach-created environment stem from the achievement goal theory which proposes that task oriented goals are adaptive and empowering while ego goals are maladaptive and compromising (Nicholls, 1984).

Self-Determination Theory

Self-determination theory is a theory of motivation that posits that psychological outcomes are influenced by the nature of one's motivation (Ryan & Deci, 2000). Motivation runs along a continuum of self-determined motivation. The more self-determined the athlete's motivation for sport, the more adaptive it is in persisting in the face of struggle/failure and the more adaptive it is for athlete psychological health (e.g., promotion of engagement and deterrence of burnout). SDT further states that motivation is influenced by three psychological needs: autonomy, competence, and relatedness. Autonomy is the feeling of personal choice or control, competence is a sense of success and being effective in one's environment, and relatedness is the social connection to others reflected by feelings of acceptance and belonging. The social environment determines the extent to which these three psychological needs can be either fulfilled or thwarted. In the current study, SDT is utilized to guide our examination of the connection between

athlete perceptions of their relationship with the coach and psychological outcomes of burnout and engagement. Therefore, our focus was on the motivational outcomes posited by the theory (i.e., the self-determination continuum). Accordingly, we did not assess need satisfaction explicitly in the current study.

Smith et al's 2015 study, "The relationship between observed and perceived assessments of the coach-created motivational environment and links to athlete motivation", examined links between the coach-created motivational climate and athlete motivation. Observers rated the degree to which the coaching climate was autonomy supportive, controlling, task-involving, ego-involving and relatedness supportive. Athletes and coaches then completed questionnaires assessing their perceptions of the coach-created climate in relation to the previously mentioned dimensions of the environment; athletes also completed a measure of their sport-based motivation regulations. The study was guided by both achievement goal theory and self-determination theory. Smith et al found that there was a positive relationship between coach-perceived social support and athletes' autonomous motivation; there was also a positive relationship between coach-perceived use of controlling behaviors and athletes' controlled and amotivation. These findings suggest that athletes value an activity when coaches create a warm, supportive and caring environment, and participate in the activity out of personal interest and enjoyment. The current study does not directly assess the athletes' motivational climate nor needs satisfaction; however, the research by Smith et al guides our hypotheses because it links the coach created social environment to the quality of athletic experiences and the outcomes for athletes. The current study attempts to

build off this research by exploring the link between the coach-athlete relationship and specific athlete psychological health outcomes of burnout and engagement.

The most self-determined form of motivation is intrinsic motivation, which refers to doing an activity for the inherent satisfaction of the activity itself (Ryan & Deci, 2000). The most non self-determined form of motivation is amotivation, a state characterized by unwillingness and a lack of recognition that one's actions have an effect on the outcomes. Extrinsic motivation lies along the motivation continuum, with some categories characterized by more self-determined forms of motivation than others. Intrinsic motivation has been deemed a more positive motivational trend, in which athletes participate in activities for their own sake (i.e., enjoyment, learning, mastery) inherently promoting competence and self-determination, leading to engagement with that activity. On the other side, extrinsic motivation leads to maladaptive outcomes such as athlete burnout; the athlete experiences a loss of competence and self-determination during some activity, resulting in an overall decrease in intrinsic motivation and identification and an increase in amotivation and external regulation (Pelletier et al, 1995). The degree to which motivation is more or less self-determined for sport, then, is asserted to impact athlete motivational, psychological (burnout, engagement) and behavioral (i.e., attrition/dropout) outcomes.

Coon's 2015 study, "Predicting College Women Rowers' Motivation and Persistence: A Self-Determination Theory Approach", examined individual and social-contextual factors that contributed to collegiate female rowers' motivation and continued participation (or dropout) from sport. Coon measured basic needs

satisfaction, motivation for rowing, and perceptions of coaches' behaviors. Athletes participated in the surveys at two different time points in order to assess the variables both at the end of the previous season and the start of the new season. This also allowed Coon to measure how many athletes "persisted" or dropped out from the sport between the two time survey periods. Coon found that true novices had less perceived competence as compared to their peers, and athletes working directly with their head coach felt more competent and autonomous than athletes working with a secondary coach. Autonomy and coach relatedness were positively correlated with intrinsic motivation and negatively related to athletes' amotivation. Amotivation at Time 1 predicted rower dropout at Time 2, while participants continuing in their sport felt similar needs satisfaction and motivation at the two times. These findings support previous research utilizing SDT in sport (specifically collegiate rowing) by showcasing that satisfaction of athlete's basic needs and self-determined forms of motivation predict persistence in sport, while amotivation (neither intrinsic or extrinsic motivation) predicts dropout, specifically in the collegiate women's rowing environment. The current study was reviewed because of its seminal investigation of motivation and behavior within collegiate rowing as well as its use of SDT to guide such work. Informed by this seminal study, future work in this area should examine how different aspects of the rower's environment impact motivation and the subsequent impact that has on psychological health outcomes including athlete burnout and engagement. The current study attempts to fill this research gap via a focus on the impact of the coach-athlete relationship.

Athlete Burnout

Athlete burnout is a cognitive-affective syndrome of physical/emotional exhaustion, sport devaluation, and reduced athletic accomplishment (Raedeke, 1997). Physical/emotional exhaustion is mental and physical fatigues resulting from intense training and/or competition. Sport devaluation refers to the loss of interest in sport including resentment towards participating. An athlete feeling unable to achieve personal goals or perform up to individual expectations characterizes reduced accomplishment. Burnout is different than dropout from sport: not all burned out athletes quit participating in sports, and dropout from sport can be the result of another different outside factor (DeFreese, Smith, & Raedeke, 2015).

Goodger et al. (2007) found that across 22 samples of burnout research, five themes of psychological factors impacting burnout were most common: motivation, coping with adversity, response to training and recovery, role of significant others, and identity. Two different frameworks can explain burnout: self-determination as it relates to motivation and entrapment in sport, and stress. Raedeke (1997) found that athletes were involved in sport for two reasons: attraction, they want to be involved, and entrapment, they have to be involved. Athletes who felt entrapped by their sport participation had higher burnout scores on the Athlete Burnout Questionnaire than athletes who were involved in the sport for attraction-related reasons. This is important to study in relation to the coach-athlete relationship because the coach, as a factor in the social environment, plays a role in impacting how an athlete views his/her sporting experiences (Smith & Smoll, 2014).

Extrinsically motivated athletes complete behaviors as a means to an end. Intrinsic

motivation is the most self-determined form of motivation and athletes experiencing this engage in sport for pleasure and satisfaction of the activity (Pelletier et al., 1995). SDT assumes that amotivation may lead to dropout or burnout. In a study of female collegiate rowers, amotivation at time point one predicted dropout at time point two (Coon, 2015). Another assumption provided by SDT is that the coach and his/her behaviors contribute to the social environment of the athlete. Therefore, coaching behaviors have a direct impact on the athlete's fulfillment or thwarting of the basic psychological needs. Coon (2015) found that in a longitudinal study of female collegiate rowers, autonomy and coach relatedness were positively related to intrinsic motivation (more self-determined).

Athlete stress has been conceptualized as a key burnout antecedent. According to Smith (1986), burnout is a maladaptive stress response that results from the athlete's perceived resources being inadequate to meet sport demands. A systematic literature review on burnout found perceived stress to be consistently and positively associated with burnout perceptions (Goodger et al, 2007). Athletes have identified potential sources of stress as high training and competitive demands (Gould et al, 1997). Athletes also often describe interactions with peers and coaches as negative more often than positive when dealing with burnout and stress, particularly when that stress was related to an injury that prevented them from practicing and competing. Udry et al. (1997) found that coaches' own emotional depletion prevented them from having positive social interactions with athletes during the stressor and hindered clear communication between the coach and athlete. Further, Price and Weiss (2000) found that coaches with higher

emotional exhaustion provide less positive feedback; coaches' autocratic styles result in negative psychological responses from athletes that are precursors to burnout. These include higher stress, anxiety, and self-criticism. This relates to the fundamental psychological needs of autonomy, relatedness, and competence in that low autonomy results in higher stress, anxiety, and self-criticism, which increases an athlete's susceptibility to burnout (Lemyre et al., 2006). In addition, research supports a positive association between negative sport-based social interactions and burnout (Smith et al, 2010). For example, DeFreese and Smith (2014) found that social support and negative social interactions over the course of a competitive season contributed to burnout and psychological wellbeing for collegiate athletes. Specifically, social support was negatively associated with burnout and positively associated with well-being while negative social interactions were positively associated with burnout and negatively associated with well-being. This study included multiple sources of social interactions, including coaches. Based on these findings, future work should focus on the impact of athlete perceptions of coaches on burnout as other psychological outcomes including engagement.

