

Summer 2017

Exploring rehabilitation adherence and the motivational climate created by athletic trainers: A mixed methods approach

Kaleb W. Cusack
James Madison University

Follow this and additional works at: <https://commons.lib.jmu.edu/master201019>

 Part of the [Other Psychology Commons](#), [Sports Sciences Commons](#), and the [Sports Studies Commons](#)

Recommended Citation

Cusack, Kaleb W., "Exploring rehabilitation adherence and the motivational climate created by athletic trainers: A mixed methods approach" (2017). *Masters Theses*. 487.
<https://commons.lib.jmu.edu/master201019/487>

This Thesis is brought to you for free and open access by the The Graduate School at JMU Scholarly Commons. It has been accepted for inclusion in Masters Theses by an authorized administrator of JMU Scholarly Commons. For more information, please contact dc_admin@jmu.edu.

Exploring Rehabilitation Adherence and the Motivational Climate Created by Athletic
Trainers: A Mixed Methods Approach

Kaleb William Cusack

A Thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Masters of Arts

Department of Graduate Psychology

August 2017

FACULTY COMMITTEE:

Committee Chair: Robert Harmison

Committee Members/ Readers:

Gregg Henriques

Cara Meixner

Acknowledgements

I wish to thank Dr. Bob Harmison for the theoretical contributions and assistance in the preparation of the manuscript, and support throughout the entire process. I can't thank Dr. Bob enough for the support throughout this academic hazing. Despite my constant frustrations, I have found this entire process to be one of the greatest learning experiences in my early career. Hopefully I haven't scared you away from ever taking on a master's student again. I would like to thank Dr. Cara Meixner for the support in the data collection and analysis process. I would like to thank Dr. Cara Meixner and Dr. Gregg Henriques for their reviews and suggestions towards the manuscript and methodology. Additionally, I would like to express my very profound gratitude to my friend Grant Ostrander for the countless hours spent reading drafts, editing the same basic grammar mistakes over and over again, and brainstorming when I thought I had lost direction. There is not enough beer in the world to get anyone else to drudge through my early manuscript drafts. Dr. Bob thought he had it rough. Lastly, I would like to thank Chris Bilder for his theoretical contributions and review of the later manuscript drafts.

Table of Contents

Acknowledgements.....	ii
List of Tables.....	v
List of Figures.....	vi
Abstract.....	vii
I. Introduction.....	1
Rehabilitation Adherence.....	2
Self-Determination Theory and Rehabilitation Adherence.....	5
Achievement Goal Theory and Rehabilitation Adherence.....	10
Empowering Motivational Climates.....	17
Purpose of Study.....	19
II. Method.....	20
Participants.....	20
Materials.....	21
Rehabilitation Adherence.....	21
Interview Guide.....	21
Procedure.....	22
Data Analysis.....	22
III. Results and Discussion.....	24
Rehabilitation Adherence Scores.....	24
Motivational Strategies Used by Athletic Trainers.....	25
Relationship between Strategies and Adherence.....	36
Other Emergent Themes.....	40
IV. General Discussion.....	47
Limitations.....	50

Future Directions.....	52
Conclusion.....	53
V. References.....	54
VI. Appendix A.....	60
VII. Appendix B.....	61
VIII. Appendix C.....	62
IX. Appendix D.....	63

List of Tables

Table 1. The TARGET Dimensions for Task-Involving and Ego-Involving Motivational Climates.....	16
Table 2. Mean RAdMAT Scores of Division I Athletes as Rated by Athletic Trainers...	24
Table 3. Matrix Table of Division I Athlete Rehabilitation Adherence and Strategies Implemented by Athletic Trainers	38
Table 4. Strategies Implemented by Athletic Trainers for High-Adhering and Low- Adhering Division I Athletes	39

List of Figures

<i>Figure 1.</i> The self-determination continuum from Ryan and Deci, 2000.....	60
<i>Figure 2.</i> Data analysis flowchart.....	63

Abstract

The purpose of the study was to explore the relationship between the athletic trainer created motivational climate and rehabilitation adherence displayed by their athletes. Four certified athletic trainers from one National Collegiate Athletic Association Division I institution participated. The study implemented a convergent mixed methods design, using the Rehabilitation Adherence Measure for Athletic Training as a quantitative measure of adherence and a semi-structured interview to establish the strategies athletic trainers use to organize the rehabilitation process, provide feedback to athletes, and evaluate rehabilitation progress. The semi-structured interview also allowed for other emerging themes during analysis. Results indicated that high-adhering athletes received more task-involving, basic need satisfying (empowering) strategies than low-adhering athletes. Additional exploration of emerging themes (i.e., outside influences, injury specifics, idiosyncrasies of the athlete) also impacted how the motivational climate was created. While the relationship indicates high-adhering athletes may be experiencing empowering motivational climates more so than low-adhering athletes, additional research must be conducted to understand the interaction of the other emergent themes in the creation of motivational climates in the sport injury rehabilitation context.

Introduction

From the 2004-2009 seasons, the Datalys Center (2014) reported 41,000 injuries in football, 26,000 injuries in women's volleyball, 10,000 injuries in field hockey, 55,000 injuries in women's soccer, and 55,000 injuries in men's soccer, all at the collegiate level. Due to the process of reporting, from the athlete to the athletic training staff and the athletic training staff to the Injury Surveillance System, these numbers likely underrepresent the true levels of sport injury at the collegiate level. Nonetheless, given these numbers, sport injuries are seemingly unavoidable for collegiate athletes.

There are both physical and psychological consequences when athletes do incur an injury (Brewer, 2001). The physical implications of sport injury can arise from the time lost from practice and missed opportunities to compete. This often negatively affects training and competitive operations (Calvert & Clarke, 1979). Research has shifted from the traditional focus on physical aspects to a focus on the psychological aspects of sport injury rehabilitation (Brewer, 2001). The influence of psychological factors on rehabilitation has been a converging interest in athletic training (e.g. Yang, Peek-Asa, Lowe, Heiden, & Foster, 2010) and sport psychology (e.g. Weise, Weiss, & Yukelson, 1991) alike. Psychological issues, such as re-injury concerns, lost confidence in returning to pre-injury performance, concerns in self-presentation, social isolation, and pressures to return to sport, have been of particular interest in the athletic training and sport psychology literature (Podlog, Dimmock, & Miller, 2010).

Alongside the physical and psychological ramifications of sport injury, new social contexts also emerge. Because athletic trainers often have the most contact with injured athletes, they are influential in the social and environmental factors surrounding sport

injury rehabilitation. Athletic trainers have noted athletes having psychological reactions to injury, such as stress/anxiety, anger, and treatment adherence problems (Clements et al., 2013). The quality of the social and environmental factors are showing evidence of helping thwart the psychological reactions seen in injury rehabilitation. For example, higher perceptions of social support tend to show decreased anxiety and depression scores at return to play (Yang et al., 2014).

Athletic trainers have a special role to play in promoting ideal physical and psychological outcomes during rehabilitation (Granquist, Podlog, Engel, & Newland, 2014). When adverse reactions to injury emerge, they are left to the athletic trainers to resolve as only 20.5% of athletic trainers report having access to sport psychology services (Clements et al., 2013).

Rehabilitation Adherence

One of the most notable issues related to sport injury is rehabilitation adherence. Grandquist, Podlog, Engel, and Newland (2014) define rehabilitation adherence as “the behaviors an athlete demonstrates by pursuing a course of action that coincides with the recommendations of the athletic trainer” (p. 1). As athletes begin working with an athletic trainer to rehabilitate from sport injury, issues with rehabilitation adherence, such as attending rehabilitation sessions and following recommendations of the athletic trainer, can surface (Granquist et al., 2014). Furthermore, athletic trainers have reported nonadherence to be the most significant issue in rehabilitation when working with injured athletes (Clement, Granquist, & Arvinen-Barrow, 2013; Wiese, Weiss, & Yukelson, 1991).

The issue of nonadherence is not a new phenomenon. Byerly, Worrell, Gahimer, and Domholdt (1994) found that 63% of the athletes in their studies were rated as nonadhering by their athletic trainers based on low attendance and participation. Also, in a review of rehabilitation adherence literature, Brewer (1998) found adherence rates to range from 40% to 91% in studies examining various ranges of athletic participation (from club athletes to elite level competitors) and measures of rehabilitation adherence (attendance, practitioner observations, and home exercise completion). In addition, Brewer (1998) observed that negative psychological characteristics (e.g., trait anxiety or ego-involvement) can result in decreased rehabilitation adherence and/or extended recovery rates. Nonadherence could have major physical implications, as attendance to rehabilitation is positively correlated with the one-leg hop for distance test (a test for functional ability) in individuals recovering from anterior cruciate ligament tears (Brewer et al., 2000).

Granquist et al. (2014) investigated athletic trainers' perspectives on the degree in which rehabilitation adherence is an issue in collegiate athletic training settings and sought to gain insight from athletic trainers on what factors contribute to nonadherence and their views on the most effective means for promoting adherence. Their analyses revealed that nearly all the athletic trainers reported poor rehabilitation adherence to be a problem in sport-injury rehabilitation, and nearly all had athletes who exhibited poor rehabilitation adherence. Hierarchical content analysis of the qualitative data revealed that four themes regarding the reasons for nonadherence emerged: (1) motivation to adhere; (2) development of positive athletic trainer-athlete rapport; (3) athletic trainers' perception of the coaches' role in fostering adherence; and (4) the influence of injury or

individual-specific characteristics (i.e., injury severity, sport type, and gender). Likewise, Granquist et al. (2014) implied that athletic trainers should listen to the athletes and consider using a patient-centered approach in the rehabilitation process to promote adherence.

So, what is the solution to nonadherence in college athletes? Forced compliance can physically bring the athletes to the training room. However, it does not facilitate better psychological outcomes and does not guarantee a full investment of effort and participation, as athletes view threats and scare tactics as poor strategies for promoting rehabilitation adherence (Fisher & Hoisington, 1993). Rehabilitation adherence, noted earlier as behaviors of an athlete that coincide with the athletic trainer's plan of action, presents itself as a matter of motivation, as one of the most important variables presented in the literature is the athlete's motivation to adhere (Brewer, 1998). There are psychological influences that affect the decision to adhere to rehabilitation. Techniques and strategies to increase adherence and improve psychological outcomes have been consistently found within the literature. Practical implications to improve rehabilitation, such as social support (Yang et al., 2010; Yang et al., 2014) or the use of the six dimension framework for creating motivational climates, known as the TARGET strategy (Brinkman & Weiss, 2010) come from the frameworks of Self-Determination Theory (Ryan & Deci, 2000) and Achievement Goal Theory (Nicholls, 1984). The basic tenets from Self-Determination Theory and Achievement Goal Theory provide a potential means for understanding how to increase rehabilitation adherence.

Self-Determination Theory and Rehabilitation Adherence

Self-Determination Theory (SDT) views the facilitation of motivation through the satisfaction of three basic psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2000). Motivation is posited on a continuum of behavior ranging from inaction to internalized and self-determined effort, Fulfillment of these needs is contingent on the support provided by the environment in which the individual is positioned. Motivation is viewed on a continuum (see Appendix A) that distinguishes the forms of motivation by the degree to which the behavior is self-determined (i.e., performed without external contingency and with free-choice).

