THE RELATIONSHIP BETWEEN INTERNAL AND EXTERNAL LOCUS OF CONTROL AND SELF-REPORTED FREQUENCY OF ATHLETIC INJURY

A Thesis

by

CARA BETH KRUEGER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2005

Major Subject: Health Education

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Approved by:

Chair of Committee,	B.E. "Buzz" Pruitt
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December 2005

Major Subject: Health Education

ABSTRACT

The Relationship between Internal and External Locus of Control and Self-Reported Frequency of Athletic Injury. (December 2005)

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Chair of Advisory Committee: Dr. B.E. “Buzz” Pruitt

The objective of this study was to examine the relationship between two types of locus of control among a sample of Texas A&M varsity athletes and their frequency of self-reported injury in athletic competition and practice in a 12 month period. Using a web-based survey, 640 varsity athletes were asked to respond to a questionnaire which evaluated Locus of Control type using an adapted version of the Health Locus of Control Scale. Respondents were also asked to self-report their frequency of injury within the past 12 months. Locus of Control was not found to be a significant predictor of athletic injury.

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INTRODUCTION

The purpose of this study was to examine the relationship between two types of locus of control among a sample of Texas A&M varsity athletes and their frequency of self-reported injury in athletic competition and practice in a 12 month period. The study's guiding hypothesis was that athletes characterized by an *internal* Locus of Control are injured less frequently than athletes characterized by an *external* Locus of Control. The null hypothesis for this study was that Locus of Control type does not predict frequency of injury.

Background

The Social Ecological Model as defined by McLeroy, Bibeau, Steckler & Glanz, 1988, is a conceptual framework which defines multiple levels of influence in a given system. The five levels of influence defined by the model are intrapersonal, interpersonal, institutional, community, and public policy. Intrapersonal factors include characteristics of the individual. These are comprised of items such as knowledge, attitudes, and behavior. Interpersonal factors are formal and informal social networks. These contain social support systems such as family, work group, and friends. Institutional factors are social institutions with organizational characteristics. These include formal and informal rules of operation, such as smoking policies in work places. Community factors are relationships among organizations. These are informal networks among institutions within defined boundaries. Public policy factors are laws and

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This thesis follows the style of the *Journal of Sport & Exercise Psychology.*

policies. They can exist on the local, state, and national levels (McLeroy et. al., 1988).

Sports organizations can be affected on multiple levels as described by the Social Ecological Model (Heil, 1993; McLeroy et al., 1988). At the intrapersonal level, athletic injury may affect the athlete exclusively (Heil, 1993). The athlete may experience pain, inhibition in play, or a delayed rehabilitation due to the injury. Interpersonal outcomes due to athletic injury are related to established social networks of the athlete. For example, the relationship between the injured athlete and his or her teammates may become strained due to the injury. Similarly the institutional level may be affected by athletic injury. Administrators in a sports organization may have to change treatment or practice polices due to the recurrence of a certain type of injury harming the organization's athletes. Athletic injury may affect sports organizations at the community level in the relationships they have established in the community. These relationships may be with the media or donors to the organizations. The public policy level may be influenced by athletic injury also. For example a sports organization may have to change their allocation of money for the prevention, treatment, and rehabilitation of athletic injury. At every level of influence prevention as well as intervention strategies can be implemented by athletes, coaches, administrators, athletic trainers, and many others involved in the collegiate sports organization (Heil, 1993).