Athlete Engagement

Athlete engagement is the persistent, positive, cognitive-affective experience in sport that is characterized by vigor, confidence, dedication, and enthusiasm (Hodge, Lonsdale, Jackson, 2009). Vigor is a sense of liveliness. Confidence is a belief in one's own ability to achieve a high level of performance and success in respect to one's goals. Dedication is a desire to invest in one's goals. Enthusiasm is described as excitement and enjoyment. Hodge, Lonsdale, and Jackson (2009) also found that

athletes' needs satisfaction, specifically competence and autonomy, were good predictors of athlete engagement, i.e. positive psychological outcome. Lonsdale, Hodge, and Rose (2009) supplement this by adding that needs satisfaction in athletes leads to more self-determined forms of motivation, culminating in positive psychological experiences. They found that if an athlete's motives for participating in sport were more self-determined, there was a negative correlation with burnout.

Curran et al.'s 2015 study, "Relationships Between the Coach-Created Motivational Climate and Athlete Engagement in Youth Sport", predicted that a mastery climate, created by the coach, would positively correspond with athlete engagement. Youth soccer players completed a survey that included the Perceived Motivational Climate in Sport Questionnaire and the Athlete Engagement Questionnaire. Their findings supported that the coach-created mastery climate positively corresponded with confidence, dedication, enthusiasm, and vigor (i.e. engagement). The researchers surmised that a coach-created mastery climate is a potential antecedent to athlete engagement and should be considered when looking to increase athlete engagement. This is important to the study at hand because through the framework of SDT, the coach is an important social factor in the lives of athletes and has an impact on the psychological outcomes, such as was found here with the coach-created motivational climate and athlete engagement.

The coach-athlete relationship is an important factor in the social environment of athletes. Continuing under the SDT framework, while considering stress and motivation, it is necessary to examine the effects the coach-athlete relationship has on athlete psychological health outcomes such as burnout and

engagement over time. After reviewing the extant literature, remaining key knowledge gaps include the need for studies that: 1) examine the impact of the coach-athlete relationship on athlete psychological outcomes, 2) utilize temporal (multi-time point) designs and 3) are conducted with female collegiate rowing populations. These knowledge gaps are examined within the current study and frame study purposes. Moreover, based on the previous literature to date, psychological stress and sport motivation should be accounted for in examinations of the influence of the social environment (examined via the coach-athlete relationship in the current study) on athlete psychological outcomes of athlete burnout and engagement over time. Accordingly, they are examined as a means to place study findings within the well-developed existing bodies of research on these outcomes in athlete populations.

CHAPTER 3

A multi-time point observational design was utilized to complete this study. Utilization of this design allowed researchers to collect information regarding the athlete's perceptions of the coach-athlete relationship and psychological health outcomes at multiple time points across the competitive season. The five questionnaires used to measure study variables of interest were the Coach-Athlete Relationship Questionnaire (CART-Q), Perceived Stress Scale (PSS), Sport Motivation Scale (SMS), Athlete Burnout Questionnaire (ABQ), and the Athlete Engagement Questionnaire (AEQ). Participants were told they were completing a study on athlete social experiences and psychological health. The specific procedures of the study are outlined below. Briefly, we examined how student-athletes' perceptions of their coach-athlete relationships with their primary coach were associated with athlete burnout and engagement across the fall competitive season. In assessing these associations relative to the broader knowledge base on burnout and engagement, we accounted for athlete perceptions of stress and sport motivation in exploratory follow-up models.

Recruitment

The researchers contacted the coaches of the UNC women's Division 1 rowing team and received permission to attend a team meeting in the beginning of fall 2015 in order to recruit participants and give them a brief introduction to study procedures. During the meeting, the researchers stated they were conducting a study on athlete social interactions and psychological health outcomes in collegiate athletics, specifically rowing during the fall competitive season. Participants were

informed that the study was completely voluntary and they did not have to participate, in addition, they could discontinue the study at any point if they no longer felt comfortable participating. Following this meeting, participants were contacted via a coach/administrator provided team email list and offered the opportunity to participate in the first study time point (i.e. survey wave). Consent was obtained as part of the online survey protocol. Following participation in the first survey wave, participants responded to an online questionnaire at three additional time points spaced equally across the fall competitive season.

Participants

Thirty-seven UNC-Chapel Hill Division 1 rowers (all female) between the ages of 18-23 years old participated in this study. The researchers recruited from a pool of approximately seventy-five student-athletes on the rowing team (NCAA, varsity rowing program). This group was chosen because there are limited studies on women's rowing and this intensive training sport has important implications for the understanding of athlete psychological health within the social environment of collegiate sport (Coon, 2015).

Inclusion criteria

In order to have been included in this study, a participant must be an active member of the UNC women's novice or varsity rowing program as well as both training and competing during the current participation season. The participant must also have been a full time member of UNC-Chapel Hill and be able to read English.

Exclusion criteria

Participants were excluded from the study if they were not at least 18 years of age at the time of study enrollment.

Instrumentation

Demographics

There were two sections of demographics questions asked, general and rowing specific, in the questionnaire. On the initial survey wave, both general demographics and rowing specific demographics information were gathered. The general demographics information included participant self-report: age, gender, race/ethnicity, school attended, sport played, number of years the participant has been playing this sport, number of years the participant has been playing this sport on this team, and whether or not the participant participated in this sport prior to college.

On the remaining three survey waves, only the rowing specific demographics information was collected. This included self-reported: varsity/novice team participation, what boat the participant was in (i.e. competitive ranking), whether or not the boat the participant was in had changed since the last survey, how recently the athlete participated in formal competition, the participants current training load, whether or not the participant was in taper, injured or unable to practice at the time of the assessment wave. The boat the participant was in refers to his/her competitive ranking. The top competitive ranking is the Varsity 8 (V8). The V8 is the top eight rowers based on speed and rowing technique and the best coxswain. The 2V8 is the next eight rowers and coxswain; the V4 is the next four plus coxswain

after them. Below the varsity boats are the novice boats, which can also be referred to as the 3V8.

Coach-Athlete Relationship Questionnaire (CART-Q)

The Coach-Athlete Relationship Questionnaire (CART-Q) was used to assess athlete self-report perceptions of the coach-athlete relationship via the three factors of closeness, complementarity, and commitment (Jowett 2009). The 11-measure CART-Q measures student-athlete perceptions of the relationship from both Meta and direct perspectives. The meta-perspective reflects the athlete's perception of how the coach thinks, feels, and behaves towards him/her (e.g. "My coach likes me"). The direct perspective reflects the athlete's perceptions of personal feelings, thoughts, and behaviors relative to the coach (e.g. "I like my coach"). The participants rated each item based on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Subscale scores are calculated by averaging all the times from each respective subscale. Higher scores on the CART-Q subscales are reflective of higher feelings of closeness, complementarity and commitment of the coach-athlete relationship from the athlete perspective. The internal consistency reliability scores of the CART-Q has been previously supported and ranged from 0.78 to 0.87 for the direct subscales and 0.82 to 0.90 for the meta-perspective subscales (Jowett, 2009). This measure has been used with a collegiate athlete sample (Jowett, 2009), providing some evidence of population-specific validity.

Perceived Stress Scale (PSS)

The Perceived Stress Scale (PSS) was used to assess athlete self-report perceptions of sport stress using a 12 item questionnaire. Stress related experiences

are rated on a 5-point Likert scale (1: never, 5: very often), and a sport stress score is calculated by averaging scores on all items. Scores from the PSS have been positively associated with athlete burnout scores and have been shown to possess acceptable internal consistency validity for use in collegiate athlete populations (DeFreese & Smith, 2013; 2014). Internal consistency reliability scores for the PSS have alpha coefficients ranging from 0.81 to 0.86 in previous studies with competitive athletes (Raedeke & Smith, 2001).

