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Athlete Coping: Personality Dimensions of Recovery from Injury

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Abstract

Athletic injury is a devastating and common occurrence that can happen in any sport. Injured athletes often require resources and treatment to be able to return to the field of play. Athletes become more involved with physical and mental treatment as the length of recovery time increases. Recent research suggests that there may be personality traits that directly correlate to athletic injury. The current study investigated the potential relationship between personality traits and recovery time; more specifically, the personality traits of locus of control, hardiness, social support, competitive trait anxiety and the "Big 5" personality traits. Results indicated that athletes with a higher internal locus of control tend to report being physically ready to return to play and "ready" to return to play faster than those with an external locus of control. Additionally, Openness to Experience (among the Big 5 personality dimensions) was also related to speed of return to play.

Keywords: athlete, injury, personality, readiness to play, recovery

Introduction

As participation in organized sports increases, so does the risk of sustaining an athletic injury. These unfortunate injuries result in missed time from practice and inevitably, the field of competition. Recovery time plays a pivotal role in the overall rehabilitation of the athlete. With time and rehabilitation, an athlete's physical injury can be properly treated. However, there seem to be few measures assessing psychological recovery from injury. Although an athlete has been cleared to return to play, there may still be lingering doubt in their injury. Overall, there is a vast difference between physically cleared and psychologically ready to return to play. Certain personality traits might serve as predictors of an individual's rate of psychological recovery from an injury.

The purpose of this research study is to explore the correlations between athletes' personality and their recovery from an athletic injury, specifically, examining how locus of control has been utilized through other studies and can be beneficial to the current study. Additionally, this section will examine the link between hardiness and coping strategies. In the current study, mental toughness is being tested but it is important to determine the link in these two concepts. Hardiness and coping strategies are closely related and can play a major role in an athlete's mental toughness. It is important to examine competitive trait anxiety to illustrate perceived anxiety during athletic competition. The Big 5 and Social Support will also be examined in conjunction with recovery from athletic injury.

Locus of Control

An aspect of personality that needs to be addressed is an individual's locus of control (LOC). Though Julian Rotter first proposed the concept of Locus of Control in 1954 and presented a method for measuring it in 1966, little research on the construct has been done outside the realms of academia or the workplace (Lefcourt,

2014). Therefore, literature on locus of control cannot be directly applied to the current study but rather use the concepts as a basis.

According to Ng, Sorensen, and Eby (2006), LOC can be differentiated by two separate categories. Individuals with an internal LOC believe that they are in control of their own destiny. As a result, these individuals tend to be more confident and assertive in their abilities. In contrast, those with an external LOC believe that they are not in direct control of their fate. Therefore, externals attribute the outcomes of events to an outside force or luck.

LOC is a popular psychological construct that has been extensively measured in relation to academic achievement (Hattie, 1992; Ross & Broh, 2000; Skaalvik & Hagtvet, 1990; Wang et al., 1999). This is relevant to the current research study because academic achievement is imperative for the success of a student athlete, injured or not. Overall, the findings of Pradesh (2014) indicate that individuals with a high internal LOC often strive to maintain control of their environment; Therefore, these individuals are assumed to be better at learning and performing skills associated with rehabilitation protocol. Recent research focused on the connection between LOC and online learning suggests that individuals with a high internal LOC are more likely to succeed in an online learning environment because they tend to be more engaged and motivated in the classroom (Cascio et al., 2013). The more perceived control an individual feels in their environment, the more increased likelihood of a positive response. Individuals with an external LOC tend to be less motivated and lack persistence in academic settings because they feel their ability to succeed is beyond their control (Rotter, 1954).

The study by Ng, Sorensen, and Eby (2006), investigated LOC in the workplace. They categorized LOC into three outcome categories. These included LOC and well-being, LOC and motivation, and LOC and behavioral orientation. LOC and well-being is derived from the external beliefs in the environment. LOC and motivation explain an individual's response to the environment. The more perceived control an individual feels in their environment, the increased likelihood of a positive response. LOC and behavioral orientation examine the social situations an individual is likely to engage in. Individuals will seek a situation that has greater perceived control. Also, this explains how an individual is likely to behave in the workplace. The results of the study indicated that internal LOC was positively associated with work, given tasks, and social experiences. Overall, individuals that perceived greater control in the workplace, received greater satisfaction from their work than individuals with an external belief.