The purpose of this study was to examine the relationship between two types of locus of control among a sample of Texas A&M varsity athletes and their frequency of self-reported injury in athletic competition and practice in a 12 month period. Locus of control was selected as this study's focal variable due to its ability to predict future behaviors. The Locus of Control construct is an intrapersonal factor as defined by the Social Ecological Model. Locus of control scales have historically been able to correlate locus of control types with behaviors (Rotter, 1966)

Locus of control was first defined by Rotter in 1966 as a "generalized attitude, belief, or expectancy regarding the nature of the causal relationship between one's own behavior and its consequences" (p. 2). Locus of control may be defined by its two dimensions which are *attribution style* and *cognitive reinforcement of behaviors*. *Attribution style* refers to the way in which individuals attribute consequences in their lives to preceding circumstances. For example, if an individual is speeding in his or her car and gets a speeding citation, he or she may attribute the result of the speeding citation to a variety of circumstances. The individual may contend that the reason for the citation was "bad luck", or an unkind police officer. These reasons focus on *external* causes. The individual may also believe the reason that he or she received the citation was due to exceeding the speed limit. This reason focuses on *internal* causes. The method by which the individual attributes getting the speeding ticket defines his or her attribution style.

Cognition refers to the way in which an individual receives, processes, stores, and uses information, while, *reinforcement* designates an event, circumstance, or a condition that increases the likelihood that a given response will recur in a situation similar to that in which the reinforcing condition originally occurred. *Cognitive reinforcement* relates to the reinforcing thoughts or established schemas an individual develops due to events that have happened to the individual. For example, a child may have been taught to fear large dogs. If the child comes into contact with a large dog and the dog barks at him or her, then he or she may be cognitively reinforced to *fear* the dog. On the other hand, if the child come into contact with a large dog and the dog "kisses" the child, and the child has a good experience with the dog, then he or she may be reinforced *not to fear* large dogs. Consequently, the child's schema that "large dogs are *meant* to be feared" can either be reinforced or a new schema formed that "large dogs are *not meant* to be feared".

An individual's locus of control can be oriented *internally* or *externally*. Individuals with an *external* locus of control view circumstances or situations in their lives as a result of *external* influences such as luck, higher beings, chance or predetermination. Through incidents in their lives, individuals characterized by an *external* locus of control begin to cognitively reinforce behaviors by placing responsibility for outcomes on *outside* forces. For example, an athlete with an *external* locus of control tends to place responsibility for athletic injury on forces outside of him/herself (Rotter, 1966).

Conversely, an individual characterized by an *internal* locus of control views circumstances in their life as a result of influences emanating from within, such as hard work, determination, motivation and dedication. Through experience an individual with an *internal* locus of control is cognitively reinforcing behaviors by attributing outcomes to *internal* factors. An athlete that has *internal* reinforcement tends to place responsibility for athletic injury on him or herself (Rotter, 1966).

Individuals with an *internal* locus of control tend to feel more in control of their destiny. As Rotter affirms,

> A series of studies provides hypotheses that the individual who has a strong belief that he can control his own destiny is likely to (a) be more alert to those aspects of the environment which provide useful information for his future behavior; (b) take steps to improve his environmental condition; (c) place greater value on skill or achievement reinforcements and be generally more concerned with his ability, particularly his failures; and (d) be resistive to subtle attempts to influence him [sic] (1966, p.23).

This study examined the relationship between these two types of locus of control and the frequency of injury in athletic competition and practice in a 12 month period among a sample of Texas A&M varsity athletes. The analysis focused on one psychological construct (locus of control) in the examination of psychological antecedents to athletic injury.

Research indicates that the determinants of athletic injury are complex and multifactored (Bergandi, 1985). The author's purpose is to observe and research single determinants of athletic injury. This study contributes to understanding of one psychological component (Locus of Control) coupled with the self-reported incidence of athletic injury.

If psychological antecedents to athletic injury are understood, subsequently athletes who manifest these antecedents can be identified as "at-risk". Preventive measures for these "at-risk" athletes can be employed in the form of taping and/or bracing, strengthening exercises, risk minimizing behaviors, and simple monitoring of the athlete during athletic competition and practice. Sports organizations may benefit in the future from proactive care of athletic injuries at all levels, as defined by the Social Ecological Model.