Sport Motivation Scale (SMS)

The Sport Motivation Scale (SMS) was utilized to assess athlete self-report perceptions of motivation for sport. The SMS assesses sport motivation via seven subscales of motivation for sport: three for intrinsic motivation (IM to Know, IM to Accomplish Things, IM to Experience Stimulations); three for extrinsic motivation (External Regulation, Introjection, Identification); and amotivation. The 28 question SMS asks participants to respond to “Why do you practice your sport” on a 7-point Likert scale ranging from 1 (does not correspond at all) to 7 (corresponds exactly). Subscale scores were determined by averaging item scores within each subscale. The SMS was used to account for motivation in the current study as coaching behaviors have been found to have an impact on motivation as well as an association with athlete outcomes like burnout (Mageau and Vallerand, 2003). In the present study, internal consistency reliability values were $\alpha = .74$ to $.92$. To calculate the degree to which sport motivation was self-determined, the five subscales were used to create a self-determined motivation index using the following formula: $2 \times \text{Intrinsic Motivation} + 1 \times \text{Identified Regulation} - 1 \times (\text{mean of}$

Introjected Regulation and External Regulation) – 2*Amotivation (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002). Possible scores on this self-determined motivation index range from -18 to 18. Higher scores indicate that an athlete is motivated to participate in sport for relatively more self-determined reasons. The SMS subscale and index scores have shown validity in collegiate athlete population (DeFreese & Smith, 2014; Pelletier et al, 1995) and has been found to have internal consistency reliability for individual subscales with alpha coefficients ranging from 0.73 to 0.95 (Pelletier et al, 1995).

Athlete Burnout Questionnaire (ABQ)

The Athlete Burnout Questionnaire (ABQ) was utilized to assess athlete self-report perceptions of burnout and contains three subscales of burnout (i.e. dimensions) of emotional and physical exhaustion, reduced sense of sport accomplishment, and sport devaluation (Raedake and Smith, 2001). The 15-item self-report assessment is rated on a 5-point Likert scale ranging from 1, “almost never”, to 5, “almost always”. Subscale scores were calculated by averaging item scores corresponding to individual burnout dimensions and an overall burnout score was then calculated by averaging scores on all items. Higher scores reflect the individual is experiencing higher athlete burnout, whereas lower scores indicate the individual is experiencing less athlete burnout. The ABQ has been found to exhibit strong internal consistency reliability for each subscale with alpha coefficients ranging from 0.84 to 0.91 in former collegiate athlete samples (Raedeke and Smith, 2001). Validity of the ABQ has been exhibited in a myriad of athlete populations including collegiate athletes (Raedeke & Smith, 2009). This data informed our

decision to utilize the ABQ to measure collegiate athlete burnout within the current study.

Athlete Engagement Questionnaire (AEQ)

The Athlete Engagement Questionnaire (AEQ) was utilized to assess athlete self-report perceptions of engagement with the sport context. The AEQ is a 16-item self-report that evaluates four dimensions (i.e. subscales) of athlete engagement including confidence, vigor, dedication, and enthusiasm (Lonsdale, Hodge, Jackson, 2007). The AEQ is measured on a 5-point Likert scale with 1 referring to “almost never” and 5 referring to “almost always”, and scores reflect overall athlete engagement. Each subscale score is determined by averaging item scores linked to each respective subscale. Higher scores represent higher levels of engagement. The AEQ has been found to exhibit acceptable internal consistency reliability for each subscale with alpha coefficients ranging from 0.85 to 0.92 in former athlete populations (Lonsdale, Hodge, Jackson, 2007). The AEQ has also been found to be a valid measure of athlete engagement based on previous research with former athlete populations (Lonsdale, Hodge, Jackson, 2007).

Procedure

Data were collected via a Qualtrics survey distributed through an administrator/coach provided email list. Qualtrics is an online survey system that allows data to be collected anonymously by linking email addresses to each survey. Participants were asked to respond to an online questionnaire at four different time points (survey waves) throughout the fall semester. At each of the four waves of data collection, the following data was collected: rowing demographics, sport stress,

motivation, athlete burnout, athlete engagement, and the coach-athlete relationship. The athletes were asked to think about their primary coach when answering questions, and were reminded to do this during the remaining survey waves. The general demographics information was only collected at the first wave. Participants were required to answer whether or not they were over the age of 18, with an answer of no skipping them to the end of the survey. Participants were also required to enter their email address at the completion of each wave to aid in linking data across survey waves.

The survey waves were determined by examining the fall rowing season schedule; 20 hours is the maximum amount of time each week the NCAA allows student-athletes to spend on their respective sports and includes time spent both at practices and competition. The rowing team enters this training/competition phase on September 8th. The competitive season following the start of this training phase was split into four training segments. Each segment represented an approximately one week training window and was separated from the subsequent window by a one-week assessment buffer. This first survey wave took place during the second week the team was in the 20-hour training/competition phase; the final survey wave occurred in the last full week of the 20-hour training/competition phase. The other two waves were spaced evenly between the first and fourth survey waves. See Table 1 for a more detailed explanation of the survey wave schedule.

Table 1: Expected Survey Wave Schedule

Aug 26th	Week of Sept 6 th	Week of Sept 13 th	Week of Sept 20 th	Week of Sept 27 TH	Week of Oct 4 th	Week of Oct 11 th	Week of Oct 18 th	Week of Oct 25 th	Week of Nov 1st
Tryout, Begin 8 hours	Begin 20 hours	Survey Wave 1		Survey Wave 2		Survey Wave 3		Survey Wave 4	End 20 hours

For each specific survey wave, the online survey was sent to individual participants via Qualtrics.com (a secure email distribution vendor). The schedule for reminders is adapted from the Dillman method for survey distribution (2007). Each survey was made available for a week with reminders sent to participants at 2 and 7 days after the initial email. After 7 days, no more email correspondence occurred until the next survey wave. Following the fourth survey wave, all communication with potential participants ceased. The initial team meeting took 20 minutes and each survey wave too no longer than 20 minutes to complete; thus, the total time a participant spent participating in the study was no longer than 100 minutes.

Analysis Methods

Preliminary data screening was performed according to best practice (Tabachnick & Fidell, 2007). This involved examining each data wave for potential missing values, outliers, and violations of assumptions of multivariate analysis. Internal consistency reliability values (e.g. Cronbach's alpha) were calculated for all

psychometric scale with .70 used as a cut-off criterion for acceptability. Descriptive statistics and scale reliabilities were calculated for all study variables at every time point. This was done to identify the nature and magnitude of relationships between participant perceptions of the coach-athlete relationship and athlete psychological outcomes. Missing data from a completed assessment wave were replaced with values calculated via mean imputation.

Multilevel linear modeling (MLM; Singer & Willett, 2003) was then conducted to examine relationships among the study variables of athlete perceptions of their relationship with their primary coach and psychological outcomes of interest (i.e. burnout and engagement) over time while accounting for perceived stress and sport motivation. MLM is suitable for the testing of study hypotheses because it accounts for the nesting of repeated measures data within a longitudinal design while allowing for the investigation of both between- and within-subject predictors of change in study outcomes of psychological health factors (see DeFreese and Smith, 2014 for an example).

CHAPTER 4

For athletes, the coach is an important member of their social environment, and therefore has great potential to impact athlete psychological health. The coach-athlete relationship has been shown to be positively associated with the fulfillment of psychological needs, therefore impacting motivational processes and subsequent psychological health outcomes (Riley & Smith, 2011; Hodge, Lonsdale, Jackson, 2009). The psychological health outcomes of athlete burnout and athlete engagement are particularly salient to the athletic population because the overall health and wellbeing of athletes leads to individuals who are more satisfied and happy and are therefore more likely to persist through both good and bad sport-related experiences (Jowett & Shanmugam, 2016). Therefore, a deeper understanding of the impact the coach-athlete relationship has on athlete psychological experiences is crucial to further understanding of athlete psychological health and wellbeing. To address this research need in the present study, we examined how coach-athlete interactions link with athlete burnout and engagement experiences in collegiate rowers.