In a related study, Ajzen (2002) examines LOC in conjunction with perceived behavioral control, self-efficacy, and the theory of planned behavior. Overall, these theories relate to an individual's perception of control, specifically, how they respond to any environmental situation. In contrast to previous beliefs, Ajzen (2002) speculated that the perceived control of an outcome is independent of the internal or external LOC. "For instance, fear of flying is an internal factor, but people may nevertheless feel that they have little control over it" (Ajzen, 2002, p. 676).

Overall, LOC is an underlying personality trait that may be associated with recovery from athletic injury. To establish the possible relevance of LOC for understanding injury recovery, this study will survey collegiate athletes that have suffered an athletic injury. This will serve to determine the amount of perceived control an individual feels toward their injury and recovery time. Depending on the injury, rehabilitation can be a long and grueling process. The amount of control the athlete feels in their rehabilitation may directly correlate to the time until they return to the field of play. LOC may be a major personality factor indicative of psychological readiness to play.

Hardiness

When examining an athletes' time in rehabilitation, it is necessary to measure their hardiness. In general, it may be useful to determine the athletes' hardiness before an injury and hardiness through the sports injury process. According to Kobasa (1979), hardiness can be characterized in individuals who experience adversity without experiencing any negative health related side effects. Hardiness is divided into three subcategories. These include commitment, control, and challenge. Overall, individuals high in hardiness are deeply committed to the activities in their lives, they are also in control of most situations, and they are not threatened by change (Kobasa, 1982). In fact, these individuals are highly excited by the challenge of change.

In a study by Wadey, Evans, Hanton, and Neil (2012), researchers examined hardiness as a predictor of

athletic injury and the direct effects of athletes' response to injury. Participants in the study were recruited from 8 team sports and 18 individual sports. Their competitive level ranged from recreational to international.

Although the level of competition varied, most participants averaged three years in the same sport. Experience may be a factor that needs to be more thoroughly examined. Individuals that have participated in the same sport for an extended amount of time may be more likely to be resilient in the sport. It may be valuable to keep in mind the amount of time spent in each sport. Perhaps the more experience playing leads to an increase in the individual's hardiness.

Measures of the study included hardiness, major life events, coping strategies, and psychological responses. The Dispositional Resilience Scale (DRS) was used to examine hardiness and all three of its subcomponents. To examine major life events, the Life Events Survey for Collegiate Athletes (LESCA) was used pre-injury to examine major life events. This also measured the athletes' perceived impact of the event. The Coping Orientation Problems Experienced (COPE) was given to participants post injury. The purpose of this was to assess coping strategies related to injury over a desired period. This included problem-focused coping, emotion-focused coping, and avoidance coping. Lastly, the Psychological Responses to Sport Injury Inventory (PRSII) was used to measure post injury psychological responses.

Overall, the results of the study indicated a correlation between life events and injury. Negative life events indicated susceptibility to athletic injury. As these negative life events increased, the probability of an injury also increased. Regarding hardiness, researchers indicated that athletes high in hardiness are less likely to sustain an injury. Interestingly, post-injury data analysis indicated that athletes high in hardiness that sustain an injury can enable their psychological recovery. In contrast, athletes low in hardiness encountered more difficulties recovering from injury. Hardiness also has a significant impact on coping abilities. Athletes high in hardiness were more likely to use problem-focused coping. The effect of this coping increased feelings of recognition throughout the athlete's recovery. Researchers found it was vital for athletes to recognize the severity of their injury from the beginning. Their recognition of their injury positively correlated with faster recovery and rehabilitation time. This increased their confidence and mental strength. In general, an individual's hardiness can determine their response to an adverse situation. Athletes that report high levels of hardiness are more likely to transform negative life events to experiences of growth and success (Wadey, 2012).