Ryan and Deci (2000) defined three types of motivation: amotivation, extrinsic motivation, and intrinsic motivation. Amotivation is a motivational state in which individuals feel no value in an activity and no intention to continue it (i.e., the absence of motivation). This is akin to athletes who do not adhere to rehabilitation through lack of effort or missing sessions. Intrinsic motivation is defined by an internal perceived locus of causality and behavior performed for the sake of the inherent satisfaction. Thus, it may be useful to examine the motivation for activities that are not inherently intrinsic, such as sport injury rehabilitation, through the facilitation of self-determined extrinsic motivations.

Extrinsic motivation lies between the absence of motivation and behavior elicited for the sake of the activity. Extrinsically motivated behaviors are completed to attain some outcome that is separate from the activity (Ryan & Deci, 2000). Athletes participate in rehabilitation activities to return to sport, not for the sake of doing rehabilitation modalities. Unlike intrinsic motivation and amotivation, extrinsic motivation varies on

the extent to which the regulation is autonomous, or dependent on external regulations. The four levels of extrinsic motivation are: (a) external regulation, (b) introjected regulation, (c) identified regulation, and (d) integrated regulation. External regulation refers to behavior performed to satisfy a contingency, much like making rehabilitation mandatory through threats and scare tactics. Though this kind of motivation could bring rehabilitation adherence, this has been noted by athletes as an unfavorable way of increasing rehabilitation adherence (Fisher & Hoisington, 1993). Introjected regulation requires regulation from the individual, which depends on processes such as self-control, ego-involvement, and internal contingencies, but the need to complete the behavior is not fully accepted as the volition of the individual (Ryan & Deci, 2000). One example of this process could be an athlete is attending rehabilitation to avoid feelings of guilt (an internal punishment) and not necessarily because they feel rehabilitation is important to them.

Identified regulation considers the value of the behavior as a means to an end that is accepted by the individual as important (Ryan & Deci, 2000). Athletes whose motivation is regulated by identification will understand that adhering to rehabilitation is important for them to return to play with the best outcomes, the true goal for the athlete. The most self-determined, autonomous, and internal form of extrinsic motivation is integrated regulation. Integrated regulation shares many qualities with intrinsic motivation in that the individual finds their values aligning with the completion of the behavior. Rehabilitation adherence is understood as a quality of the athlete, and internalizing that adherence is important to the athlete's personal values, even if rehabilitation is not enjoyable on its own. Intrinsic, identified regulated, and integrated

regulated motivation are noted as being autonomous motivation, which has shown positive outcomes in various domains such as education, health care, religion (e.g., support for autonomy and relatedness predicting higher well-being in nursing home residents; see Ryan & Deci, 2000 for further review).

SDT recognizes that these states of motivation are not static. Behaviors can become more self-determined through the satisfaction of the basic psychological needs for autonomy, competence, and relatedness (Ryan & Deci, 2000). Autonomy is the perception that the individual's behaviors are through their own volition (deCharms, 1968). Competence is the perception of an individual's ability to successfully engage in their respective activity (Markland, 1999), or the self-efficacy for the activity (Ryan & Deci, 2000). Relatedness is the sense of connection that an individual feels for others (Ryan & Deci, 2000). SDT posits that this social connection is the central reason many individuals perform actions that are not inherently intrinsic. SDT posits that all three needs must be satisfied in order for the behavior to approach intrinsic motivation.

It is important to know how these basic needs could be present in injured athletes when applying SDT to understand motivation related to sport injury. Mosewich, Crocker, and Kowalski (2014) explored female athletes' experiences during setbacks and how they attempted to cope with them. The researchers utilized semi-structured interviews to understand the experiences of setbacks of five elite female athletes. The most prevalent setback was sport injury and the process of rehabilitation. Each of the basic psychological needs emerged in the issues the athletes faced during injury rehabilitation. Athletes experienced a thwarted need for autonomy, as athletes had to adjust their normal routines to the modified activity in rehabilitation that seemed irrelevant to their future goals. A

similar finding from Granquist et al. (2014) was that coaches who were seen as controlling were detrimental to rehabilitation adherence, which could suggest that the satisfaction of the basic psychological need of autonomy could be an important factor related to adhering to treatment. Other athletes described unfulfilled needs for competence, noting aimlessness and incompetence as being part of the injury experience. The need for relatedness was prevalent, as athletes described feelings of isolation during the rehabilitation process and noted social support as an important factor in effectively coping (Mosewich et al., 2014). Understanding the experience of a setback like sport injury from the perspective of the athlete elucidates how thwarted needs can be present during the process of recovery.

While present in the experience of injury, it is additionally important to understand how the satisfaction of these needs could psychologically benefit the athletes during recovery. Satisfied basic needs could be related to various psychological outcomes, such as increased well-being and decreased anxiety and depression (Yang et al., 2014). For example, Podlog, Lochbaum, and Stevens (2010) examined whether components of psychological well-being (i.e., positive affect, negative affect, self-esteem, vitality) mediated the relationship between basic needs and two perceived return-to-sport outcomes: (a) renewed perspective (i.e., a positive return-to-sport outcome) and (b) return concerns (i.e., a negative return-to-sport outcome). Two hundred four participants with two months of participation lost due to injury participated in the study. Direct effects of basic need satisfaction on well-being were found, as each basic psychological need was positively correlated with the components of psychological well-being. Indirect effects on return-to-sport outcomes were found as well. Specifically, positive affect partially

mediated the effects between competence and autonomy and a renewed perspective on sport. The results provided strong support for the effects of well-being in fully mediating the negative relationship between relatedness satisfaction (i.e., social support) and return concerns following injury.

The satisfaction of the need for relatedness can also come from the social support surrounding the athlete, including athletic trainers. Yang et al. (2010) examined pre- and post-injury support patterns of college athletes. The researchers measured the number of sources of social support (family, friend, coach, athletic trainer, physician, counselor, and other) that the athletes have available and the satisfaction with each source of social support at baseline and three months post-injury. At baseline, athletic trainers were noted by 49% of the athletes as being sources of social support. The follow-up scores indicated that 83% of the athletes noted athletic trainers as social support sources. Additionally, injured athletes' reported significantly higher satisfaction scores with athletic trainers than at baseline, suggesting that the relationship between athletes and athletic trainers could improve during rehabilitation.

To further explore the benefits of the athletic trainer-athlete relationship, Yang et al. (2014) examined the relationship between perceived social support and state anxiety and depression at return to play. The researchers assessed the state-trait anxiety and depression of 387 collegiate athletes after an injury event, with some athletes experiencing multiple injury events, producing 597 documented injury events. Results indicated that 84.3% of the athletes reported receiving social support from their athletic trainers for injury events. In 22.2% of documented injury events, the athletes reported symptoms of depression at return to play, and 27.8% reported symptoms of anxiety at

return to play. No differences in anxiety or depression symptom scores at return to play were found between athletes who received social support and those who did not.

However, satisfaction with social support did have an effect, with those claiming to be very satisfied or satisfied being less likely to report symptoms of depression or anxiety at return to play compared to those who were not satisfied. Athletic trainers may not be perceived as sources of social support before an athlete is injured. After injury the importance of the athletic trainer, not only becoming a source of social support but also being a satisfying source of social support, may be crucial for reducing negative psychological issues in injured athletes if they are to return to play.

Within the context of SDT, injured athletes could experience unfulfilled needs of autonomy, relatedness, and competence during rehabilitation. In a review of the literature regarding psychosocial aspects of returning to sport after serious injury, environments surrounding athletes should be supportive for the needs of autonomy, competence, and relatedness (see Podlog & Eklund, 2007 for a review). The experience of sport injury rehabilitation shows some evidence of thwarted basic needs, and the satisfaction of basic needs suggests improved outcomes. Strategies for developing an environment that provides support for these basic needs may be the answer to nonadherence.

Achievement Goal Theory and Rehabilitation Adherence

Achievement Goal Theory (AGT; Nicholls, 1984, 1989) views that success and failure in any context are reflective of one's competence in an achievement situation. Individuals are motivated to demonstrate high competence and avoid displaying low competence in any given achievement situation. This criterion for success or failure is known as the individual's goal orientation. Two goal orientations have been proposed,

task-orientation and ego-orientation, also distinguished in the literature as mastery orientation and performance orientation, respectively (Duda, Papaioannou, Appleton, Quested, & Krommidas, 2014). For the sake of consistency within this manuscript, all studies referenced using the mastery/performance terminology have been adapted to the task/ego dichotomy. Task-oriented individuals are motivated to gain mastery, basing success on their previous performances. Ego-oriented individuals are motivated through outperforming others and view success only as outperforming others regardless of effort or mastery of the skill. Though two orientations are understood to exist, they are not mutually exclusive, and individuals can present both.

Nicholls (1989) argued that individuals who are task-oriented will display more adaptive strategies to accomplish their goals than their ego-oriented counterparts. Task-oriented individuals also are thought to be more resilient in the face of adversity. Task-oriented individuals adopt adaptive achievement strategies, such as working hard, seeking tasks that are challenging, and persisting through difficult situations, while individuals with ego-orientations may adopt maladaptive strategies, such as only working hard when successful, dropping out when failing, and only seeking easy tasks (Roberts & Athanasios, 2014).

The development of goal orientations is affected by the motivational climate, which is the environment created through the actions and words of authority figures and how these authority figures provide feedback (Duda et al., 2014, 2014). Motivational climate is formally defined as “the social psychological environment that is created by coaches or teachers via what they typically say or do and captures how they tend to provide feedback, evaluate, and organize matters in training/competitions or classes,

respectively” (Duda et al., 2014, p. 547). Two types of motivational climate have been proposed within the AGT framework: task-involving and ego-involving (Ames, 1992). Similar to their respective orientations, task-involving climates emphasize self-reference as a parameter of success, giving one’s best effort towards task mastery, and support collaboration. An ego-involving climate emphasizes success as beating others, and ability is recognized as the most important characteristic (Duda et al., 2014).

The individual’s perception of the motivational climate is central to the research on motivational climates, and relationships have been found between the perception of motivational climates and various affective correlates that have relevance to sport injury. For instance, Parish and Treasure (2003) found that perceptions of a task-involving climate were strongly related to situational self-determined motivation and physical activity, while perceptions of an ego-involving climate were related to less self-determined forms of motivation. In addition, Seifriz, Duda, and Chi (1992) found that perceived task-involving climates were associated with higher levels of enjoyment and intrinsic motivation, while ego-involving climates were associated with higher levels of anxiety related to performance. These findings suggest a link between the motivational climate and the motivational state experienced by the athletes. If the athletes perceive a task-involving climate in the athletic training room, then they could experience higher rehabilitation adherence through a more self-determined form of motivation.

Aside from the supported correlates between perceived motivational climates and affective measures, some controversy has emerged between whether emphasis should be placed solely on an individual’s perception of a motivational climate versus an objective measure of the motivational climate. Keegan, Harwood, Spray, and Lavalley (2010)

argued that the use of perceived motivational climates to assess the nature of motivational climates has been justified incorrectly in two arguments: (1) measuring perceived motivational climates is theoretically/empirically better than an objective measure of the motivational climate, and (2) the overall and often unspoken convenience of assessing relationships between motivational climates and the dependent variable of interest via questionnaires.