Athlete burnout is a cognitive-affective syndrome of physical/emotional exhaustion, sport devaluation, and reduced athletic accomplishment (Raedeke, 1997). Physical/emotional exhaustion is characterized by mental and physical fatigues resulting from intense training and/or competition. Sport devaluation refers to the loss of interest in sport including resentment towards participating. An athlete feeling unable to achieve personal goals or perform up to individual expectations characterizes reduced accomplishment. Self-determined behavior, as it

relates to motivation and entrapment in sport, and stress have both been used to explain burnout. Raedeke (1997) found that athletes who felt entrapped by their sport participation had higher burnout scores on the Athlete Burnout Questionnaire than athletes who were involved in the sport for attraction-related reasons. The coach, as a factor in the social environment, plays a role in impacting how an athlete views his/her sporting experiences (Smith & Smoll, 2014), and therefore the coach has the potential to negatively contribute to burnout in athletes.

In addition to motivation, perceived stress has been consistently and positively associated with burnout perceptions (Goodger et al, 2007). Athletes have identified potential sources of stress as high training and competitive demands (Gould et al, 1997). Athlete perceptions of an event as a stressor can create a behavioral response that leads to burnout. A study by Udry et al (1997) asked either injured or burned out athletes (i.e. athletes experiencing stress) to describe their interactions with their coaches, and found that athletes viewed these interactions more negative than positive when experiencing stress. Therefore, if an athlete experiencing a stressor had a better coach-athlete interaction during the stressor, he/she would potentially be able to deter the negative effects of burnout or injury.

Athlete burnout and engagement are two distinct, yet related constructs; athlete engagement is important to look at because it is the more positive, adaptive athlete psychological health outcome. Athlete engagement is the persistent, positive, cognitive-affective experience in sport that is characterized by vigor, confidence, dedication, and enthusiasm (Hodge, Lonsdale, Jackson, 2009). Vigor is a sense of liveliness. Confidence is a belief in one's own ability to achieve a high level of

performance and success in respect to one's goals. Dedication is a desire to invest in one's goals. Enthusiasm is described as excitement and enjoyment. Global athlete engagement has been linked to lower levels of burnout (DeFreese & Smith, 2014). Coaching behaviors have been positively correlated with athlete engagement; Curran et al (2015) found that the coach-created mastery climate, which reinforces learning and effort from athletes, positively corresponded with confidence, dedication, enthusiasm, and vigor (i.e. engagement) in athletes. Therefore, coaches should look to promote athlete engagement as a way to improve the overall health and wellbeing of athletes as opposed to only identifying burnout in their athletes.

Self-determination theory, a prominent theory of sport motivation and psychological health, proposes that social factors within an environment influence an individual's level of satisfaction of the psychological needs of autonomy, competence, and relatedness. It has been found that satisfaction of these needs positively correlates with higher endorsement of positive aspects of the coach-athlete relationship levels by athletes (Riley & Smith, 2011). Needs satisfaction has also been positively associated with athlete engagement, which is a positive psychological outcome, and negatively associated with burnout, a negative psychological outcome (Hodge, Lonsdale, Jackson, 2009). Therefore, guided by this theory, the coach, a key actor within the dynamic social environment of the athlete, has great potential to impact the athletes' psychological outcomes, including athlete perceptions of engagement and burnout.

Additionally, SDT posits that psychological outcomes are influenced by the nature of one's own motivation (Ryan & Deci, 2000). Motivation runs along a

continuum of self-determined motivation. The more self-determined the athlete's motivation for sport, the more adaptive it is in persisting in the face of struggle/failure and the more adaptive it is for athlete psychological health (e.g. promotion of engagement and deterrence of burnout). The focus in our study was on the motivational outcomes, athlete burnout and engagement; however, in understanding other antecedents of burnout and engagement, it is important to account for athlete motivation.

One important psychosocial variable which has the potential to impact athlete psychosocial outcomes is the coach-athlete relationship. Relationships perceived as close and significant, as coach-athlete relationships often are, affect one's views about oneself. The coach-athlete relationship is the situation in which coaches' and athletes' emotions, thoughts, and behaviors are mutually and casually interconnected (Jowett and Ntoumanis, 2004). The relationship consists of three components: closeness, commitment, and complementarity. Higher levels of these three components are associated with a stronger, more adaptive coach-athlete relationship. Fulfillment of psychological needs is one explanation of the link between the coach-athlete relationship and positive outcomes such as performance success and personal satisfaction (Jowett & Shanmugam, 2016). Based on the SDT framework, the coach-athlete relationship is an important social antecedent for athlete psychological health outcomes and therefore warrants further investigation into the association between the coach-athlete relationship and such outcomes.

One sport which represents a particularly unique environment to examine associations among markers of the coach-athlete relationship and outcomes of

burnout and engagement is varsity, collegiate rowing. Across all collegiate levels, women's rowing has an average roster of 50.2 participants and has grown from only being offered at 6.9% of schools in 1977 to being offered at 16.2% of schools in 2014 (Acosta & Carpenter, 2014). However, rowing is a sport typically associated with high attrition rates within their rosters each season (Macur, 2014). Coon (2015) examined individual and social-contextual factors that contributed to collegiate female rower's motivation and continued participation (or dropout) from sport. Coon measured basic needs satisfaction, motivation for rowing, and perceptions of coaches' behaviors. The findings from this study supported previous research utilizing SDT in sport by showcasing that satisfaction of athlete's basic needs and self-determined forms of motivation predict persistence in sport, while amotivation (neither intrinsic or extrinsic motivation) predicts dropout, specifically in the collegiate women's rowing environment. Therefore, efforts to prevent dropout via improved athlete motivation and outcomes of psychological health (e.g. burnout, engagement) are needed. Research investigations of these outcomes will further inform practice efforts to promote athlete well-being in women's rowing via positive experiences in the social sport environment, specifically from coaches.

Review of the current literature provides three remaining key knowledge gaps relative to the coach-athlete relationship and athlete psychological health: 1) a need to examine the impact of the coach-athlete relationship on athlete psychological health outcomes including burnout and engagement, 2) a need to utilize temporal (multi-time point) designs and 3) a need to conduct research with female collegiate rowing populations. To address these important knowledge gaps,

the purpose of the following study was to examine the association of athlete perceptions of the coach-athlete relationship (closeness, commitment, and complementarity) with athlete burnout and engagement in a sample of collegiate female rowers over the course of a competitive season. We hypothesize that

- A) Athlete endorsement of higher levels of markers of the coach-athlete relationship (i.e. closeness, commitment, complementarity) would be negatively associated with athlete burnout perceptions across the competitive season.
- B) Athlete endorsement of higher levels of the markers of the coach-athlete relationship would be positively associated with athlete engagement perceptions across the competitive season.

Sport-based burnout theory further informs other key burnout (and engagement) antecedents which merit consideration along with coach-athlete relationship antecedents. Therefore, to further explore the relative importance of coach-athlete relationship variables within the context of common burnout and engagement antecedents, we explored additional hypotheses that, after controlling for perceived stress and sport motivation,

- A) Athlete endorsement of higher levels of markers of the coach-athlete relationship (i.e. closeness, commitment, complementarity) would be negatively associated with athlete burnout perceptions across the competitive season.

- B) Athlete endorsement of higher levels of the markers of the coach-athlete relationship would be positively associated with athlete engagement perceptions across the competitive season.

METHOD

Participants

Data were collected from female Division 1 collegiate rowers from the University of North Carolina at Chapel Hill. Participants ($N=37$; $M_{\text{age}}=19.3$ years, $SD=1.18$) completed online self-report assessments of study variables across four seasonal survey waves. The majority of participants did not identify as Hispanic or Latino, and most were white. Approximately 20% had rowed before college. 46% of participants were varsity members, 54% novice. 46% have rowed for one year, 13% have rowed for two years, 26% have rowed for 3 years, and 16% have rowed for four or more years. 60% of participants have been on the team for one year. This population was chosen because there are limited studies on women's rowing and this intensive training sport has important implications for the understanding of athlete psychological health within the social environment of collegiate sport (Coon, 2015).