In conjunction with hardiness, toughness is an important personality trait to identify among athletes. A study conducted by Petrie, Deiters, and Harmison (2013), examined the effects of social support, athletic identity, and mental toughness on injury outcome of Division I football players. It is important to state that this study only examined males playing football. Therefore, these personality constructs may vary based on gender. Researchers defined mental toughness as the collection of attitudes and emotions that impact how athletes assess and manage negative and positive situations to reach their goals (Petrie et al., 2013). Along with toughness, social support affects the resilience of athletes. In general, individuals with more social support are healthier than individuals with low social support. These individuals show an increase in both physical and psychological health. Also, individuals with more social support report fewer injuries through their athletic career (Petrie at al., 2013). Participants in the study were Division I collegiate football players from a southern school. Athletes were given questionnaires at the beginning of the season that contained instruments that measured life stress, social support, athletic identity, mental toughness, and athletic injury. In addition to the initial questionnaire, injury data were collected throughout the season.

The results of the study indicated that high positive life stress is correlated to time missed. High social support reduced the number of missed practice days from over 35 to under 10. According to Petrie, Deiters, and Harmison (2013), researchers suggested that social support from family is more effective than support from peers or significant others. Although there was not a significant direct effect between the two, mental toughness did moderate positive life stress. Overall, the research suggests that mental toughness may assist athletes through an injury recovery. Athletes with higher mental toughness may possess dispositional characteristics that aid recovery. These include optimism, hardiness, and positive affectivity. Over time, these characteristics allow athletes to appraise obstacles as events that can be overcome.

Big-Five Personality

The current research study uses the big five to determine students personality types by determining their level(s) of: Openness to Experiences – seeking new experience, Conscientiousness – honest and hard-working, Neuroticism – emotional, Extroversion – social and out-going, and Agreeableness – polite and submissive. Coaches and educational professionals must be able to effectively support diverse groups of learners, regardless of their personality traits or online self-efficacy level. In order to better support student athletes enrolled in online coursework, it is recommended for educational professionals and administrators to explore psychological characteristics associated with these online learners (Chiung-Sui et al., 2014). Therefore, it is necessary to investigate differences in personality traits (or types) that are associated with academic achievement and likelihood of sustaining athletic injury.

Due to the massive amount of growth in online course offerings to student athletes, there is an increased interest in drawing a connection between personality types that are suitable for success in an online learning environment (Abe, 2020). The main purpose of this article (Abe, 2020) was to address how academic performance can be predicted by certain personality traits within the big five. The results found by Abe (2020) suggests that Conscientiousness and Openness to Experience are associated with success in both traditional (face-to-face) and online learning environments. Furthermore, results of prior research (Abe, 2020) also suggests that Agreeableness, Neuroticism and Extroversion show weak associations with online learning success. Therefore, the current study supports these findings as it anticipates for Conscientiousness and Openness to Experience to be more strongly associated with success, both in the classroom and recovering from athletic injury.

Coping Strategies

In addition to locus of control and hardiness, it is essential to explore an athlete's ability to cope. Under stress, some individuals perform poorly, whereas others can remain resilient (Bolger, 1990). As competitive sports increase in difficulty, the likelihood of injury also rises. Therefore, it is reasonable to expect an injury throughout an athlete's career. Without the proper ability to cope with injury, the return to play can be difficult.

In a study conducted by Dias, Cruz, and Fonseca (2012), researchers examined the relationship between competitive trait anxiety, cognitive threat appraisal, and coping styles. As part of the study, coping was divided into three categories: problem-focused, emotion-focused, and avoidance coping. Problem-focused coping refers to cognitive and behavioral efforts aimed at solving the stressful relationship between the individual and environment. Emotion-focused coping aims to regulate the response to a form of distress. The goal of emotion focused coping is to regulate the emotional response to a problem or lessen the emotional distress. Typically, avoidance coping is considered a form of emotion-focused coping. Participants in the study consisted of 550 athletes over 13 sports (some individual and some team sports). Athletes were given several questionnaires to assess levels of coping. The scales included the Sport Anxiety Scale, COPE, and the Cognitive Appraisal Scale in Sport Competition-Threat Perception. Results of the study indicated that threat appraisal and anxiety play an important role with coping. In general, athletes with higher levels of worry were more likely to completely disengage from the behavior. Also, athletes with higher concentrations of problems were more apt to vent their problems and engage in self-distraction. Overall, these methods of coping supported the link between cognitive anxiety and poor performance.