Keegan et al. (2010) contended that the justification for measuring motivational climates through the subjective interpretation of the environment has been repeatedly assumed rather than repeatedly shown or demonstrated. There have been no direct comparisons between “perceived” and “actual” climates; thus, there is no evidence for the accuracy of an individual’s subjective interpretation of the environment. Keegan et al. (2010) argued that this inaccuracy is exacerbated by the results of Papaioannou (1994), who found that the variability in perceptions of motivational climate was higher between students in the same class than the variability between different classrooms.

Keegan et al. (2010) further contended that only emphasizing the importance of subjective interpretation of the environment is logically unsound, as it suggests that rather than training authority figures to create motivational climates, practitioners instead should focus on training athletes to cognitively restructure their interpretation of authority figures’ behaviors as motivating. Additionally, Keegan et al. (2010) pointed out that despite the body of literature that has grown in support of perceived motivational climates, evidence has not refuted the difference between an individual’s goal orientation and their perception of motivational climate. Keegan et al. (2010) asked, “If two constructs are measured with remarkably similar questionnaire items, are frequently

highly correlated, and appear to correlate with a highly similar constellation of other variables, how different are they?" (p. 35). Due to the convenience of assessing motivational climates through an individual's perception, Keegan et al. (2010) argued that the field has allowed a pragmatic limitation to become the theoretical backbone in which motivational climates are methodologically assessed.

These methodological issues discussed by Keegan et al. (2010) have surfaced when research has attempted to assess the perceived motivational climates in the athletic training room. For example, Brinkman-Majewski and Weiss (2015) explored if differences in athletes' characteristics are related to their perceptions of the motivational climate and identified whether perceptions of the motivational climate in the athletic training room are related to athlete's individual goal orientation. The results revealed that there was an influence of goal orientation on the perceptions of the motivational climate. Specifically, components of a task-involving climate (i.e., cooperative learning, rewarded for effort, acknowledgement as an important member of the team) were rated highest by the high task-low ego and high task-high ego groups, while components of an ego-involving climate (i.e., unequal recognition and punishment for mistakes) were rated lowest by the high task-low ego group. In support of the arguments made by Keegan et al. (2010) against using subjective perceptions, the goal orientations seemingly reflected the perceptions of a motivational climate, which do not provide any actual evidence of what "motivational climate" the athletic trainers attempted to create.

Limited research has examined AGT and motivational climates in the athletic training room, especially in the paradigm of objective motivational climates. However, research on physical training adherence in young athletes sheds some light on the

potential of creating task-involving motivational climates in the athletic training room. Specifically, Way, Jones, and Slater (2012) explored facilitators and barriers to athletes' training adherence. The researchers collected interviews from three groups: athletes, parents of the athletes, and strength and conditioning coaches of the athletes. Their findings suggested that coaches who encourage initial attendance by promoting a task-involving climate through emphasizing effort and personal improvement, making the experience enjoyable, and providing individualized attention often led athletes to enjoy the training sessions themselves and find an intrinsic motivation to adhere to their training. While the interviews came from the perspective of young athletes, adherence may be related to the motivational climate created by their coaches. Examining the behaviors and actions of athletic trainers in their attempts to create a motivational climate could provide a transition away from sole dependence on the perceptions of the athletes, providing an opportunity to examine correlates between perceived climates and created climates towards a better understanding of the objective motivational climate. At the very least, an opportunity to understand the dynamic between injured athletes and their athletic trainers.

While issues in the assessment of motivational climates is still debated, practical implications have been proposed, although the sparse evidence has not provided effects on outcomes related to sport injury. For example, one practical implication of creating motivational climates is the TARGET strategy (Ames, 1992), an acronym that represents six dimensions in an environment that structure the motivational climate: Task, Authority, Recognition, Grouping, Evaluation, and Timing (see Table 1).

Table 1

The TARGET Dimensions for Task-involving and Ego-involving Motivational Climates

<u>Dimension</u>	<u>Task-Involving Climate</u>	<u>Ego-Involving Climate</u>
Task	Meaningful, diverse, personally challenging and cooperative tasks	Competitive tasks emphasizing normative outcomes
Authority	The athlete or student participates in decision making	The authority figure makes all decisions
Recognition	Based on high effort, progress and task accomplishment	Based on normative performance and normative ability
Grouping	Often changes, mixed ability within groups	Relatively stable and groups are based on normative ability
Evaluation	Personal criteria of evaluation, mistakes are considered as part of learning, low performance is used to provide feedback for improvement	Normative criteria of evaluation, mistakes are considered as indication of low ability, low performance is considered failure
Time	Flexible time for learning and task completion based on athletes' needs	Inflexible time, everyone should accomplish a task within a specific time

Note. Adapted from Roberts and Papioannou (2014).

Brinkman and Weiss (2010) suggested that emphasizing a task-involving climate through TARGET-based strategies in the athletic training room could lead to increased perceptions of rehabilitation competence, motivation, and rehabilitation enjoyment while decreasing stress and anxiety. Within each dimension of TARGET, Brinkman and Weiss (2010) highlighted opportunities for athletic trainers to develop a task-oriented climate within the athletic training room. For example, athletic trainers can help athletes set short-term goals (Task), allow athletes to choose exercises for the rehabilitation session (Authority), provide opportunities for recognition through effort (Recognition), group athletes together for exercises (Grouping), allow practice for testing sessions

(Evaluation), and adjust pace of rehabilitation tasks for each athlete (Time). The use of these practical implications theoretically create a task-involving motivational climate. Thus, it is proposed that examining the use of these strategies by athletic trainers may provide a new objective measure of the motivational climate surrounding athletes.

Empowering Motivational Climates

SDT and AGT can be viewed as complementary, as they both illustrate that social and environmental factors influence motivation. The merger of the two theories has gained traction in the last few years within the coaching literature (Duda, 2013) and offers implications for motivational climate created by the athletic trainer. The focus of the merge specifically examined the coach's influence on the motivational climate and basic need satisfaction experienced by the athletes. Reinboth and Duda (2006) examined the changes in the perceptions of the motivational climate to athletes' need satisfaction and psychological and physical well-being. The researchers found that when the coach developed a climate that increased task-oriented behavior (evident in the change of perception), athletes reported increased basic need satisfaction of autonomy, competence, and relatedness. In contrast, an ego-oriented climate led to decreased satisfaction of relatedness, with no change in the satisfaction of autonomy and competence. The satisfaction for the need for autonomy was related to psychological well-being, implying benefits of creating a task-involving climate.

Duda, Papaioannou, Appleton, Quested, and Krommidas (2014) proposed that authority figures creating motivational climates should also consider basic psychological needs from SDT. One application of the integrated approach includes the training program for coaches called Empowering Coaching™ (Duda, 2013). Within the

Empowering Coaching™ framework, the psychosocial environment coaches build around their athletes is deemed as being either empowering or disempowering. A successful and empowering climate would be created by a coach who is task-involving, non-controlling, autonomy supportive, and providing social support to their athletes.

To apply these ideas to the sport injury context, it is important to remember that motivation is dyadic. Motivation to adhere to treatment is dependent on the inherent characteristics of the athlete (i.e., self-motivation) and the influence of the psychosocial environment created by the athletic trainer. Issues prevalent in nonadherence, such as poor attendance, poor effort/attitude, or poor communication, reflect an athlete's motivational state. SDT posits that motivational states are facilitated by the satisfaction of basic psychological needs. In addition to increasing the athlete's motivation to adhere, the satisfaction of basic psychological needs from psychosocial environments surrounding injured athletes also impacts psychological outcomes (Podlog and Eklund, 2007).

Integrative approaches such as Duda's (2013) that merge SDT and AGT provide a current understanding of the psychosocial environment as a motivational climate, which is created by an authority figure's feedback and actions. The development of the motivational climate in an athletic training room happens through the strategies used by the athletic trainers to plan and implement the rehabilitation process. Athletic trainers can use strategies that create a task-oriented climate and support basic psychological needs, such as good interpersonal communication skills, positive reinforcement, keeping the athlete involved with the team, using a realistic timeline to full recovery, focusing on short term goals, positive self-thoughts, athlete's understanding of rehabilitation strategy, and a variety in rehabilitation exercises (Clement et al., 2013; Weise et al., 1991).

While considerations for best practice emphasize the authority figures' using TARGET strategies and incorporating AGT and SDT in developing motivational climates to increase motivation (Brinkman & Weiss, 2010; Duda, 2013), a holistic assessment of the psychosocial environment created by athletic trainers in the training room and the impact on rehabilitation adherence does not currently exist in the literature. Rather, contemporary assessments have relied on the athletes' perception of the motivational climate, which could be skewed by the athletes' goal orientation and does not provide an accurate measure of the motivational climate created by authority figures, such as athletic trainers (Keegan et al., 2010). To better understand the influence of the created motivational climate on rehabilitation adherence, strategies currently used by athletic trainers that promote task-involvement and satisfaction of basic psychological needs should be explored.

Purpose of Study

The purpose of this convergent parallel mixed methods study (Creswell & Plano Clark, 2011), which entails a qualitative and quantitative strand, was to explore the relationship between the motivational climate created by the athletic trainer and the athlete's rehabilitation adherence. A mixed methods design was chosen for two reasons. First, the current quantitative paradigm is inadequate in understanding the motivational climate being created around athletes, as it can only provide the subjective perception from the athlete and does not allow for any real practical recommendations. Secondly, qualitative inquiry allows for a richer and deeper exploration into phenomena and can allow for a complete picture between the motivational climate and rehabilitation adherence.

Qualitative interviews were conducted to understand the strategies used by athletic trainers to organize the rehabilitation process, provide feedback to athletes, and evaluate rehabilitation progress in the context of environmental and social influences (i.e., motivational climate) for each athlete with whom they worked. Each athletic trainer's strategies was assessed as being (1) empowering (task-involving and basic psychological need supportive) or (2) disempowering (ego-involving and basic psychological need thwarting). The relationship between the athletic trainer-reported strategies and rehabilitation adhering behaviors observed in their athletes were examined by comparing the general use of recommended strategies (i.e., qualitative strand) and rehabilitation adherence scores (i.e., quantitative strand). In addition to exploring the relationship between athletic trainers' strategies and rehabilitation adherence, the study's design offers scholarly significance in providing a new framework in understanding the motivational climate created by the athletic trainers through their actions.

Method

Participants

Four full-time, certified athletic trainers working within the athletic department of a NCAA Division I university participated in this study. The participants (three females, one male) had varied sport experience, a mean age of 30.5 years (ranging from 27 to 34 years), and an average of eight and a half years of athletic training experience (ranging from five to 11 years). The study used convenient and purposeful sampling. Participants were recruited in person at a monthly sports medicine department meeting and contacted again to schedule individual sessions for data collection. Qualification for the study required that each participant had worked with four athletes who had suffered an

orthopedic injury within the last two years and did not participate in their sport for a minimum of two months because of the injury. It was required that two of these athletes displayed a high level of rehabilitation adherence and two of these athletes displayed a low level of rehabilitation adherence.

Materials

Rehabilitation adherence. The Rehabilitation Adherence Measure for Athletic Training (RAdMAT; Granquist et al., 2010) is a 16-item survey that assesses an athletic trainer's perception of an injured athlete's rehabilitation adherence based upon behaviors identified by practicing athletic trainer as conducive to rehabilitation adherence. It provides a total adherence score and scores for three subscales: attendance/participation, communication, and attitude/effort (range). The RAdMAT has shown good internal consistency and clear discrimination between high, medium, and low adherence levels (Cronbach's $\alpha = .89, .92, .90$). The RAdMAT was used to assess the adherence level of each athlete with whom the participant had worked (Appendix C).