Design and Measures

A multi-time point observational design was utilized to complete this study. Utilization of this design allowed researchers to collect information regarding the athlete's perceptions of the coach-athlete relationship and psychological health outcomes at multiple time points across the competitive season. Participants were

told they were completing a study on athlete social experiences and psychological health. Measures of the following variables comprised the questionnaires:

Demographics. The initial survey wave gathered both general demographics and rowing specific demographics information. The general demographics information included participant self-report: age, gender, race/ethnicity, school attended, sport played, number of years the participant has been playing this sport, number of years the participant has been playing this sport on this team, and whether or not the participant participated in this sport prior to college. The remaining three survey waves gathered only rowing specific demographics information. This included self-reported: varsity/novice team participation, what boat the participant was in (i.e. competitive ranking), whether or not the boat the participant was in had changed since the last survey, how recently the athlete participated in formal competition, the participants current training load, whether or not the participant was in taper, injured or unable to practice at the time of the assessment wave. The boat the participant was in refers to his/her competitive ranking. The top competitive ranking is the Varsity 8 (V8). The V8 is the top eight rowers based on speed and rowing technique and the best coxswain. The 2V8 is the next eight rowers and coxswain; the V4 is the next four plus coxswain after them. Below the varsity boats are the novice boats, which can also be referred to as the 3V8.

Coach-Athlete Relationship. The Coach-Athlete Relationship Questionnaire (CART-Q) was used to assess athlete self-report perceptions of the coach-athlete relationship via the three factors of closeness, complementarity, and commitment

(Jowett 2009). The participants rated each of the 11 items based on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores on the CART-Q subscales are reflective of higher feelings of closeness, complementarity and commitment of the coach-athlete relationship from the athlete perspective. The internal consistency reliability scores of the CART-Q have been previously supported and ranged from 0.78 to 0.87 for the direct subscales and 0.82 to 0.90 for the meta-perspective subscales (Jowett, 2009). This measure has been used with a collegiate athlete sample (Jowett, 2009), providing some evidence of population-specific validity. Internal consistency reliability values for the current study ranged from .72 to .96 for CART-Q subscales.

Perceived Stress. The Perceived Stress Scale (PSS) was used to assess athlete self-report perceptions of sport stress using a 12-item questionnaire. Stress related experiences are rated on a 5-point Likert scale (1: never, 5: very often). Scores from the PSS have been positively associated with athlete burnout scores and have been shown to possess acceptable internal consistency validity for use in collegiate athlete populations (DeFreese & Smith, 2013; 2014). Internal consistency reliability scores for the PSS have alpha coefficients ranging from 0.81 to 0.86 in previous studies with competitive athletes (Raedeke & Smith, 2001). Internal consistency reliability values for the current study ranged from .55 to .70 for PSS subscales. As a result of current study internal consistency reliability scores being below common cut-offs for highest acceptability at some study waves, current study stress results should be interpreted cautiously.

Sport Motivation. The Sport Motivation Scale (SMS) was utilized to assess athlete self-report perceptions of motivation for sport. The 28 question SMS asks participants to respond to “Why do you practice your sport” on a 7-point Likert scale ranging from 1 (does not correspond at all) to 7 (corresponds exactly). Higher scores indicate that an athlete is motivated to participate in sport for relatively more self-determined reasons. The SMS was used to account for motivation in the current study as coaching behaviors have been found to have an impact on motivation as well as an association with athlete outcomes like burnout (Mageau and Vallerand, 2003). In the present study, internal consistency reliability values were $\alpha = .74$ to .92. The SMS subscale and index scores have shown validity in collegiate athlete population (DeFreese & Smith, 2014; Pelletier et al, 1995) and has been found to have internal consistency reliability for individual subscales with alpha coefficients ranging from 0.73 to 0.95 (Pelletier et al, 1995).

Athlete Burnout. The Athlete Burnout Questionnaire (ABQ) was utilized to assess athlete self-report perceptions of burnout and contains three subscales of burnout (i.e. dimensions) of emotional and physical exhaustion, reduced sense of sport accomplishment, and sport devaluation (Raedake and Smith, 2001). The 15-item self-report assessment is rated on a 5-point Likert scale ranging from 1, “almost never”, to 5, “almost always”. Higher scores reflect the individual is experiencing higher athlete burnout, whereas lower scores indicate the individual is experiencing less athlete burnout including individual burnout dimensions. The ABQ has been found to exhibit strong internal consistency reliability for each subscale with alpha coefficients ranging from 0.84 to 0.91 in former collegiate

athlete samples (Raedeke and Smith, 2001). Validity of the ABQ has been exhibited in a myriad of athlete populations including collegiate athletes (Raedeke & Smith, 2009). This data informed our decision to utilize the ABQ to measure collegiate athlete burnout within the current study. Internal consistency reliability values for the current study ranged from .95 to .97 for ABQ subscales.

Athlete Engagement. The Athlete Engagement Questionnaire (AEQ) was utilized to assess athlete self-report perceptions of engagement with the sport context. The AEQ is a 16-item self-report that evaluates four dimensions (i.e. subscales) of athlete engagement including confidence, vigor, dedication, and enthusiasm (Lonsdale, Hodge, Jackson, 2007). The AEQ is measured on a 5-point Likert scale with 1 referring to “almost never” and 5 referring to “almost always”, and scores reflect overall athlete engagement. Higher scores represent higher levels of engagement. The AEQ has been found to exhibit acceptable internal consistency reliability for each subscale with alpha coefficients ranging from 0.85 to 0.92 in former athlete populations (Lonsdale, Hodge, Jackson, 2007). The AEQ has also been found to be a valid measure of athlete engagement based on previous research with former athlete populations (Lonsdale, Hodge, Jackson, 2007). Internal consistency reliability values for the current study ranged from .95 to .98 for AEQ subscales.

Procedure

Data were collected via a Qualtrics survey distributed through an administrator/coach provided email list. Participants were asked to respond to an online questionnaire at four different time points (survey waves) throughout the fall semester. The survey waves were determined by examining the fall rowing season

schedule; 20 hours is the maximum amount of time each week the NCAA allows student-athletes to spend on their respective sports and includes time spent both at practices and competition. The rowing team enters this training/competition phase a few weeks after the academic calendar began. The competitive season following the start of this training phase was split into four training segments. Each segment represented an approximately one week training window and was separated from the subsequent window by a one-week assessment buffer. This first survey wave took place during the second week the team was in the 20-hour training/competition phase; the final survey wave occurred in the last full week of the 20-hour training/competition phase. The other two waves were spaced evenly between the first and fourth survey waves. For each specific survey wave, the online survey was sent to individual participants via Qualtrics.com (a secure email distribution vendor). The schedule for reminders was adapted from the Dillman method for survey distribution (2007). Each survey was made available for a week with reminders sent to participants at 2 and 7 days after the initial email. After 7 days, no more email correspondence occurred until the next survey wave. Following the fourth survey wave, all communication with potential participants ceased.

Data Analysis

Preliminary data screening was performed according to best practice guidelines (Tabachnick & Fidell, 2007). This involved examining each data wave for potential missing values, outliers, and violations of assumptions of multivariate analysis. Internal consistency reliability values (e.g., Cronbach's alpha) were calculated for all psychometric scale with .70 used as a cut-off criterion for

acceptability. Descriptive statistics and scale reliabilities were calculated for all study variables at every time point. This was done to identify the nature and magnitude of relationships between participant perceptions of the coach-athlete relationship and athlete psychological outcomes. Consistent with best practice recommendations, missing data from a completed assessment wave were replaced with values calculated via mean imputation.

Multilevel linear modeling (MLM; Singer & Willett, 2003) was then conducted to examine relationships among the study variables of athlete perceptions of their relationship with their primary coach and psychological outcomes of interest (i.e. burnout and engagement) over time. First, we conducted a null model with no predictors to calculate intra-class correlations for all outcomes variables (i.e. global and dimensional burnout and engagement variables). Next, the hypothesized model (labeled Model 1 in Tables 2-10) was conducted to examine relationships among athlete perceptions of coach-athlete relationship markers (e.g. closeness, commitment, complementarity) and study outcomes variables of interest. Finally, exploratory models (labeled Model 2 in Tables 2-10) were also run to examine these relationships while accounting for seasonal perceived stress and sport motivation. MLM is suitable for the testing of study hypotheses because it accounts for the nesting of repeated measures data within a longitudinal design while allowing for the investigation of both between- and within-subject predictors of change in study outcomes of psychological health factors (see DeFreese and Smith, 2014 for an example). Though the current study investigated no specific

between-athlete predictors, this analytic technique was best suited to account for our multi-time point data structure.