In a similar study, researchers examined psychological risk factors as predictors of injury (Ivarsson & Johnson, 2010). The purpose of the study was to examine the relationship between personality factors, coping variables and stress and injury risk. Participants in the study consisted of 48 soccer players from three different teams. Measurements of the study included the Football Worry Scale, Swedish universities Scales of Personality (SSP), Life Events Survey for Collegiate Athletes (LESCA), Daily Hassles Scale, and Brief COPE. Participants were instructed to complete four out of the five measures at the beginning of the season. Also, the athletes were required to complete the Daily Hassles Scale once a week during the season. Once a player was injured, they were excluded from the weekly test during their rehabilitation. Overall, the results of the study indicated that anxiety, stress susceptibility (coping), and trait irritability were significant predictors of injury. However, these strategies can be considered maladaptive if used to avoid the stressor. They are also considered maladaptive if the individual

is not willing to invest any effort to overcome the adverse stressor. Self-blame and acceptance can be used to explain many injury occurrences.

Overall, coping is an integral aspect of the rehabilitation process. If an athlete does not utilize the proper coping techniques, the rehabilitation will not be successful. In many instances, positive coping techniques produce a faster recovery. In conjunction with locus of control and hardiness, these personality traits develop a framework for rehabilitation. The perceived control of recovery correlates with the athletes' effort in rehabilitation.

Competitive Trait Anxiety

In addition to other personality factors, Competitive trait anxiety is the tendency or predisposition to perceive competition as threatening. Overall, it is the difference between what an athlete perceives is required for success and his or her response capability. In a study conducted by Eisenbarth and Petlichkoff (2012), researchers studied the correlation between defined successes and the tendency to perceive an event as threatening. Participants in the study were 200 college athletes who came from three sports classifications: intercollegiate, intramural, and recreational. Participants were given two questionnaires as part of the survey. The first questionnaire assessed goal orientations and the second questionnaire assessed competitive trait anxiety. Competitive trait anxiety was measured through the Sports Anxiety Scale (SAS). The purpose of this scale is to measure an individual's disposition to perceive competition as threatening. Overall, the results of the study indicated that goal orientation rather than ego was more significant in predicting anxiety. However, there was not a clear goal-oriented profile to determine competitive trait anxiety.

Social Support

Social Support represents the perception and actuality that one is cared for, assisted by other people, and belongs to part of a supportive social network. Social support is an important personality trait to identify among athletes. A study conducted by Petrie, Deiters, and Harmison (2013), examined the effects of social support, athletic identity, and mental toughness on injury outcome of Division 1 NCAA football players. Results from this study may not be generalizable considering that the data pool is limited to male football players. Social support affects the resilience of athletes and athletes high in social support are physically and psychologically healthier than individuals with low social support. Individuals with more social support report fewer injuries and miss less practice throughout their athletic career (Petrie et. al, 2013). Parallel with the current study, this research suggests that social support from particular people in an athlete's life may predict an athlete's ability to cope and recover successfully.

Methods

The current study assessed the relationship between athletes' personality and their recovery from injury. To thoroughly assess targeted personality traits, college athletes were assessed on their hardiness, locus of control, competitive trait anxiety, the Big 5 personality test and their social support. Participants were tested at the beginning of the Spring semester. Participants consisted of athletes recruited from all NCAA Division I Intercollegiate athletic teams at Texas State University. Volunteers were 18 years of age or older and participated in a scholarship-based sport. Individuals that were involved in intramural or recreational sporting leagues were excluded from the study. Fifty participants were sought for inclusion in the research study. Due to the numerous sports and athletes on campus, a wide range of participants enrolled in the study.