Interview guide. A semi-structured open-ended interview guide was created to ascertain the strategies athletic trainers used with their athletes rehabilitating from sport injury. The interview guide focused on: (a) the overall rehabilitation process for each injured athlete, (b) how the participant structured the rehabilitation process, (c) how the participant determined progress during rehabilitation, and (d) how the participant provided feedback to each injured athlete. Probes were generated based on the recommendations for creating a task-involving climate from the TARGET strategy. Additional consultation was sought from two graduate assistant athletic trainers for

appropriateness of the questions and for any additional questions they believed were needed (Appendix D).

Procedure

Both quantitative and qualitative data were collected in the same setting. The participants completed a RAdMAT for each of the four student-athletes they selected. The participants then participated in an in-depth interview conducted by the investigator, completing the interview guide for each athlete with whom they had previously worked. The interviews lasted around 60 minutes in duration and were audio recorded and transcribed. The participants were compensated ten dollars for their participation in the study.

Data Analysis

This study utilized a convergent parallel mixed methods design with equal emphasis on each strand (Creswell & Plano Clark, 2011). The quantitative strand examined the level of rehabilitation adherence in athletes observed by the athletic trainer and verified the athletes identified by the athletic trainers were distinct in their adherence. An interview was conducted with the athletic trainers to gain understanding of their strategies in the rehabilitation setting for the qualitative strand as well as any emerging issues within the rehabilitation context. A constructivist perspective framed the analysis, as ontologically, people construct their own realities and epistemologically, the researcher and participant will influence each other.

Each strand was analyzed separately and then mixed during interpretation to examine the relationship between each strand to approach the research questions. Additional examination of the emergent themes and the strategies used by each athletic

trainer were included in the discussion (see Appendix D for a graphical display of the data analysis flow chart).

Quantitative strand. Analysis of the quantitative strand included descriptive statistics of the RAdMAT total score and subscale scores for the overall sample and for each athletic trainer and for each athlete. This basic analysis was used to compare previous RAdMAT scores in the literature (Granquist et al., 2010) to verify the participants could distinguish between high adhering and low adhering athletes.

Qualitative strand. The recorded interviews were transcribed word for word and coded by the researcher. Merriam and Tisdell (2016) recommended strategies for increasing trustworthiness (i.e., reliability and validity) in qualitative research, and these strategies were implemented. The first strategy utilized was member checking, which allowed participants an opportunity to evaluate the transcript and provide any changes to their responses. The transcripts were read multiple times for familiarity, and the researcher conducted a critical self-reflection of his personal experiences with sport injury, bracketing any bias experienced while analyzing.

The interviews were transcribed, producing 62 pages of text. The interviews were first analyzed to identify the strategies used by athletic trainers. The strategies are defined by the researcher as the athletic trainers' attempts to structure the rehabilitation process, provide feedback, evaluate progress, or change any aspect of rehabilitation that they believe will improve motivation or they find important for motivation, remaining closely to the research question. Once identified, each strategy was then coded if it was empowering or disempowering based on the possible goal-involvement (task-involving or ego-involving) and/or effect on basic psychological needs (supportive versus

thwarting), based upon previous literature (i.e., Brinkman & Majewski, 2010; Keegan et al., 2011; Duda, 2013). Lastly, the interviews were examined (i.e., open coding) for any other possible themes that were not represented in the initial research question, but related to the study purpose.

Results and Discussion

Rehabilitation Adherence Scores

The two adherence groups showed a distinction in adherence scores. The high adhering group reported a mean RAdMAT total score of 62.75 (as compared to 54.28 in Granquist et al., 2010), and the low adhering group reported a mean RAdMAT total score of 35.75 (as compared to 32.63 in Granquist et al., 2010). These findings verified that the two groups of athletes were demonstrating different levels of adherence, similarly to previous research (Granquist et al, 2010). The difference was consistent among all athletic trainers (see Table 2).

Table 2

Mean RAdMAT Scores of Division I Athletes as Rated by Athletic Trainers

	<i>n</i>	Total Score	Attendance/ Participation	Communication	Attitude/ Effort
Overall	16	49.25	16.75	7.88	22.13
High Adhering	8	62.75	19.75	10.63	30.88
Low Adhering	8	35.75	13.75	5.125	13.375
AT-A	4	51.5	17.75	8.5	22.75
AT-B	4	50	16.25	7.75	23..5
AT-C	4	49.75	18	7.5	21.75
AT-D	4	45.75	15	7.75	20.5

Note. Score range: Total (16-64), Attendance/Participation (5-20), Communication (3-12), Attitude/Effort (8-32); AT= Athletic Trainer

Motivational Strategies Used by Athletic Trainers

The analysis revealed nine empowering strategies that athletic trainers implemented during rehabilitation: (a) emphasizing social support/relatedness with athletes, (b) emphasizing autonomy with athletes, (c) flexibility in choosing exercises by finding sport specific exercises or taking athlete's feedback on exercises, (d) adjusting the workload or pace of the session with the athlete, (e) grouping athlete with other injured athletes, (f) providing feedback that was positive/informational/task focused, (g) offering a variety of work with other professionals, (h) including athlete in goal setting for rehabilitation, and (i) having athletes practice for evaluation sessions/ tests. Only one disempowering strategy emerged from the analysis: other-oriented feedback. Each of these findings is summarized below.

Emphasizing social support/relatedness with athletes. Three of the athletic trainers emphasized being a source of social support and truly trying to understand each individual athlete during sport injury rehabilitation. This was understood less as a direct strategy, but more of an attitude or philosophy that the athletic trainers carried about their role in sport injury rehabilitation. Athletic Trainer “A”, summarized the role she saw as an athletic trainer:

It's normal for us for people to be injured, but obviously for this individual, it's something new that they have never experienced. Of course a handful of these girls have experienced injury before, but a first time injured person is going to handle it really poorly, so our role, I think as an athletic trainer, is to help monitor that a lot of that and help facilitate a lot of that because we are in there every single day around them way more than their coaches are, especially when they're

injured. We are going to be that sole supporter that they are going to be seeing on a consistent basis, providing them feedback, communicating with them the most, building the closest relationship with them, so really like we have to be that source to some extent and maybe that source of motivation to be self-motivated, which I mean, is kind of hard. You can't always instill that, but sometimes when you are noticing that they are at their lows, that's where you have to step up and help fill that gap. Maybe the next day they come in with a better attitude. That's how I see my role.

Another trainer, Athletic Trainer "D", spoke on the need to build rapport before the athlete ever began rehabilitation:

So what I do with [my sport] is I try to get to know each of the athletes and over the years how each one responds to different things. If this is going to help them and sometimes things I know might not make them feel better but they think it will, I'll do it because if they think they feel better then it's like they're going to play so I'll help them out that way. So it's kind of learning the athletes too. I'll make sure that I know everyone on the team no matter what. But with soccer, since the team is kind of small, like 30 kids, at least every single person on the roster has had something go on. Maybe not an injury, maybe they had to go talk to the dietitian, or they had to get bloodwork. So I had at least interacting with every one of them besides just practice setting.

The athletic trainers implementing the strategy would theoretically support the basic need for relatedness, as they attempt to go beyond mere involvement and try to know the athlete as an individual.

Emphasizing autonomy with athletes. Every athletic trainer emphasized autonomy with their athletes, each noting the importance for athletes to begin working on their own and being responsible for the smaller tasks each day. The athletic trainers mentioned that they have multiple athletes to help at any given time, and allowing autonomy to develop is one of their main strategies to ease their own workload and allow the athlete to truly grow into their role in rehabilitation. Athletic Trainer “A” described the process as a transition from surgery:

You can see it with post-operation rehabs because they will get too comfortable with me doing stuff, especially in the beginning because obviously they are going to be on crutches and having a hard time getting around so I help them put their socks, put their shoes on, hand them their crutches, I’ll throw away their trash, like, because they are not mobile and it’s hard for them to get on and off the table in the beginning after surgery. I try to quickly transition out of that because I’m here but I also taking care of a whole team. You can walk back and put ice in your ice bag, and I’ll tie it for you and wrap it on, but like ‘hey, help me out, I’m also doing a lot.’ I think that comes with like, they also get the vibe or the routine of the training room. They know where everything is because now they are in there all the time. So it kind of happens naturally, but of course I encourage [autonomy] the whole time.

Athletic Trainer “C” shared his thoughts on why he promotes autonomy, emphasizing that he can only give attention if he is seeing the athlete’s commitment to return to sport:

I put a lot of it in their hands. I'll push them, I kind of, my overall mentality is: 'I'm here to help, if you don't want my help, great. I don't care. Everyone on our team is trying to play in the [professional leagues], so if that's your goal, then I'll do everything I can to help you. If all you want to do is play here, great, I'll keep you here. If you don't want to be here, then I'm not going to lose sleep over fighting you down.' So the guys that kind of consistently don't want to do it, at some point I'm like 'Hey dude, do we want to do this anymore? Here is what you got to do to get it done. I'm going to work with these three guys that really want to get after it.' And like right, One, Two, Three are all in the exact same rehab, way different spots, but you can tell there is a complete difference in motivation and wanting to get back and caring. One and Two are in the training room every day for hours. Three shows up whenever he needs to. Gets his little bit of work done and then gets out.

The athletic trainers supported the basic need for autonomy in their athletes, supporting efforts for the athletes to maintain ownership of their rehabilitation and often endorse work outside the athletic training room. There also are implications for building a task-involving climate as the autonomy supportive style of some athletic trainers provide opportunities for the athlete to make decisions and nurture the athletes' inner motivational resources rather than seek compliance.

Flexibility in choosing exercises by finding sport specific exercises or taking athlete's feedback on exercises. This strategy was used by athletic trainers to find ways to incorporate sport-specific movements into the exercises and allow athletes to provide input on what exercises best fit their sport. Interestingly, this strategy can be utilized only

well into the rehabilitation process. Athletic Trainer “A” noted that it is nearly halfway through the rehabilitation before she can introduce more sport specific exercises:

So that second half from about three months to six plus months we’re looking closer to eight months for a knee injury to return. That’s where you can get really creative. You can really incorporate their sport and just kind of get them back to where they need to be. For example, instead of doing a normal heel touch off of a box, you might include a ground ball pick-up and make it more sport-specific.

Athletic Trainer “B” discussed that the process of being open to feedback on the relevance of exercises also can be frustrating for the athlete and uncomfortable for the athletic trainer:

I’ve had, for example, [Athlete 2] that started off so quiet, we’re out on the field one day and we’re doing individual drills and he gets frustrated with me because they aren’t relevant to his position. So he ends up, as shy and quiet as he is, saying ‘These drills are so stupid! I’m never going to do these. They are good for this other guy that’s doing it with me because it’s relevant to his position but it doesn’t help me at all. I’m just really frustrated because I have to do this stuff. I want to do something that’s going to help me.’ So I said okay. So we go over and we watch his position for five minutes and we see the different drills that he’s doing and so we start doing drills for him and are going to help him in his position. So it was really uncomfortable for me to go through that, him going ‘This is stupid. I hate this. This isn’t going to help me’ but at the same time it helped me because I didn’t know that he doesn’t need to move like that for his position.