Significance

Between July 2000 and June 2001 an estimated 4.3 million people of all ages were treated in emergency departments due to fatal and non-fatal sport and recreation-related injuries (Nonfatal Sport…, 2002). The National Electronic Injury Surveillance System (NEISS) defined these injuries as resulting from exposure due to an external force during organized and unorganized activities. The rates were highest among persons aged 10-14, and lowest among persons ages 0-4. The four most frequent diagnoses were strains/sprain, fractures, contusions/abrasions, and lacerations (Nonfatal Sports…, 2002).

No category was provided for varsity or elite athletes; but in the age range for varsity athletes (15-19 and 20-24) the total number of individuals reported as being treated in emergency departments was 1.2 million (Nonfatal Sports…, 2002). This number does not represent the number of injuries to varsity athletes who were treated "in house" by athletic trainers or team doctors. An acceptable assumption therefore is that this number can be much higher.

The "profile" of the varsity athlete has changed over the past 30 years. This change is attributed to the transforming way in which athletes are socialized (Parham, 1993). As described by Parham in 1993, varsity athletes face many unique challenges which distinguish them from the rest of the student body. Particularly, Parham (1993) describes these athletes as having to constantly attend to their health and well-being in order to prevent athletic injury. "Issues and concerns related to success, or lack thereof, in college athletics are closely linked to an athlete's concern for his or her physical health and for the prevention of injury" (Parham, 1993, p. 415). The recognition of risk factors for athletic injury will allow health professionals to be responsive to the needs of the varsity athlete (Pinkham, 1991).

Many researchers have focused on physiological and anatomical components which may contribute to an injury. Gender is one factor that has been researched, which may or may not play a role in athletic injury according to Bergandi (1988). Bergandi (1988) has suggested through previous studies that men and women may not be socialized in the same manner regarding sport participation. Van Mechelen, Twisk, Molendijk, Blom, Snel, & Kempner (1996) have found that physical fitness and anthropometrical variables were not related to the risk of sustaining an injury. Independent of physiological and anatomical appraisals, stress is a psychological construct which is thoroughly studied and documented throughout the sport psychology literature (Bergandi, 1985; Udry & Anderson, 2002).

Life stress and negative life events are an important antecedent of athletic injury occurrence (Passer, 1983). This is revealed throughout the sport psychology literature. Anderson & Williams (1999) state that a history of negative life events, in combination with low social support will result in an athlete being left without "optimal resources" for dealing with stress. This may make the athlete prone to injury when faced with potential stress and subsequently a pronounced stress response (Anderson & Williams 1999). Negative life stress seems to discriminate between injury and the severity of injury, showing linear relationship with severity of injury and the increase of negative life stress (Hanson, 1992). This phenomenon is described in a study which tested the *Model of Stress and Athletic Injury* proposed by Anderson and Williams (Hanson, 1992). In a study conducted on female collegiate gymnast the authors concluded that injured gymnasts reported more life stress during the preceding year; that life stress was related to athletic injury; and that social support moderated certain stress-injury relationships (Petrie, 1992). Supporting the link between stress and injury occurrence; Gunnoe, Horodyski, Tennant, & Murphey (2001) found that high school football players with high levels of total life stress and negative life stress were more likely to become injured and sustain multiple injuries.

Negative life stress, when reported a year prior to the sport season, is shown to prevent athletes from coping with injuries 4 days post-injury (Albinson & Petrie, 2003). Stress seems to deteriorate certain characteristics which predict successful athletic performance (Meyers, 2001). These characteristics are concentration, anxiety management, self-esteem, and vigor. The deterioration of these characteristics will lead to the inability to focus on pertinent information, to accurately make decisions regarding rapid physical maneuvers, and to adjust to impending physical challenges which will predispose the athlete to athletic injury. Post-injury athletes have also shown similar characteristics by manifesting depression, anger, and decreased vigor (Smith, Stuart, Weise-Bjornstal, Milliner, O’Fallon, & Crowson, 1993).