Participants

Participants were recruited from an athletic study hall announcement. Recruitment was conducted on a voluntary basis. Individuals who were interested were informed about the study, including the procedures to be used and the variables that were being measured. If they agreed to participate, informed consent was then administered to them. Additionally, two paper copies of the consent form were made: one for the participant and the other was kept in a locked file cabinet in a locked research lab with only access granted to the researchers.

Research Instruments

Participants that have sustained an injury were assessed on their Big 5 personality traits, social support,

hardiness, locus of control, and competitive trait anxiety. In addition to the questionnaires assessing the Big 5 personality traits, social support, hardiness, locus of control, and competitive trait anxiety,

Participants were given a survey to collect demographic sport-related information. Primarily, the purpose of collecting demographic information was to determine the athletes' sport and the years of experience in the sport. Additional information included type and severity of injury, the amount of rehabilitation required before returning to play, and athlete perception of readiness to return to play. Although some information was not directly related to personality, it served as a basis of sport and location of injury.

To assess hardiness, participants were given the Sports Mental Toughness Questionnaire (SMTQ; See Appendix A; Sheard, Golby, van Wersch, 2009). This 14-item questionnaire assesses mental toughness as a personality factor on three dimensions: confidence, constancy, and control. Each item was scored on a four-point Likert Scale. The four-point Likert Scale was anchored by "not at all true" and "very true". However, there is no cut off in scoring the scale. In accordance with the questionnaire, confidence is the belief in one's ability to achieve goals and be better than your opponent. Constancy is the determination, personal responsibility, and unyielding attitude of the participant. Lastly, control is the belief one is personally influential, can bring about desired outcomes, and regulate emotions. Sheard, Golby, & van Wersch (2009), took steps to validate this scale while examining mental toughness in athletes. Researchers determined the SMTQ possessed satisfactory psychometric properties, adequate reliability, divergent validity, and discriminative power.

To assess locus of control, participants were given an eight-item scale to determine their perception of control (See Parada; 2006). The scale measured the degree that participants feel in control of their own lives. Locus of control served as a useful tool in measuring the athletes' perception of events in their lives outside of athletics. The scale was scored on a six-point Likert Scale. The scale was anchored by "completely disagree" and "agree". Overall, the average Cronbach's score for the scale was .71-.85. Researchers validated this scale through a bullying and victimization study in adolescent students (Marsh, Nagengast, Morin, Parada, Craven, & Hamilton, 2011).

To measure competitive trait anxiety, participants were given the Three- Dimensional Performance Anxiety Inventory (See Appendix C; Cheng, Hardy, & Markland; 2009). The three dimensions of performance anxiety were cognitive, physiological, and regulatory function. Cognitive anxiety is reproduced by worry and self-focus. The physiological effects were reflected by hyperactivity and somatic tension. Lastly, the regulatory function dimension was reflected by perceived control. Survey items were measured on a five-point Likert Scale. The scale was anchored by "totally disagree" and "totally agree". Wen-Nuan Kara, Hardy, & Woodman (2011), validated the questionnaire through work with students in a martial arts course.

To analyze the Big 5 personality test, we replicated a test used from the International Personality item pool, developed by Goldberg (1992) The self-report questionnaire is comprised of 50-items that were scored using a five-point Likert scale ranging from "disagree" to "agree". Scoring the items illustrated which of the five personality traits best describes you. The five personality traits are: (1) Extroversion- seek fulfillment from sources outside the self or community, (2) Agreeableness- individuals adjust their behavior to suit others, (3) Conscientiousness- personality trait of being honest and hardworking, (4) Neuroticism- personality trait of being emotional, and (5) Openness to experience- seeking new experience and intellectual pursuits (e.g,, Lim, 2020). Each trait was compared to recovery time.