RESULTS

Preliminary Data Screening

At each time point skewness and kurtosis values for all variables were normal based on best practice guidelines for data screening. Assessment of univariate outliers showed no values associated with z-scores were greater than [3.29]. Examination of Mahalanobis values uncovered no issues with multivariate outliers. Altogether, preliminary screening of study data resulted in no obvious violations of the assumptions of multivariate analyses. Accordingly, all study cases were included in models testing study hypotheses.

Descriptive Statistics

Descriptive statistics appear in Tables 11 and 12 and represent the average scores of study variables across all seasonal time points. Relative to response options, participants reported low levels of burnout dimensions as well as relatively low levels of perceived stress. Additionally, participants reported moderate levels of the components of the coach-athlete relationship and moderate to high levels of engagement and self-determined motivation relative to response options. Descriptive statistics were comparable to previous published work on burnout and engagement.

Within- and Between-Person Variation in Athlete Burnout

MLM using restricted maximum likelihood estimation was conducted for all athlete burnout and engagement outcome variables. First, the intraclass correlation

(ICC) was calculated via a null model with no predictors in order to assess the degree of between- and within-athlete variation in athlete burnout and engagement across study waves. Evidence was found for between-athlete variation (ICC=.78, $p<.001$) in global burnout. This suggests that 78% of the variance in mean global burnout scores across assessments were attributable to between-athlete differences. The remaining 22% was then attributable to within-athlete differences over the course of the season or measurement error. Similar ICCs were found for the burnout dimensions of emotional/physical exhaustion (ICC=.73, $p<.001$), reduced accomplishment (ICC=.74, $p<.001$), and devaluation (ICC=.75, $p<.001$). Thus, between 73% and 75% of the variance in mean dimensional burnout scores was attributable to between-athlete differences. The remaining 25% to 27% was then attributable to within-athlete differences or measurement error.

Coach-Athlete Relationship and Athlete Burnout

For global burnout, closeness was a significant negative predictor ($p=.005$). Closeness was also a significant negative predictor of the individual burnout dimensions of emotional/physical exhaustion ($p=.006$) and reduced sense of accomplishment ($p=.017$). Closeness was not a significant predictor of the burnout dimension of devaluation.

When included in the exploratory model, both perceived stress and sport motivation were significant predictors of global burnout, with perceived stress having a positive association and sport motivation having a negative association. None of the three factors of the coach-athlete relationship were significant predictors of global burnout when stress and motivation were accounted for.

Perceived stress and sport motivation were the only significant predictors of the individual burnout dimensions; however, in the exploratory model, complementarity was also a significant predictor of the individual burnout dimension emotional/physical exhaustion.

Within- and Between-Person Variation in Athlete Engagement

Evidence was found for between-athlete variation ($ICC=.91, p<.001$) in global engagement. This suggests that 91% of the variance in mean global engagement scores across assessments were attributable to between-athlete differences. The remaining 9% was then attributable to within-athlete differences over the course of the season or measurement error. Similar ICCs were found for the engagement dimensions of confidence ($ICC=.83, p<.001$), vigor ($ICC=.90, p<.001$), dedication ($ICC=.93, p<.001$), and enthusiasm ($ICC=.90, p<.001$). Thus, between 83% and 93% of the variance in mean dimensional engagement scores was attributable to between-athlete differences. The remaining 7% to 17% was then attributable to within-athlete differences or measurement error.

Coach-Athlete Relationship and Athlete Engagement

Closeness and complementarity were both significant, positive predictors of global engagement ($p=.048$ and $p=.047$, respectively). Closeness was the only significant predictor of the engagement dimension of vigor; neither of the engagement dimensions of confidence or enthusiasm had significant predictors from any of the coach-athlete relationship facets. Commitment and complementarity were significant, positive predictors of the dedication dimension of engagement ($p=.028$ and $p=.009$, respectively).

When included in the exploratory model, both perceived stress and sport motivation were significant predictors of global engagement along with the coach-athlete relationship facet of complementarity. For the engagement dimensions of confidence, vigor, and enthusiasm, only perceived stress and sport motivation were significant predictors. However, as with global engagement, for the engagement dimension of dedication, complementarity was found to be a significant, positive predictor along with perceived stress and sport motivation. For both global and dimensional engagement, perceived stress was a negative predictor and motivation was a positive predictor for all outcome variables.

DISCUSSION

We investigated how distinct components of the coach-athlete relationship (closeness, commitment, and complementarity) were associated with athlete burnout and engagement over time in a sample of collegiate female rowers. In partial support of our hypotheses, our results indicate that higher levels of the coach-athlete relationship marker of closeness related with lower levels of global athlete burnout across a competitive season. Whereas, higher levels of the coach-athlete relationship markers of both closeness and complementarity related with higher levels of global athlete engagement over time. Specific findings, including dimensional results and their interpretations, will be explored below.

Global burnout was significantly associated with the coach-athlete marker of closeness. Closeness was also found to exhibit a negative relationship with the burnout dimensions of emotional/physical exhaustion and reduced sense of accomplishment. These results are in line with study hypotheses and extant

research. Within the coach-athlete relationship, closeness is defined as how the coach and athlete feel emotionally close to each other in the relationship. Jowett and Ntoumanis (2004) noted that the lack of any component of the coach-athlete relationship led to conflict in the relationship. DeFreese and Smith (2014) found that social support was negatively associated with burnout. Therefore, these findings provide support that a stronger coach-athlete relationship characterized by feelings of closeness can reduce the global burnout in addition to the physical and emotional exhaustion and reduced feelings of accomplishment an athlete experiences over the course of intense training and/or competition. Smith and Smoll (2014) described the process of how an athlete's perception and recall of coaching behaviors impacts the athlete's evaluation of his/her sport experiences. Since, based on the present data, closeness may represent a protective factor against the global and aforementioned dimensional burnout, future research should look at specific behaviors that coaches could complete that would foster closeness with their athletes as a way to decrease perceptions of burnout. For example, further understanding of specific coaching behaviors that may drive athlete perceptions of closeness with their coaches (e.g. liking, trust, respect, and a sense of appreciation for the sacrifices one makes in order to improve performance) may inform the design of interventions to prevent athlete burnout, particularly the symptom of emotional and physical exhaustion. Accordingly, the design and evaluation of such interventions represents a fruitful potential athlete burnout direction. Specifically, studies test closeness building strategies in among athletes and coaches could benefit future generations of athletes by decreasing their perceptions of burnout.

Study findings related to athlete engagement also merit discussion. Closeness and complementarity were significantly positively associated with global engagement. This finding is consistent with the existing literature. Closeness is defined as how the coach and athlete feel emotionally close to each other in the relationship; complementarity reflects the extent that coaches and athletes work cooperatively. Athletes' perceptions of greater training and instruction, social support, and positive feedback, all areas guided by coaches, have associated with more positive outcomes (perceived competence and enjoyment) (Price & Weiss, 2000). Thus, the current finding adds to this literature on positive implications of coach-player interactions. Future work could build upon this by designing interventions to increase athlete perceptions of closeness with the coach as a means to increase athlete engagement. Additionally, it has been found that athletes' needs satisfaction, specifically competence and autonomy, were good predictors of athlete engagement (i.e. positive psychological outcome) (Hodge, Lonsdale, Jackson, 2009). Accordingly, future engagement interventions may also benefit from addressing athlete autonomy and competence perceptions, along with the promotion of coach-athlete closeness and complementarity, as a means promote athlete psychological health and well-being. The utility of such recommendations is bolstered by the present study's repeated measures design.

Exploratory models provide some information on the relative importance of coach-athlete relationship facets when considering stress and motivation, prominent antecedents of athlete psychological health outcomes. An interesting finding relative to perceived stress and sport motivation involved the burnout

dimension of physical/emotional exhaustion. Complementarity was positively associated with exhaustion even after athlete perceptions of perceived stress and sport motivation were accounted for. Based on burnout literature, one would expect stress perceptions to be positively correlated with any aspect of burnout, and self-determined motivation and positive social markers (i.e. coach-athlete relationship variables) to be negatively associated with any aspect of burnout (Goodger et al, 2007; Ryan & Deci, 2000). Accordingly, though distinct from other global and dimensional burnout results, complementarity seems to be a uniquely positioned antecedent of athlete exhaustion in this sample. Specifically, the direction of this relationship in our findings is somewhat surprising. Complementarity reflects the extent that coaches and athletes work co-operatively. Speculatively, the effort it takes for an athlete to create and maintain complementarity with his/her coach could lead to increased physical and emotional exhaustion. Thus, complementarity could be both promotive of both global athlete engagement (reviewed above) as well as athlete exhaustion. Future research should attempt to replicate this finding as well as examine whether moderators of the complementarity-exhaustion relationship could further delineate this potentially complex relationship.