Allowing the athletes to participate in the decision making process incorporates task-involvement as well as providing support for autonomy and competence. Athletic trainers using this strategy allow the athletes to become part of the process. This will require the athletic trainer and the athlete to have an open line of communication.

Adjusting the workload or pace of the session with the athlete. This strategy was noted as being used primarily to prevent re-injury. Since the participants used cases of rehabilitation from orthopedic injuries requiring surgery, more emphasis was placed on the athletic trainers, such as Athletic Trainer “B” below, looking for feedback on pain and soreness:

Both people, the athletic trainer and the athlete to kind of understand how they’re feeling and how to progress from that. Just with ACLs, you don’t want to push too hard too soon, because you don’t want to put any pressure on the actual tissue, the graft tissue, but it’s more of just how she responded to each treatment.

Athletic trainer “A” would often adjust the pace of rehabilitation, giving breaks to allow athletes to refocus while they were learning new exercises and modalities. This strategy theoretically should be task-involving and provide support for competence.

Grouping athlete with other injured athletes/keeping athlete with team. The athletic trainers often looked for opportunities for grouping athletes together and would consider trying to do exercises in the same area as the athlete’s team whenever possible. Athletic Trainer "D" often used grouping as a motivational strategy, pairing self-motivated athletes with athletes that were not coping as well:

Yeah, she did a better job that way. And she would come in because she liked the social aspects. So she was able to talk to her teammates and kind of see what’s

going on. And I'll always use these athletes, I will always make sure that if they see another athlete gets hurt and what they're going through is kind of the same thing, but it went above her. She didn't really care to even take that or look at that and do anything with it. There was another girl who tore her meniscus in the middle of the season and she worked really hard and rehabbed and came back, when sometimes you don't come back from that right away. So I would always try to schedule them at the same time so she would see this other girl working hard and that just didn't do anything.

Athletic Trainer "B" noted that grouping also helped reduce the workload for athletic trainers working on larger teams, as well as fostering a healthy competitive environment that helps motivate athletes:

Let's say you have athlete A, B, and C. We would try to at least put B and C together and then A comes in by himself, and then next day A is paired with B or C, then the third one comes in by himself. I think that really helped because we could pair them up for a lot of exercises. We didn't have a lot of hands. We had a large team and not a lot of hands as far as athletic trainers are concerned, so that helped take some of the load off of us, but also it helped them as far as challenging each other, because we could put them on tables right beside each other and if they were doing 3 lbs. and saw the other person doing 5 lbs., it bothered them. They were also all males, so if one of them was doing more weight, they wanted to do as much weight as their friend was doing. So I think that they kind of snowballed each other into a positive direction.

This strategy provides task-involvement as well as providing support for the need for relatedness. By allowing social bonds and interactions to emerge throughout the rehabilitation process, athletic trainers can reduce their workload while also supporting their athletes' psychological need for relatedness.

Providing feedback that was positive/informational/task focused. This strategy was the type of feedback the athletic trainers generally tried to give to their athletes. Whether that feedback would be focused on effort, the task at hand, or motivational in general, this strategy grouped the various types of feedback together if it was not other-oriented. Athletic Trainer "B" discussed the feedback she tried to give to one of her athletes as being more task-focused:

So you're always giving feedback on technique, whether they are doing something correctly or incorrectly. I am known for being a nitpicker for technique in rehab. I just want them to do everything perfectly, especially coming back from a surgery, you really have to re-teach them technique from ground zero and you want them to do everything perfectly because it's not going to happen perfectly in a practice or in a game, especially in a fourth quarter when you're tired. I think that sometimes he got a little frustrated with some of the feedback that I gave him and he could, he definitely, he finally got to the point that he could voice that frustration but I don't think that changed the motivation that he had towards his rehab.

On the other hand, Athletic Trainer "D", while still task-focused, tried to emphasize her feedback as being more motivational:

A lot of positive feedback to her, just more motivating. Because I would always talk to them and tell them that ACL injuries are more of a marathon not a sprint. It takes a long time and it's a process and there are going to be all of these bumps across, no matter who they or how strong they are, they are always going to have some little setback but they have to remember all the time that it's not the end of the world. They are going to get over the setbacks and it's never going to be because of them. They're collegiate athletes in their first ACL injuries, this isn't going to be the end of the world. They're going to be able to play soccer. Their knee is not in that bad of shape.

Theoretically, this strategy would be task-involving, with the focus of the feedback being self-oriented, as well as being autonomy and competence supportive. Vallerand and Reid (1988) found positive feedback will lead to higher levels of intrinsic motivation and feelings of competence.

Offering a variety of work with other professionals. The athletic trainers also would try to utilize a variety of other professionals, utilizing an aquatic therapy program and coordinating with strength and conditioning coaches to provide some variety in the workload. While this strategy may be less generalizable than others due to the sample being selected from a large Division I university, it was noted by the athletic trainers as being very useful in maintaining a positive relationship with their athletes. As Athletic Trainer "B" noted:

She had basically three different phases of her rehab. She had three different people she would work with really. So she would have me as her athletic trainer, and I would do her basic rehab. Once she got a little bit further along in the

process, she was sent to aquatic therapy, and she worked with a different athletic trainer at aquatic therapy. They progressed her while she was in the pool and then communicated with me as far as what she was able to do in the pool so that we could start trying to do it on dry land. But then we also worked really closely with the strength coach, so once she was able to start doing some of the weight lifting, we started trying to put her with him a little bit, so that he could work weightlifting technique, all the Olympic type movements, but also I think that all of that helps because if she is in front of different people's faces, she's less likely to get sick of my face. Just the fact of giving her a different variety, giving her a different setting to work in, I think that has really helped, especially as I have been here I have noticed that has really helped the kids a lot instead of just coming into the athletic training room every day, because once kids are in for so long, they start dreading coming in the door but if you can switch it up, it helps a lot.

Including the athlete in goal setting for rehabilitation. The interviews revealed a unique dyadic goal-setting approach. The athletic trainers are primarily responsible for the medical goals within the recommendations of the orthopedic surgeon, such as reducing swelling in the injured area, increasing range of motion in the joints, while the athletes focus their goals on returning to play. The athletes were invited by some of the athletic trainers to also share what they wanted to achieve once they emerged from rehabilitation. This merger of the short-term goals from the athletic trainer and the long-term aspirations from the athlete was discussed in each of the interviews. Athletic Trainer

“B” uses a meeting before she begins any rehabilitation with an athlete to discuss how she can best meet the athlete’s goals while still completing her duty as an athletic trainer:

I was primarily responsible for setting the goals. Basically what we did was we took the surgical protocol and her and I sat down together and did a thirty minute meeting. I went through the rehab protocol with her and said ‘Okay, so here are the things that I am pulling off of here that I think are important milestones for you. As far as, when I have been through this process with other athletes before here, these are the things that we really get excited about and places where you will see major improvement.’ And so then, once I have set those general goals, she decided to add a couple more for herself, such as, not only getting back to the team but being a starter. Being an all-conference selection. What she wanted to do, as far statistically, in her next season.

Athletic Trainer “B” was the only athletic trainer to note conducting a meeting for the sole purpose of goal setting. The other athletic trainers used a similar process to find a compromise between their goals and the athlete’s long term goals.

Having athletes practice for evaluation sessions/ tests. While injury rehabilitation will require athletes to strengthen muscles and improve range of motion to injured areas prior to testing for a return-to-play, certain athletic trainers emphasized directly practicing the tests that determine if an athlete is ready to return to play. Athletic Trainer “A” discussed that she has created her own protocol that allows her to track objective measures of the very same protocol her team doctor will use to determine if her athletes are ready to return to play, but also noted that this is not quite the norm in athletic training:

I designed a big return to play functional testing protocol for all knee injuries, because as you can see, I have a lot of knee injuries. Basically, we run all of these tests to prove to our doctors that they are ready to go at the point they are ready to go, and what I started to do was, almost like a preliminary, let's do it a month, two months early, and just see where you are at. So I used those tests and the numbers on those tests to show the athlete, 'See that right now your strength is at 70% at your other leg, the bare minimum to get cleared is going to be 85%.' So I think they can see that number and see where they need to work to, and I'll have them do it and feel it and kind of see how hard it is, and then obviously I'll have that all written down, documented, and then like we'll do it and I'll literally lay out there numbers and I'll say 'See? This is what you did last month, this is where you are right now. So you can see that there is a lot of improvement here or maybe there's not.'

Other-oriented feedback. Only referenced in one case, Athletic Trainer "C" discussed using other-oriented feedback with a high-adhering athlete that was excelling in his rehabilitation, comparing his progress to other athletes with similar injuries when he said "mostly it's showing him where he is comparatively to where everyone else is." Coded as disempowering, this was the only strategy that was not theoretically task-involving or basic need supporting.

Relationship between Strategies and Adherence

The primary focus of the study was to examine the relationship between the strategies used by athletic trainers and the rehabilitation adherence of the athletes with whom they worked. Due to the small sample size, subscores of the RAdMAT could not

be differentiated beyond the high/low adherence distinction and thus were not compared against the strategies. For the purposes of this study, only the groups of high-adhering athletes and low-adhering athletes were compared. Table 3 depicts the matrix between the rehabilitation adherence of each individual case and the strategies they received. Each case is denoted by the athletic trainer and the case number (AT-A1 describes Athletic Trainer “A’s” first case). The first and second cases (denoted by 1 & 2) are all high-adhering cases and the third and fourth cases are all low-adhering cases. The checkmarks indicate that the specific case received the strategy. A pattern between adherence and strategies emerged, as high-adhering athletes tended to receive more of the empowering strategies. The athletic trainers emphasized autonomy, grouped athletes together, and provided informational, positive, and task focused feedback with most of their cases.

The adherence groups were further compared on each individual strategy. Table 4 provides an overview of the athletes receiving strategies. High-adhering athletes are receiving noticeably more empowering strategies than low-adhering athletes. Specifically, athletic trainers are adjusting the workload or pace of the session with the athlete, grouping the athlete with other injured athletes, offering a variety of work with other professionals, and including the athlete in goal setting for rehabilitation for high-adhering athletes – more so than for low-adhering athletes.