Social support was assessed by administering a 27-item Social Support Questionnaire that was scored on a six-point Likert Scale. This SSQ was replicated from a study developed by Heitzmann and Kaplan (1988). Participants were asked to report how many people support them in a particular area, their relation to the supporter, and their level of satisfaction with that support. This allowed us to score our results in three dimensions: the number of people supporting you, your level of satisfaction, and the number of family members supporting the athlete. By using a test that allowed for scores to be categorized, it was possible to analyze how different aspects of social support contribute to the prediction of recovery time.

Multiple regression and correlation testing were conducted to examine the significance of the data via software SPSS (Statistical Package for Social Sciences). These tests were executed to examine hardiness, locus of control, performance anxiety, social support, and the Big 5 personality traits. These five personality factors were used as Independent Variables and the dependent variable was the athlete's perceived readiness to play. To determine the significance of personality and injury, a second test examined if personality traits could predict

injury among the participants.

The independent variables stayed the same (mental toughness, locus of control, performance anxiety, Big 5 personalities, social support) and the dependent variable was injury during athletic participation. Athletes that gave consent to participate in the research study completed the questionnaires with pencil and paper.

Procedure

Due to participant unwillingness to take the time in study hall to complete all the surveys, the current study limited the participant questionnaire to include three surveys. These include a demographic questionnaire, a scale to determine the individuals Locus of Control, and a Big 5 Personality Test. The following tests were excluded from the questionnaire administered in this research study due to time constraint of both the researchers and the athletes: the Sports Mental Toughness Questionnaire (SMTQ) to measure hardiness, a Three-Dimensional Performance Anxiety Inventory, and also a Social Support Questionnaire. Excluding personality characteristics (mental toughness, social support, and competitive trait anxiety) shortened the survey from 141 questions to only 77, allowing athletes to have time to complete the survey.

Results

Statistical Analysis

A total of 54 (32 males, 22 females) scholarship athletes completed the questionnaire before the data was transferred to SPSS (Statistical Package for the Social Science) software for evaluation. To get a general idea of the athletes involved in this study, the descriptive statistics of the sample were broken down into age, classification, and sport. The athletes in this demographic sample ranged from ages 18-23, consisting of 25 freshmen, 10 sophomores, 8 juniors, and 11 seniors. The athletes measured participated in eight different sports consisting of basketball (n=14), baseball (n=4), football (n=10), track & field (n=13), soccer (n=2), volleyball (n=5), golf (n=2), and softball (n=4). The following tables show the injury recovery period for the athletes and the athletes views of how "ready" to return to play they felt once medically cleared.

how long until you were cleared to return to team activities?

		Frequency	*Percent*	*Valid Percent*	*Cumulative Percent*
Valid	no time missed	**17**	**31.5**	**31.5**	**31.5**
	1-8 weeks	**20**	**37.0**	**37.0**	**68.5**
	9-16 weeks	**4**	**7.4**	**7.4**	**75.9**
	17-24 weeks	**6**	**11.1**	**11.1**	**87.0**
	24 weeks or more	**7**	**13.0**	**13.0**	**100.0**
	Total	**54**	**100.0**	**100.0**	

once cleared, did you feel ready to return to play?

		Frequency	*Percent*	*Valid Percent*	*Cumulative Percent*
Valid	0	**1**	**1.9**	**1.9**	**1.9**
	yes	**24**	**44.4**	**44.4**	**46.3**
	no	**29**	**53.7**	**53.7**	**100.0**
	Total	**54**	**100.0**	**100.0**	

A deeper look into the descriptive statistics indicated that in this study 29 of the 37 athletes who sustained an injury did not feel ready to return to all team activities once they were cleared to play. Only 7 athletes in this study felt ready to return to play once they were cleared or deemed healthy from a prior injury. It

is interesting to note that 37 of the 54 athletes in this study had sustained an injury but only 7 of them felt mentally ready to return once they were deemed to be physically healthy and recovered.

It is important to keep in mind that this study addressed only the mental aspects involved with predicting recovery time, not any physical aspects pertaining to recovery.