Another novel finding relative to complementarity was that when accounting for perceived stress and sport motivation, the coach-athlete relationship marker of complementarity was significantly associated with the engagement dimension of dedication. Dedication is a desire to invest in one's goals. This finding suggests that athletes perceive that stronger complementarity with the coach in training results in higher dedication. Accordingly, as a means to promote athlete engagement, coaches

should consider strategies to enhance athlete feelings that their goals and behaviors are mutually beneficial toward common competitive and interpersonal goals. Additionally, as described above, future research should look at the tradeoff between the impacts complementarity can have simultaneously on the burnout dimension of exhaustion and the engagement dimension of dedication.

Study results showcasing the impact of the coach-athlete relationship on athlete burnout and athlete engagement have practical implications for coaches working with collegiate athletes. Our study supports previous findings that the coach-athlete relationship can impact athletes' psychological health outcomes and adds to this literature by linking possibly protective effects against burnout and promotes effects relative to athlete engagement. Specifically, closeness and complementarity within the coach-athlete relationship were found to have a significant role in mitigating athlete burnout and promoting athlete engagement in collegiate female rowers. These results should encourage coaches to adopt methods to promoting these two features of their relationships with their athletes. Jowett & Shanmugam (2016) proposes that improving communication is one way to improve the coach-athlete relationship because it decreases interpersonal conflict. Jowett offers the COMPASS model as a communication tool; COMPASS stands for conflict management, openness, motivation, preventative, assurance, support, and social networks. Specifically, openness in communication was suggested as a way to improve closeness, and conflict management strategies as a way to improve complementarity. Improving communication and thus decreasing interpersonal conflict is one strategy for a coach to increase both his/her complementarity with

his/her athletes. Coaches should want to improve their relationship with their athletes in order to maximize athlete engagement, the efficacy of their coaching efforts, and athlete psychological health.

The coach-athlete relationship is a dyadic relationship, implying that two people are responsible for the upkeep and well-being of such a relationship. However, much of the research and interventions aimed at increasing the effectiveness of this relationship are directed at coaches, lending to the assumption that it is the coach's sole responsibility to maintain this relationship. The athlete has a unique role establishing closeness and complementarity with his/her coach as well. Accordingly, future research examining interventions to increase athlete perceptions of the coach-athlete relationship could also benefit from an athlete-centered approach. For example, athletes could be trained on specific behavioral and/or communication strategies designed initiate positive social interactions with their coaches. We feel this idea is relatively novel within the sport psychology literature and, as a result, represents innovative future research directions in applied sport psychology.

Based on the exploratory results with perceived stress and motivation, coaches should also aim to find ways to decrease the stress load and increase self-determined motivation in their athletes. Accordingly, study results are consistent with the extant literature on stress and motivation perceptions and psychological outcomes (e.g. burnout and engagement). This is also supported by previous literature with strategies coaches can employ. Coaches can promote a mastery climate that reinforces effort and learning from athletes, with the goal of this

environment increasing intrinsic motivation in athletes. Coaches can also decrease the stress on athletes by increasing communication. Udry et al (1997) found that during a time of a stress, athletes reported a lack of clear communication with their coach. Therefore, coaches should look to increase effective communication with athletes during particularly stressful times such as an injury in order to decrease the overall stress athletes are experiencing.

Study limitations also merit discussion in order to better inform future research regarding the coach-athlete relationship, athlete burnout, and athlete engagement. The study was limited by a small sample size and therefore a fairly homogenous population; future studies should examine a larger sample size, include both genders, and include a variety of sports, both team and individual. Additionally, participants responded to study measures in regards to one of two primary coaches-specific to their team. Accordingly, this limits the study's generalizability, as the results from this sample are not necessarily representative of all collegiate rowing coaches or programs. Another limitation is that the present study only provides information on the athletes' perspective of the coach-athlete relationship. Studies including both the coach and an objective third party perspective (i.e. observational study designs) will provide a more complete evaluation of the relationship. Along these lines, the current study focused on the athlete's perspectives of their relationships with their primary coaches, referred to in the literature as the direct perspective. In future work, the Meta perspective (e.g. "My coach likes me") could also be examined alongside the direct perspective (e.g. "I like my coach") as another

way to provide a more complete view of the relationship amongst variables and outcomes.

These limitations acknowledged, the current study provides a meaningful contribution to the literature on the coach-athlete relationship and athlete burnout and engagement, topics of theoretical and practical interest in sport psychology, coaching, and intercollegiate athletics. Examining relationships among study variables across a sport season, this study highlights the individual importance of the markers of closeness and complementarity in the coach-athlete relationship to athlete burnout and engagement perceptions. Moreover, this study suggests the importance of the impact of coaching in the sport of collegiate rowing specifically, a growing sport with relatively high attrition rates. In sum, we feel this study is innovative because it is theory-based, longitudinal in design, and links the literatures on coach-athlete relationship and athlete psychological health in a manner that has implications for both theory and sport psychology (and coaching) practice. We hope this study sparks future research efforts with the goal of further understanding and positively impacting the psychological health of competitive athletes via the promotion of positive interpersonal relationship with their coaches.

Table 2

Within-Person Variation Models for Global Burnout

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	2.396593	0.081862	p<0.001*	4.475567	0.350407	p<0.001*	0.965032	0.548256	0.082
Stress							0.755016	0.122826	p<0.001*
Motivation							-0.094488	0.010360	p<0.001*
Closeness				-0.339019	0.117570	0.005*	-0.024016	0.068083	0.725
Commitment				0.020649	0.092518	0.824	-0.060211	0.051198	0.242
Complementarity				-0.064687	0.120607	0.593	0.060720	0.066893	0.366
Residual	0.675663	0.114724	p<0.001*	0.386505	0.055215	p<0.001*	0.116612	0.016832	p<0.001*

Notes: *p < 0.05

Table 3

Within-Person Variation Models for Emotional/Physical Exhaustion

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	2.764216	0.099431	p<0.001*	4.495560	0.463148	p<0.001*	0.895694	0.963730	0.355
Stress							0.767693	0.215905	0.001*
Motivation							-0.106683	0.018210	p<0.001*
Closeness				-0.434015	0.155398	0.006*	-0.094114	0.119677	0.434
Commitment				-0.054375	0.122285	0.658	-0.143827	0.089996	0.113
Complementarity				0.150565	0.159411	0.347	0.284968	0.117585	0.017*
Residual	1.008435	0.141906	p<0.001*	0.675225	0.096461	p<0.001*	0.360320	0.052008	p<0.001*

Notes: *p < 0.05

Table 4

Within-Person Variation Models for Reduced Sense of Accomplishment

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	2.492523	0.100370	p<0.001*	5.064845	0.415864	p<0.001*	1.162678	0.810504	0.155
Stress							0.846806	0.181578	p<0.001*
Motivation							-0.093702	0.015315	p<0.001*
Closeness				-0.337572	0.139532	0.017*	-0.006957	0.100650	0.945
Commitment				0.029730	0.109800	0.787	-0.052594	0.075688	0.489
Complementarity				-0.161669	0.143136	0.261	-0.028986	0.098890	0.770
Residual	0.889346	0.148661	p<0.001*	0.544391	0.077770	p<0.001*	0.254852	0.036785	p<0.001*

Notes: *p < 0.05

Table 5

Within-Person Variation Models for Sport Devaluation

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	1.939216	0.080369	p<0.001*	3.842361	0.391318	p<0.001*	0.814510	0.850025	0.340
Stress							0.650117	0.190432	0.001*
Motivation							-0.083126	0.016062	p<0.001*
Closeness				-0.236429	0.131297	0.075	0.038072	0.105557	0.719
Commitment				0.077630	0.103319	0.454	0.006800	0.079378	0.932
Complementarity				-0.178934	0.134688	0.187	-0.069803	0.103712	0.503
Residual	0.658843	0.092712	p<0.001*	0.482024	0.068861	p<0.001*	0.280311	0.040459	p<0.001*