Table 3

Matrix Table of Division I Athlete Rehabilitation Adherence and

Strategies Implemented by Athletic Trainers

Case	Adherence	Strategies										
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	
AT-A1	High	✓	✓	✓	✓	✓	✓	✓	✓		✓	
AT-A2	High	✓	✓	✓	✓	✓	✓	✓	✓		✓	
AT-A3	Low	✓	✓			✓	✓				✓	
AT-A4	Low	✓	✓	✓			✓	✓			✓	
AT-B1	High		✓			✓	✓	✓	✓			
AT-B2	High		✓	✓		✓	✓	✓	✓	✓		
AT-B3	Low	✓		✓		✓			✓	✓		
AT-B4	Low		✓	✓		✓	✓					
AT-C1	High		✓		✓	✓	✓		✓			
AT-C2	High		✓			✓						✓
AT-C3	Low		✓				✓					
AT-C4	Low		✓									
AT-D1	High	✓	✓	✓	✓	✓	✓	✓	✓			
AT-D2	High	✓	✓									
AT-D3	Low	✓	✓			✓						
AT-D4	Low	✓	✓				✓					

Note. 1 = Emphasizing Social Support/Relatedness with Athletes; 2 = Emphasizing Autonomy with athletes; 3 = Flexibility in choosing exercises by finding sport specific exercises or taking athlete's feedback on exercises; 4 = Adjusting the workload or pace of the session with the athlete; 5 = Grouping athlete with other injured athletes; 6 = Providing feedback that was positive/informational/task focused; 7 = Offering a variety of work with other professionals; 8 = Including athlete in goal setting for rehabilitation; 9 = Having athletes practice for evaluation sessions/ tests; 10 = Other-oriented feedback. AT = Athletic Trainer

Table 4

*Strategies Implemented by Athletic Trainers for High-Adhering and Low-Adhering**Division I Athletes*

Strategies	High Adherence (n=8)	Low Adherence (n=8)
Emphasizing Social Support/Relatedness with Athletes	4 (50%)	5 (62.5%)
Emphasizing Autonomy with athletes	8 (100%)	7 (87.5%)
Flexibility in choosing exercises by finding sport specific exercises or taking athlete's feedback on exercises	4 (50%)	3 (37.5%)
Adjusting the workload or pace of the session with the athlete	4 (50%)	0
Grouping athlete with other injured athletes	7 (87.5%)	4 (50%)
Providing feedback that was positive/informational/task focused	6 (75%)	5 (62.5%)
Offering a variety of work with other professionals	5 (62.5%)	1 (12.5%)
Including athlete in goal setting for rehabilitation	4 (50%)	1 (12.5%)
Having athletes practice for evaluation sessions/ tests	3 (37.5%)	3 (37.5%)
Other-oriented feedback	1 (12.5%)	0

Another interesting insight from Table 3 is the differences between the strategies implemented by the athletic trainers differed more from athletic trainer to athletic trainer. While as a whole, the relationship between strategies and adherence is observable, the pattern is less clear when looking at the implementation of each athletic trainer. For instance, Athletic Trainer “B” and “C” used far less social support than the other trainers. Athletic Trainer “C” implemented less strategies overall than the other athletic trainers, citing reasons explored further in the discussion. While the initial investigation of the

pattern does find some evidence, other emergent themes may best explain the reasons why a disparity exists.

Other Emerging Themes

After analyzing the data for the strategies athletic trainers used when working with their athletes, an opportunity was taken to examine the data again, but with less focus on the main research question. Instead, the focus was on exploring the athletic trainers' perspective on other possible issues and influences that occur during the rehabilitation process. Three additional themes emerged from the last round of analysis: (a) athlete personality, (b) outside influences on the rehabilitation process, and (c) injury specifics that altered the strategies used.

Athlete personality. When asked what it was like working with each athlete, the largest distinction between high-adhering and low-adhering athletes was described as being self-motivated, similarly to SDT's definition of autonomous motivation (identified, integrated, and intrinsic motivation). Every high-adhering athlete was noted as being self-motivated throughout the rehabilitation process, whereas all but two low-adhering athletes were described as unmotivated by their athletic trainers. Athletic trainer "B" noted how a highly-motivated athlete can ease the demands on the athletic trainers:

This is an athlete who had a six to nine-month rehab process. This person was very self-motivated, even before the injury, somebody who was self-motivated, somebody who was very independent, and somebody that you really didn't have to coach to try to get them motivated. They would basically just come in and work until they couldn't move every day, even before the injury, so I was really blessed to have an athlete like that going into the process. I think that if they are

intrinsically motivated and they're a strong person going in, it's kind of less that the athletic trainer has to put on them coming out.

Self-motivated athletes go beyond what they are told to do, an important component of the rehabilitation process as mentioned by Athletic Trainer "A:"

I think that naturally she has the athlete mentality that like even though I did not make her do bike or elliptical cardio twice a week, just because we don't have time, I know that she would go to the gym on Sunday after her quick treatments with me and do 30 minutes on the elliptical. Which it sounds miniscule, but things like that make a difference and shows if the athlete cares and are they doing things outside, or are they literally, whatever is written on the rehab sheet that day, that's what they do, that's what they stick to. And a lot of people do that, they like, they live and die by what I write on their rehab sheet and the thing that sets the better motivated athletes apart are the ones who went to the pool and swam or started elliptical two or three times a week or schedule extra lifts with the strength and conditioning coach.

Contrary to the experience with self-motivated athletes, the "unmotivated" athletes generally require more work from the athletic trainer. Athletic Trainer "A" discussed her experience with an athlete that required constant attention to be sure she completed all her exercises:

She's the girl that if I didn't explicitly write it on her sheet, she wouldn't ever search out an opportunity to better herself on her own ever. I mean, she's not outright negative, but she does poke out a lot of 'I really don't want to do that' but she will do it because I told her to do it, but you can tell she doesn't want to do it.

Like if I say get on the line because we are doing sprints, she is like “How many are we doing?” She will do them, but she will be like ‘My knee hurts, I really don’t want to do this.’ That’s kind of her every day

Additionally, the athletic trainers noted the athletes’ personality being a major influence on if they will group them with other athletes. Athletic Trainer “C” often waits until he can trust the athletes to not get distracted or distract others during exercises:

Typically, I hate having the surgery rehabs around anyone else because usually they don’t focus. So when we are doing the exercises, which are mundane, they’re the same thing over and over. I’ve learned they will start playing on their phones or talking to somebody.

Outside influences on the rehabilitation process. Various influences on the rehabilitation process were discussed, each with positive or negative effects on the rehabilitation process. Both of Athletic Trainer “A’s” high adhering athletes had been previously injured in college and had gone through the rehabilitation process with her. She described the initial process as “pretty slow and long going” with the same negative psychological and behavioral responses found in the literature (e.g., Clement et al., 2013), but found the following injury experience to be much more positive. Athletic Trainer “A” said the athletes provided more feedback on their exercises and were motivated to improve the rehabilitation experience and recover quickly:

She really used that experience to come into this one and she was like ‘I’m going to do better this time. I’m really going to do better. I’m going to do what ‘A’ says’. Like you know it hurts in the beginning, you know, when you’re getting around. And she knows what has to happen, like last time we really struggled

with, like she didn't fire her quad well enough. So she was hitting those quads early on, like she really drew from that first experience to be like 'I'm not going to be a pain in your butt. I'm going to what you say.'

Issues from outside of school and athletics also were prevalent for some low adhering athletes, possibly detracting their focus away from rehabilitation. Athletic Trainer "B" described her experience with one of her low adhering athletes where outside influences were very apparent:

[He] was a kid that also some mental health issues going on. He had a lot family issues going on. So he had a lot of things that he needed to deal with other than just his injury, and sometimes I think that hampered his approach to his rehab and his motivation towards his rehab because he had a lot going on. Then also, obviously if you have mood issues, it's going to affect your motivation and your enthusiasm. It was hard to keep him consistent because I don't think rehab was his first priority.

Athletic Trainer "B" readjusted her schedule to allow for individual sessions that focused more on the athlete's personal struggles before she would begin any rehabilitation exercises, finding that it improved his adherence if he believed that he could trust her. Athletic Trainer "C" and "D" saw similar issues with one of their low adhering athletes, as they found out that both athletes' parents were going through a divorce at the same time as their rehabilitation. Both athletic trainers said they only had discovered the family issues long after the rehabilitation adherence issues began to arise and suspected issues in other areas (e.g., school).

Unsurprisingly, athletic trainers also spoke on the lack of interest in continuing to play their sport that some of their low adhering athletes displayed, which also led into a lack of motivation to complete rehabilitation and return to play. Athletic Trainer “D” spoke about a previous athlete she had worked with that had outright refused to her exercises, eventually only coming to rehabilitation to avoid losing her scholarship. She suspected the athlete was prepared to receive a medical hardship (i.e., a special scholarship for athletes so they can continue school without having to continue their sport due to severe injuries). Athletic Trainer “C” found that most of the issues he had with a low-adhering athlete may have been directly due to disinterest in continuing playing:

I think there’s a lot more pressure from parents to play baseball than foresaid athlete to play baseball. So I think that’s some of that issue with the rehabbing. He really didn’t care, he doesn’t want to it.

Injury specifics that altered the strategies used. Certain injuries called for alteration of the strategies athletic trainers would use with other cases. Often, the athletic trainers had to coincide with the surgeon who completed the orthopedic surgery to prevent reinjury or cause other medical issues. Every athlete that Athletic Trainer “C” had worked with received a ligament reconstruction common for that particular sport. He discussed how the protocol is followed more strictly than most injuries:

I follow our doctor, we have a protocol, and I follow it pretty closely with our current doctor. I go off that. If it says 0 to 50 range of motion, I get them to 50. I won’t really push them past much until the doctor looks at them again and goes ‘No, he’s doing really good, let’s pick this up.’ Like another athlete we did that with, we really got his motion going really good because he was healing good...

like with a knee, there is not much you can do damage wise, depending on, like an ACL, you can just “it’s healed, let’s go’. With [body part], with the motion of it, yeah you really have to be careful because you can pull the graft and just destroy the whole [body part] again.”

Also, due to the nature of ligament reconstruction rehabilitation, poor adherence would hamper the rehabilitation process, and Athletic Trainer “C” often would have to “start back at square one,” which was his experience with one of his low adhering athletes:

I was trying to stay as close to the protocol as possible. But at the same time we were missing chunks and I think I was getting him in for 4 days a week when typically during the fall I want him in there 5 to 6. So it was just trying to stay within the protocol. You know, we would fall behind and I would have to push him. He was a great example because he wouldn’t take time so his extension was really really bad. At a certain point you can’t get any more until you put them in this torture almost. They lay on the table and their [body part] gets straightened out and their [body part] gets pulled to the ground with a band. He was in that constantly, because he wasn’t doing the work up front. Compared to the Athlete 2 who I have done with only three times and he’s pretty much back to where he was before surgery. With Athlete 3 we did it 4 days a week and it was just one of those things. It’s horrible. The doctor kept saying ‘You need to work on it. You need to work on it,’ and then he would kind of ‘Meh, yeah, I know.’ Two to three days would go by and we would come back in.

With his other low adhering athlete, Athletic Trainer “C” had to alter his strategies because the athlete had gone outside the school’s medical network, requiring him to follow the other surgeon’s protocol precisely to avoid liability:

With him, he actually had surgery done by a different doctor, so his parents didn’t think our physician was qualified to do the surgery so he went down [state] and got it done at the [name] Clinic, a big fancy name guy. So his rehab I went to the tee and I would not budge. If we were going to go outside we are going to do it exactly like how your doctor wants it, if and when something goes wrong I can go, ‘Nope. I am following to the tee.’ I didn’t want to mess with it. Again, [name] did the surgery, I wasn’t going to tweak it. The other three, our guy did it and I have a great rapport with that doctor so I can call him up and go ‘Hey, so and so is here. What do you think about doing this?’ or ‘Hey, this issue is happening, what do you think about backing down?’ With the other one, ‘Nope. I don’t care what you do. We are going to go step by step so that you can’t come back and say ‘you screwed him up, you did something wrong.’