A multiple regression test was run through SPSS software to examine the significance of the data. In this regression, the dependent variable was "Return to Play", a variable which was computed by measuring a combination of how long it took each athlete to be cleared from an injury along with whether they felt ready to return to play. The independent variable or predicting factors in this regression represented the scores of the athletes' on both the Locus of Control test and the Big 5 Personality test. Locus of Control Scores were individually combined and represented by one variable and the Big 5 Personality test scores were computed into the five different variables that represent each of the five different personality traits: a) Extroversion b) Agreeableness c) Conscientiousness d) Neuroticism and e) Openness to Experience.

ANOVA

Model		*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
1	Regression	**27.961**	**6**	**4.660**	**2.451**	**.038**[b]
	Residual	**89.373**	**47**	**1.902**		
	Total	**117.333**	**53**			

a. Dependent Variable: Ready to Return

Coefficients[a]

Model		*Unstandardized Coefficients*		*Standardized Coefficients*			*Correlations*			*Collinearity Statistics*	
		B	*Std. Error*	*Beta*	*t*	*Sig.*	*Zero-order*	*Partial*	*Part*	*Tolerance*	*VIF*
1	(Constant)	**2.418**	**1.639**		**1.475**	**.147**					
	Locus of Control Score	**-.106**	**.042**	**-.352**	**-2.530**	**.015**	**-.235**	**-.346**	**-.322**	**.836**	**1.196**
	Extroversion	**-.022**	**.038**	**-.095**	**-.582**	**.563**	**.177**	**-.085**	**-.074**	**.607**	**1.647**
	Agreeableness	**.046**	**.035**	**.202**	**1.315**	**.195**	**.172**	**.188**	**.167**	**.687**	**1.455**
	Conscientiousness	**.010**	**.058**	**.025**	**.164**	**.870**	**.183**	**.024**	**.021**	**.705**	**1.419**
	Neuroticism	**.006**	**.030**	**.025**	**.188**	**.852**	**.184**	**.027**	**.024**	**.886**	**1.129**
	Openness to Experience	**.110**	**.046**	**.373**	**2.391**	**.021**	**.344**	**.329**	**.304**	**.667**	**1.498**

a. Dependent Variable: Ready to Return

It appears that of the six predictors, two seemed to relate significantly to Return to Play. The regression analysis supported the hypothesis as it illustrates that there was a significant negative correlation between Locus of Control and Return to Play. The Locus of Control test was scored so that a higher number means more

external and lower score means more internal- as the score goes down (more internal), it is related to an increase in Return to Play.

Openness to Experience also proved to be a significant predicting variable in conjunction with return to play. Openness to Experience and Return to play illustrated to have a positive relationship; the higher score on open experience, the faster the athlete will return to play. The regression and ANOVA confirmed the same patterns and showed for the relationship to be significant.

Correlations

	how long until you were cleared to return to team activites	*once cleared, did you feel ready to return to play*	*Locus of Control Score*	*Extroversion*	*Agreeableness*	*Conscientiousness*	*Neuroticism*	*Openness to Experience*
how long until you were cleared to return to team activites	**1**							
once cleared, did you feel ready to return to play	**.016**	**1**						
Locus of Control Score	**-.198***	**-.144**	**1**					
Extroversion	**.170**	**.054**	**.024**	**1**				
Agreeableness	**.224**	**-.096**	**.302**	**.433**	**1**			
Conscientiousness	**.121**	**.196**	**.075**	**.468**	**.390**	**1**		
Neuroticism	**.164**	**.087**	**-.142**	**.108**	**.082**	**.152**	**1**	
Openness to Experience	**.291**	**.206**	**.161**	**.480**	**.285**	**.394**	**.264**	**1**