Notes: *p < 0.05

Table 6

Within-Person Variation Models for Global Engagement

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	4.103727	0.075602	p<0.001*	2.251162	0.312667	p<0.001*	4.023951	0.544800	p<0.001*
Stress							-0.347731	0.122115	0.005*
Motivation							0.097550	0.010215	p<0.001*
Closeness				0.213394	0.106471	0.048*	-0.034925	0.068393	0.611
Commitment				-0.113113	0.082544	0.174	-0.040703	0.050665	0.424
Complementarity				0.221971	0.110173	0.047*	0.134414	0.067816	0.050*
Residual	0.410803	0.070409	p<0.001*	0.306583	0.044251	p<0.001*	0.109865	0.020261	p<0.001*

Notes: *p < 0.05

Table 7

Within-Person Variation Models for Confidence

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	3.695197	0.096578	p<0.001*	1.237994	0.406910	0.003*	3.308874	0.828194	p<0.001*
Stress							-0.410349	0.185610	0.029*
Motivation							0.112725	0.015537	p<0.001*
Closeness				0.222237	0.138563	0.112	-0.068362	0.103958	0.512
Commitment				-0.028869	0.107424	0.789	0.054458	0.077018	0.481
Complementarity				0.248816	0.143380	0.086	0.152148	0.103077	0.143
Residual	0.753190	0.127581	p<0.001*	0.519252	0.074948	p<0.001*	0.254643	0.049930	p<0.001*

Notes: *p < 0.05

Table 8

Within-Person Variation Models for Vigor

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	4.193628	0.085776	p<0.001*	2.610000	0.364364	p<0.001*	4.476381	0.641849	p<0.001*
Stress							-0.344576	0.144557	0.019*
Motivation							0.113582	0.011744	p<0.001*
Closeness				0.275072	0.124188	0.029*	-0.007970	0.080793	0.922
Commitment				-0.158102	0.096253	0.104	-0.064415	0.059565	0.283
Complementarity				0.154471	0.128512	0.232	0.043589	0.080362	0.589
Residual	0.458739	0.079901	p<0.001*	0.410515	0.071887	p<0.001*	0.136013	0.025198	p<0.001*

Notes: *p < 0.05

Table 9

Within-Person Variation Models for Dedication

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	4.368672	0.065143	p<0.001*	2.867657	0.283101	p<0.001*	4.484977	0.623638	p<0.001*
Stress							-0.338671	0.139566	0.017*
Motivation							0.067880	0.011761	p<0.001*
Closeness				0.147857	0.096630	0.129	-0.040774	0.078183	0.603
Commitment				-0.167373	0.074851	0.028*	-0.110961	0.057965	0.059
Complementarity				0.268246	0.100023	0.009*	0.198728	0.077509	0.012*
Residual	0.306924	0.052548	p<0.001*	0.241880	0.042007	p<0.001*	0.148508	0.025534	p<0.001*

Notes: *p < 0.05

Table 10

Within-Person Variation Models for Enthusiasm

Variable	Estimate	Null Model		Estimate	Model 1		Estimate	Model 2	
		Std. Error	Sig.		Std. Error	Sig.		Std. Error	Sig.
Intercept	4.156000	0.075576	p<0.001*	2.322680	0.331915	p<0.001*	4.047698	0.660845	p<0.001*
Stress							-0.340310	0.147870	0.024*
Motivation							0.094185	0.012470	p<0.001*
Closeness				0.205625	0.113025	0.072	-0.033455	0.082835	0.687
Commitment				-0.102746	0.087626	0.244	-0.031691	0.061418	0.607
Complementarity				0.217133	0.116955	0.066	0.130477	0.082120	0.115
Residual	0.461510	0.079307	p<0.001*	0.345490	0.049867	p<0.001*	0.167257	0.024397	p<0.001*

Notes: *p < 0.05

Table 11

Means, Standard Deviations and Internal Consistency Reliability Values for Study Variables by Wave

Variable	Wave											
	1 (n=37)			2 (n=28)			3 (n=22)			4 (n=15)		
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α
Stress	2.99	0.45	0.55	2.91	0.48	0.70	2.85	0.47	0.66	2.97	0.44	0.62
Motivation	7.30	4.19	<i>n/a</i>	7.88	3.99	<i>n/a</i>	7.62	4.94	<i>n/a</i>	6.62	5.60	<i>n/a</i>
Closeness	5.19	1.63	0.93	5.39	1.56	0.91	5.39	1.49	0.91	5.56	1.35	0.85
Commitment	4.63	1.56	0.90	4.68	1.66	0.96	4.94	1.54	0.93	5.13	1.49	0.91
Complementarity	5.50	1.18	0.79	5.80	1.01	0.72	5.63	1.13	0.72	5.75	1.08	0.72
Burnout	2.33	0.79	0.95	2.42	0.88	0.96	2.35	0.81	0.95	2.59	0.87	0.97
Exhaustion	2.64	0.93	0.93	2.86	1.12	0.94	2.61	0.93	0.91	3.10	1.05	0.97
RSA	2.49	0.95	0.91	2.43	1.00	0.93	2.52	0.97	0.91	2.56	1.01	0.95
Devaluation	1.86	0.80	0.74	1.97	0.80	0.89	1.91	0.84	0.92	2.12	0.89	0.93
Engagement	4.08	0.60	0.95	4.21	0.67	0.97	4.13	0.75	0.97	3.95	0.80	0.98
Confidence	3.63	0.81	0.89	3.83	0.88	0.92	3.71	1.00	0.95	3.60	1.04	0.97
Vigor	4.19	0.65	0.90	4.26	0.74	0.88	4.26	0.79	0.90	4.02	0.88	0.95
Dedication	4.31	0.56	0.78	4.49	0.57	0.86	4.39	0.62	0.88	4.27	0.65	0.89
Enthusiasm	4.17	0.65	0.86	4.27	0.68	0.91	4.16	0.76	0.91	3.92	0.81	0.94

Notes: RSA= Reduced Sense of Accomplishment

Table 12

Means and Standard Deviations for Study Variable, Stacked Data

Variable	Stacked	
	M	SD
Stress	2.92	0.46
Motivation	7.43	4.53
Closeness	5.35	1.52
Commitment	4.78	1.56
Complementarity	5.64	1.10
Burnout	2.40	0.82
Exhaustion	2.76	1.00
RSA	2.49	0.97
Devaluation	1.94	0.81
Engagement	4.11	0.68
Confidence	3.70	0.90
Vigor	4.20	0.74
Dedication	4.37	0.59
Enthusiasm	4.16	0.70

Notes: RSA= Reduced Sense of Accomplishment

Table 13

Correlations among Means of Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Stress	1													
2. Sport Motivation	-0.68	1												
3. Closeness	-0.72	0.55	1											
4. Commitment	-0.64	0.45	0.90	1										
5. Complementarity	-0.68	0.52	0.89	0.82	1									
6. Burnout	0.83	-0.84	-0.67	-0.60	-0.61	1								
7. Exhaustion	0.71	-0.74	-0.59	-0.54	-0.48	0.88	1							
8. RSA	0.79	-0.78	-0.65	-0.58	-0.62	0.90	0.65	1						
9. Devaluation	0.69	-0.72	-0.52	-0.45	-0.51	0.89	0.66	0.74	1					
10. Engagement	-0.72	0.85	0.56	0.46	0.57	-0.87	-0.67	-0.84	-0.80	1				
11. Confidence	-0.70	0.79	0.60	0.53	0.59	-0.81	-0.61	-0.87	-0.67	0.90	1			
12. Vigor	-0.64	0.83	0.48	0.37	0.46	-0.79	-0.62	-0.75	-0.73	0.95	0.79	1		
13. Dedication	-0.62	0.71	0.45	0.33	0.50	-0.77	-0.56	-0.71	-0.79	0.91	0.70	0.86	1	
14. Enthusiasm	-0.68	0.80	0.54	0.45	0.55	-0.84	-0.68	-0.76	-0.83	0.96	0.79	0.89	0.89	1

Notes: all correlations significant at $p < .01$

RSA= Reduced Sense of Accomplishment

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