Other injuries may not provide any opportunity for usual strategies. While injury specifics are noted in the literature as an influence on rehabilitation adherence (Granquist et al., 2014), the interviews offered tangible examples of some of the injury specifics that alter the rehabilitation process. Athletic Trainer “B” discussed a low adhering athlete with multi-directional shoulder instability. Rehabilitation requires completing the same exercises to help stabilize rotator cuff muscles over the course of months. Athletic Trainer “B” made a point to use goal setting with all of her athletes, but found she could not with this particular athlete who was doing the same exact exercises every day for

three months. She realized there was not much she could provide besides positive and task-oriented feedback. Athletic Trainer “D” also had a unique case that impeded her typical strategies with a low adhering athlete:

She really couldn't do anything because the doctors didn't know what was wrong with her because she would have all these symptoms but they don't want to dismiss it all so she couldn't really lift anything because we didn't know if it could be the symptoms in her foot, could they be coming from her back? Could they come from her leg?....We were able for her to feel good for a week, and she did a bike workout, and the all of a sudden she couldn't walk again. But it never really correlated, because a bike workout shouldn't really hurt you. So any time we made any improvements and I think she saw herself 'Oh, I can get back on the field' I think she thought 'Oh, it hurts too bad. I can't play.' So I don't know if she was scared to play because she wasn't good or if it was more of what was going on with the outside factors like her family. But she would good improvements and do well and start to come in, and then she would be like 'No, no. It hurts too badly' and then the downward cycle would start again. Then we would improve, then it would start again.

General Discussion

The purpose of study was to explore the relationship between the motivational climate created by the athletic trainer and the athlete's rehabilitation adherence. The results show some difference in the strategies used by athletic trainers for athletes displaying high adherence versus athletes displaying low adherence. Interestingly the difference was found to be the application of empowering strategies to high adhering

athletes and the lack of those applied strategies to low adhering athletes, rather than application of disempowering strategies for the low adhering athletes. As many of the athletes were treated in the same time frame, the athletic trainers showed the capacity to use facilitative strategies with adhering athletes, but revealed an inability to use the same strategies with low adhering athletes. Less distinction is seen when the relationship is examined for each athletic trainer. In Table 4, which summarizes how each athletic trainer utilizes strategies, we see vastly different climates created without distinctions for adherence level. For instance, flexibility in choosing exercises or taking feedback on exercises was used more by Athletic Trainer “A” and “B” than the other two athletic trainers. The in-depth interviews revealed nuance in the implementation by athletic trainers in the emergent themes.

What is the cause for this disparity among athletic trainers when creating motivational climates? Similar to the findings of Granquist et al. (2014), influences on rehabilitation adherence also may be affecting the creation of motivational climates in rehabilitation. For example, the specifics of a ligament injury prevented Athletic Trainer “C” from using most of the strategies his contemporaries use. Strategies such as involving the athlete with goal setting and being flexible were not possible due to the specific protocol the rehabilitation required. Adjusting the workload, specifically increasing the workload from the athlete’s feedback, also was not possible because of the risk of pulling the graft from the bone and having to start the rehabilitation all over again.

Athletic trainer-athlete rapport also may be a coinciding element in creating facilitative motivational climates. For instance, Athletic Trainers “B” and “C” usually do not group athletes together until they believe that the athletes can work with others

without being a distraction. While grouping athletes may be a strategy that theoretically could provide psychological benefits, its use is limited by practicality. If the athlete is unable to stay focused or draws others' focus away from rehabilitation, it is easier for the athletic trainer to keep them separated.

The dyadic nature of motivational climates also may influence what strategies emerged, as the athletes influenced what strategies were used by athletic trainers. For example, Athletic Trainer "A" discussed how her athletes often hold back from offering suggestions because "they think they are attacking me or something." Athletic Trainer "D" described the rapport she had with her adhering athletes as being able to "click" with them. Mirroring Brewer's (1998) finding that an athlete's self-motivation was the most important variable for adherence, Athletic Trainer "D" found her experience with motivated athletes (such as her adhering cases D1 and D2 in Table 4) as bringing a positive "presence" to the athletic training room and being easier to work with. Her experience with unmotivated athletes made her job harder. She described the athletes as "contributing to their own downward spiral," which she found could affect her impact with other athletes during the day, so she would "pick her battles" and focus more on her adhering athletes.

Case C3 (Table 4) is an example of how previous experiences can carry over and negatively affect the rapport between an athlete and athletic trainer. Athletic Trainer "C" described his experience with C3's diabetes before he was injured, how he believes that the low adherence and the athlete's apparent carelessness with a medical issue carried over into poor adherence to his recovery from ligament surgery. Unlike the success seen by Athletic Trainer "A" with her previously injured athletes, Athletic Trainer "C" could

not ever alter the athletes' rehabilitation because "they were always back to square one" every few weeks. Recovery depended on C3 putting forth the effort to advance. Similar to Athletic Trainer "D" having to "pick her battles," Athletic Trainer "C" began putting his effort towards the other athletes needing attention.

Directly practicing for an evaluation or test was a strategy that was not implemented evenly across athletic trainers. Athletic Trainer "A" was the only trainer to design her return to play around a functional testing protocol, allowing for a baseline measure and subsequent tests to show progress, a strategy that theoretically would be task-oriented and competence supportive. Unlike other strategies discussed in the interviews, this one seemed to be more evident to standard practices of athletic training. While Athletic Trainer "A" said she was not the only one to do it, it is not very common in sport injury rehabilitation.

Overall, the current study suggests a relationship between the strategies used by athletic trainers to structure the rehabilitation process, provide feedback, and evaluate progress and the adherence level of the athletes with whom they have worked. This study may be the first of its kind to explore the possible dynamics of the athletic trainers' strategies that shape a motivational climate, rehabilitation adherence, and the other possible influences that emerge from sport injury rehabilitation.

Limitations

While this study does suggest a pattern emerges with the overall relationship between the strategies used for high adhering and low adhering athletes, there are several methodological issues that should be addressed. While steps were taken to increase the trustworthiness of the data, one important strategy was not implemented in the study: the

use of multiple coders. Merriam and Tisdell (2016) highly recommend the use of multiple coders to increase the creditability of qualitative data analysis, as only one investigator is going to bring in their own subjective experience into the analysis and interpretation, similarly to inter-rater reliability in quantitative research. This limits the trustworthiness of the data. The results may be different if the subjectivity of one coder was controlled for with additional coders examining the data.

The interpretation of retrospective data deservedly requires caution. The data depends on the subjective experience of the participants and their memory. Additionally, many processes in creating a motivational climate, such as how someone provides feedback, may require direct observation to truly capture. The interviews only could ascertain a general sense of the feedback provided, but without any degree of certainty for the whole rehabilitation process. Beyond direct observation, this study was able to gain a sense of the general feedback given, and one case did have an example of other-oriented feedback. With additional data collection, saturation of the types of feedback could emerge.

Additionally, another methodological critique of the current study is the sample size. While qualitative research is focused more on depth and less so on the broad generality of its findings, it will be important for future research to increase the number of participants to ensure the saturation of themes for the qualitative data and to test if the relationship continues to hold true at a level of statistical significance. That being said, the focus of this study was not to find broad, general relationships, but to explore the possibility of the relationship in-depth.

Future Directions

While the generality of the findings are needing additional support in future research, this study does provide a possible avenue in understanding motivational climates in the athletic training room from the perspective of the authority figure, a lacking methodology in the current study of motivational climates. Additionally, while the study does not provide a strong case for generality, it does provide a narrative for other influences on the rehabilitation process. Similar issues found in rehabilitation adherence (Granquist et al., 2014) also are prevalent for issues in creating a motivational climate.

It is recommended that future research improve on the methodology of the current study with multiple coders, increased sample sizes, and how to ascertain certain strategies through other means, such as the feedback given to athletes. With improved methodology, it is recommended that future research also improves the generality of the findings. Future studies should also examine the relationship with the other influences, such as injury specifics that altered the strategies used, athlete characteristics, and outside issues influencing the rehabilitation process. Current trends in research are looking at the use of sport psychology skills in sports medicine such as goal setting, imagery, positive self-talk, etc. (e.g., Zakrajsek, Fisher, Martin, 2017) with possible overlap in this study's focus on motivational climates, as participants in the current study also used goal setting and using exercises similar to sport demands. Subsequent studies should consider exploring this relationship with samples of athletes, measuring the influence of how athletes perceive the athletic trainer or their impressions of sport injury rehabilitation (Clement et al., 2012). Additionally, further research should compare the perceived

motivational climates from the athlete's perspective to the motivational climate that the athletic trainer attempted to create to further research in the current debate of how motivational climates are currently assessed.

Conclusion

The current study found a possible relationship between the motivational climate created by the athletic trainer and the athlete's level of rehabilitation adherence. The difference in the motivational climates were either a climate that used empowering strategies with high-adhering athletes, or a climate that had a lack of empowering strategies for low-adhering athletes rather than a climate utilizing disempowering strategies. This may suggest that athletic trainers try to build empowering climates regardless of adherence level, but other influences (outside influences, injury specifics, idiosyncrasies of the athlete) also impact how the motivational climates are created.

References

- Ames, C. (1992). Achievement goals, motivational climate, and motivational processes. In G.C. Roberts (Ed.), *Motivation in sports and exercise* (pp. 161-176). Champaign, IL: Human Kinetics.
- Brewer, B. (1998). Adherence to sport injury rehabilitation programs. *Journal of Applied Sport Psychology, 10*(1), 70-82.
- Brewer, B. (2001). Psychology of sport injury rehabilitation. In Singer, R.N., Hausenblas, H.A., & Janelle, C.M. (Eds.), *Handbook of sport psychology* (2nd ed., pp.787-809). New York: John Wiley & Sons.
- Brewer, B. (2007). Psychology of sport injury. In Tenebaum, G., & Eklund, R.C. (Eds.), *Handbook of sport psychology* (3rd ed., pp. 404-424). New Jersey: John Wiley & Sons, Inc.
- Brinkman, R.E., & Weiss, W.M. (2010). The motivational climate in the rehabilitation setting. *Athletic Therapy Today, 15*(2), 44-46.
- Brinkman-Majewski, R.E., & Weiss, W.M. (2015). Examination of the motivational climate in the athletic training room. *Journal of Sport Behavior, 38*, 143-160.
- Byerly, P.N., Worrell, T., Gahimer, J., & Domholdt, E. (1994). Rehabilitation compliance in an athletic training environment. *Journal of Athletic Training, 29*(4), 352-355.
- Calvert, R., & Clarke, K. (1979). Injuries and collegiate athletics: Taking their measure. *Educational Record, 60*, 444-446.
- Clement, D., Granquist, M.D., & Arvinen-Barrow, M.M. (2013). Psychosocial aspects of athletic injuries as perceived by athletic trainers. *Journal of Athletic Training, 48*(4), 512-521.