*=p<.05

To compare the correlations between the major variables of this study, a correlation matrix was run in SPSS. In this analysis, the two variables that make up the "Return to Play" were separated so their impact could be tested separately. The two variables that made up the "Return to Play" variable were: 1) how long until you were cleared to return to team activities, and 2) once cleared, did you feel ready to return to play? These variables were used in a regression analysis with each of the same predicting factors (Locus of Control, Extroversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience). It provided greater support for the previous findings illustrated in this study- Locus of Control (p=.028) and Openness to Experience (p=.056) proved to be not only significant, but also the most important personality traits that served as predictors of recovery time. None of the personality factors measured in this study provided a significant relationship in predicting if any of the athletes felt ready to return to play once they were cleared. Openness of Experience proved to be significant (p=2.91) in correlation with how long it took for an athlete to be cleared to return to team activities. The lack of significance in any correlation regarding the "once cleared, did you feel ready to return to play" variable provided illustration of this variables lack strength. How long it took an athlete to be cleared exhibited to have a much stronger impact than whether they felt ready to return to competition; therefore, combining the two variables actually served as a limitation in this study.

Discussion

The current study focuses on identifying a link between personality traits and response to athletic injury. This study hypothesizes that recovery time from athletic injury can be predicted by testing certain personality traits, such as, the locus of control and the Big 5 personality test. This research study predicts for the locus of control to be a major personality factor indicative of psychological readiness to return to play and this prediction is upheld by the data that represents a significant negative correlation between locus of control scores and readiness to return to play. Individuals with an internal locus of control believe they are in control of their own destiny and this research study shows that this "internal" way of thinking significantly effects an athletes' ability to return to play. The significant negative correlation results corresponded directly with the hypothesis, athletes with

a low score (more internal) on the locus of control test are related to an increase in the athletes' ability to return to play.

Individuals with an internal locus of control also tend to be more open to experience; this is interesting because there is also a significant relationship between the athletes' openness to experience and their ability to return to play. Openness to experience represents a personality trait of seeking new experience and intellectual pursuits. Athletes who score high on the openness to experience sector of the Big 5 personality appear to daydream more while low scorers are better described as being more down to earth. The significant data in this research study illustrates a significant positive relationship, the higher the score on openness to experience the faster the athlete will return to play. No other personality traits of the Big 5 (extroversion, conscientiousness, agreeableness, neuroticism) have a major effect on an athletes' ability to recover from injury and return to play.

Considering much of our literature and sample is related to academia, it is important to discuss how external factors, such as academic success, can affect a student athletes ability to recover from an athletic injury. Recent research suggests that there may be personality traits that directly correlate to academic success, especially in an online learning environment (Zhonggen, 2021). For example, it does not matter how fast a student athlete is able to recover if they are unable to succeed in the classroom because they will be deemed ineligible. Therefore, personality traits that play a role in academic success can be directly related to our target sample of D1 NCAA athletes.

As mentioned in the results section, combining the two variables served to be a limitation in this study. Variable 1 (how long until you return to team activities) and Variable 2 (once cleared, did you feel ready to return to play) were combined to illustrate if an athlete was ready to play or not. Variable 1 is measured on a four-point Likert scale and variable 2 is a binary variable as the participants could only answer yes or no. How long it took an athlete to be cleared exhibited to have a much stronger impact than whether they felt ready to return to competition. To level out the level of strength amongst variable 1 and 2, it is suggested for future research to use a four-point Likert scale for both variables. The data suggests that personality variables have a stronger influence on how quickly they recover but not their perception of recovery; however, you cannot know for sure because of the limitation of categorizing the "Ready to Return" variable as "yes" or "no" only.

The current study finds that specific personality characteristics have a significant impact on recovery from an athletic injury. Two trends are inferred from the data in this research study: (1) Athletes with an internal locus of control are more likely to return to play faster, and (2) athletes more open to experience will also return from an athletic injury faster. Despite the small sample size, the implications from this study can be used as a foundation for future research. A great way to build on this research would be by analyzing other personality characteristics that were mentioned but not measured in this study (such as competitive trait anxiety, social support, and mental toughness). Future research should make it an objective to collect data over the course of multiple seasons to assess if there is a change in the relationship between personality variables and recovery from injury and return to play depending on the seriousness of injury, history of injury, etc.

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