- Clement, D., Hamson-Utley, J., Arvinen-Barrow, M., Kamphoff, C., Zakrajsek, R., & Martin, S. (2012). College athletes' expectations about injury rehabilitation with an athletic trainer. *International Journal of Athletic Therapy and Training, 14*(4), 18-27.
- Creswell, J.W., & Plano Clark, V.L. (2011). *Designing and conducting mixed methods Research*. (2nd edition). California: SAGE Publications.
- Datalys Center for Sports Injury Research and Prevention. (2014). [Fact sheets highlighting injury data from 2004/2005-2008/2009 seasons]. *NCAA sport injury fact sheets*. Retrieved from <http://www.datalyscenter.org/fact-sheets/>.
- deCharms, R. (1968). *Personal causation: The internal affective determinants of behavior*. New York: Academic Press.
- Duda, J.L. (1989). Relationship between task and ego orientation and the perceived purpose of sport among high school athletes. *Journal of Sport & Exercise Psychology, 11*, 318- 335.
- Duda, J. L., Papaioannou, A. G., Appleton, P. R., Quested, E., & Krommidas, C. (2014). Creating adaptive motivational climates in sport and physical education. In Papaioannou, A.G. & Hackfort, D. (Eds.) *Routledge companion to sport and exercise psychology: Global perspectives and fundamental concepts* (pp.544-558). New York: Routledge.
- Duda, J.L. (2013). The conceptual and empirical foundations Empowering CoachingTM: Setting the stage for the PAPA project. *International Journal of Sport and Exercise Psychology, 11*(4), 311-318.

Fisher, A.C., & Hoisington, L.L. (1993). Injured athletes' attitudes and judgements toward rehabilitation adherence. *Journal of Athletic Training, 28*(1), 48-53.

Granquist, M.D., Gill, D.L., and Appaneal, R.N. (2010). Development of a measure of rehabilitation adherence for athletic training. *Journal of Sport Rehabilitation, 19*, 249-267.

Granquist, M.D., Podlog, L., Engel, J.R., and Newland, A. (2014). Certified athletic trainers' perspectives on rehabilitation adherence in collegiate athletic training settings. *Journal of Sport Rehabilitation, 23*, 123-133.

Keegan, R., Harwood, C., Spray, C., & Lavallee, D. (2010). From 'motivational climate' to 'motivational atmosphere': A review of research examining the social and environmental influences on athlete motivation in sport. In Geranto (Ed.), *Sport psychology* (pp. 1-55). New York: Nova Science.

Markland, D. (1999). Self-determination moderates the effects of perceived competence on intrinsic motivation in an exercise setting. *Journal of Sport and Exercise, 21*, 351-361.

Merriam, S.B., & Tisdell, E.J. (2016). *Qualitative research: A guide to design and implementation* (5th ed., pp.249). San Francisco, CA: Jossey-Bass.

Moran, A.P, Matthews, J.J., & Kirby, K. (2011). Whatever happened to the third paradigm? Exploring mixed methods research designs in sport and exercise psychology, *Qualitative Research in Sport, Exercise and Health, 3*(3), 362-369

Mosewich, A.D., Crocker, P.R.E., & Kowalski, K.C. (2014) Managing injury and other setbacks in sport: experiences of (and resources for) high-performance women athletes. *Qualitative Research in Sport, Exercise and Health, 6*(2), 182-204.

- Newton, M., Duda, J. L., & Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes. *Journal of Sports Sciences, 18*, 275-290.
- Nicholls, J.G. (1984) Achievement motivation: conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*, 328-346.
- Nicholls, J.G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
- Papaioannou, A. (1994). The development of a questionnaire to measure achievement orientations in physical education. *Research Quarterly for Exercise and Sport, 65*, 11-20.
- Parish, L.E. & Treasure, D.C. (2003). Physical activity and situational motivation in physical education: Influence of motivational climate and perceived ability. *Research Quarterly for Exercise and Sport, 74*, 173-182.
- Podlog, L., & Eklund, R.C. (2007). The psychosocial aspects of a return to sport following serious injury: A review of the literature. *Psychology of Sport and Exercise, 8*, 535-566.
- Podlog, L., Dimmock, J., Miller, J. (2010). A review of return to sport outcomes following injury rehabilitation: practitioner strategies for enhancing recovery outcomes. *Physical Therapy in Sport, 1*, 36-42.
- Podlog, L., Lochbaum, M., & Stevens, T. (2010). Need satisfaction, well-being, and perceived return-to-sport outcomes among injured athletes. *Journal of Applied Sport Psychology, 22*, 167-182.

- Reinboth, M. & Duda, J.L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise*, 7, 269-286.
- Roberts, G.C., & Papioannou, A.G. (2014) Achievement motivation in sport settings. In Papaioannou, A.G. & Hackfort, D. (Eds.) *Routledge companion to sport and exercise psychology: Global perspectives and fundamental concepts* (pp.49-66). New York: Routledge.
- Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.
- Ryan, R. M., & Deci, E. L. (2002). An overview of self-determination theory: An organismic-dialectic perspective. In E. L. Deci, & R. Ryan (Eds.), *Handbook of self-determination* (pp. 3–37). Rochester, NY: University of Rochester Press
- Seifriz, J.J., Duda, J.L., & Chi, L. (1992). The relationship of perceived motivational climate to intrinsic motivation and beliefs about success in basketball. *Journal of Sport and Exercise Psychology*, 14, 375-391.
- Vallerand, R.J., & Reid, G. (1998). On the relative effects of positive and negative verbal feedback on males' and females' intrinsic motivation. *Canadian Journal of Behavioral Science*, 20(3), 239-250.
- Way, A., Jones, M.V., & Slater, M.J. (2012) Exploring training adherence in elite school-age athletes. *Qualitative Research in Sport, Exercise and Health*, 4(1), 154-171.
- Weise, D.M., Weiss, M.R., & Yukelson, D.P. (1991). Sport psychology in the training room: A survey of athletic trainers. *The Sport Psychologist*, 5, 15-24.

- Yang, J., Peek-Asa, C., Lowe, J.B., Heiden, E., & Foster, D.T. (2010). Social support patterns of collegiate athletes before and after injury. *Journal of Athletic Training*, 45(4), 372-379.
- Yang, J., Schaefer, J.T., Zhang, N., Covassin, T., Ding, K., & Heiden, E. (2014). Social support from the athletic trainer and symptoms of depression and anxiety at return to play. *Journal of Athletic Training*, 49(6), 773-779.
- Zakrajsek, R.A., Fisher, L.A., & Martin, S.B. (2017). Certified athletic trainers' understanding and use of sport psychology in their practice. *Journal of Applied Sport Psychology*, 29(2), 215-233.

Appendix A

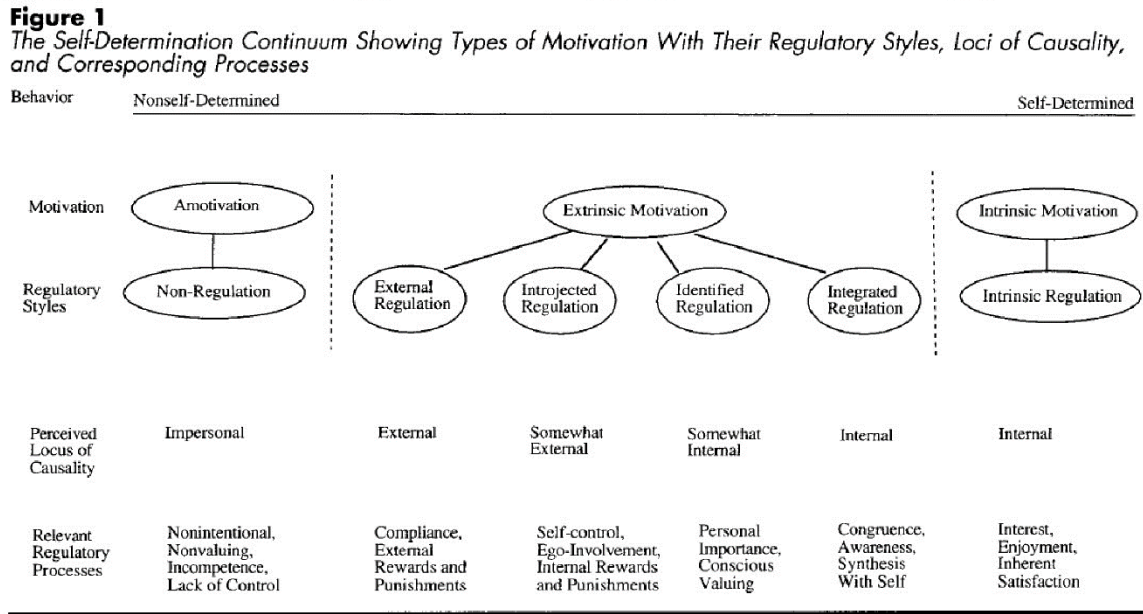


Figure 1. The self-determination continuum from Ryan and Deci, 2000.

Appendix B

Rehabilitation Adherence Measure for Athletic Training (RAdMAT)

Granquist, Gill, and Appaneal (2010).

Please think about your experience with the athlete over the past semester and rate the athlete on each item using the scale: 1 = *never*, 2 = *occasionally*, 3 = *often*, 4 = *always*.

	Never	Occasionally	Often	Always
1. Attends scheduled rehabilitation sessions	1	2	3	4
2. Arrives at rehabilitation on time	1	2	3	4
3. Follows the athletic trainer's instructions during rehabilitation sessions	1	2	3	4
4. Follows the prescribed rehabilitation plan	1	2	3	4
5. Completes all tasks assigned by the athletic trainer	1	2	3	4
6. Asks questions about his or her rehabilitation	1	2	3	4
7. Communicates with the athletic trainer if there is a problem with the exercises	1	2	3	4
8. Provides the athletic trainer feedback about the rehabilitation program	1	2	3	4
9. Has a positive attitude during rehabilitation sessions	1	2	3	4
10. Has a positive attitude toward the rehabilitation process	1	2	3	4
11. Gives 100% effort in rehabilitation sessions	1	2	3	4
12. Is self-motivated in rehabilitation sessions	1	2	3	4
13. Is an active participant in the rehabilitation process	1	2	3	4
14. Stays focused while doing rehabilitation exercises	1	2	3	4
15. Is motivated to complete rehabilitation	1	2	3	4
16. Shows interest in the rehabilitation process	1	2	3	4

Appendix C

Interview Guide

Grand Tour: Can you give me an overview of what the rehabilitation process looked like for the injured athlete?

What was it like working with them?

When was the rehabilitation process taking place (off-season/in-season)?

How did you try improving non-compliance?

How did you structure the rehabilitation process for the injured athlete?

Probes

- How were the exercises for the rehabilitation session chosen?
- How did you plan the workload for the rehabilitation sessions?
- What types of challenges did you present the athlete with?
- Did you have the athlete work alone or together with other athletes through the rehabilitation exercises?
 - What considerations led to this decision?
- How was the amount of time and effort required for the athlete to complete the rehabilitation exercises determined?

How did you evaluate progress in rehabilitation for this injured athlete?

Probes

- What standards did you use to assess the amount and type of progress being made by the athlete in rehabilitation?
- What types of goals were set for rehabilitation?
- Who was primarily responsible for setting goals for rehabilitation?
 - Who else was involved in setting goals for rehabilitation?
- During times in which the athlete failed to make progress during rehabilitation, what conclusions did you make about his/her low performance?

How did you provide feedback to this athlete related to his/her injury rehabilitation?

Probes

- How did you communicate the athlete's progress/lack of progress in rehabilitation to him/her?
- What, if any, feedback did you provide the athlete regarding his/her ability related to the rehabilitation exercises?
- What, if any, feedback did you provide the athlete regarding his/her effort related to the rehabilitation exercises?

Are there any other questions you thought I should have asked you?

Appendix D

Data Analysis Flow Chart