Udry & Anderson (2002) suggest that the stress response plays a major role in the occurrence of athletic injury. Anxiety, a product of the stress response, is found to be linked with injury (Kolt, 1994). Along with the relationship between anxiety and athletic injury, there is also been a relationship between self-reported sleep disturbances and athletic injury (Greg, Banderet, & Reynolds, 2002). Perceived risk, which has been shown to be affected by the stress response, also plays a significant role in the prediction of athletic injury (Heil, 1993). When an athlete shows low levels of perceived risk, there is a significant increase in injury risk (Kontos, 2004).

Positive states of mind and mood have shown to have positive relationships with athletic injury (Udry & Anderson, 2002). These constructs are both related to personality. Locus of control is a psychological construct contained within the personality component of the Anderson-Williams *Model of Stress and Athletic Injury* (Anderson & Williams, 1988). An athlete's personality will be shaped due to locus of control because of the role that the sport establishment (coaches, administrators, trainers, etc.) has on their psychological "being" (Leunes & Nation, 1982; San Jose, 2003). Locus of Control is an attribution style, and may play a role in the way that stress and negative life events are viewed in an athlete's life (Leunes & Nation, 1982). Rotter (1966) has suggested that events in an individual's life are attributed to *internal* or *external* factors and behaviors subsequently reinforced due to attribution style. Stressors and negative life events, which have been shown to predict athletic injury, may affect behavior and behavioral adjustments of an athlete (Udry & Anderson, 2002; Rotter, 1966; Anderson & Williams, 1988). (see Appendix, Figure 1 for graphic representation of theory.)

METHODS

The study of the relationship between Locus of Control Type and frequency of athletic injury in a sample of Texas A&M varsity athletes was done over a five-month period beginning in Spring 2005 and ending in Summer 2005. This study was approved by the Institutional Review Board at Texas A&M University. All varsity athletes at Texas A&M were sent an e-mail containing an information sheet, and a link to the web-based survey. The e-mail was distributed during three days which corresponded with registration dates for Texas A&M (Summer semester-I 2005; Summer semester-II 2005; and Fall semester 2005). This was done in an effort to reach a considerable amount of athletes which would generate a higher response rate and more accurately capture the population. No incentives were offered per advice given by the Texas A&M Athletic Compliance office. A fourth distribution of the survey was done simultaneously with the third distribution date (Fall semester 2005) of the e-mailed surveys. This distribution was made to each varsity sport team. Coaches were asked to hand out a paper which contained the information sheet (informed consent – see Data Collection) and a link to the web-based survey. The primary investigator asked coaches to encourage their athletes to participate in the survey.

Sample

The study's total sample consisted of 74 athletes. The response rate for this population was 11.5% with 74 responding (640 varsity athletes were eligible for participation). Reponses were voluntary.

Measures

The survey consisted of three sections. The first section was demographic information. Information such as age, gender, race, and sport played was gathered through self-reported answers. There were 8 total questions in the demographic section.

The second section evaluated locus of control type. The Locus of Control Scale was adapted, based upon the need to evaluate an athlete's locus of control type in the context of athletic injury and injury prevention. Through a literature review, the Health Locus of Control (HLC) scale was selected based upon the criteria that it evaluated Locus of Control type while using language that was anchored in health and well-being terminology; which could subsequently be substituted for athletic injury and prevention terminology (Wallston, 1976). Under expert guidance the scale was, adapted to evaluate Locus of Control type in the context of athletic injury and prevention, as opposed to the original HLC scale which evaluated Locus of Control type in the context of health and well-being.

The HLC consists of 11 questions, with response selections provided as likert-type options. As mentioned earlier, the terms in the original HLC were used to evaluate an individual's health locus of control type. An example of one evaluation question is, "If I take care of myself, I can avoid illness" (Wallston, 1976, p. 581). Using expert advice, the primary investigator substituted health-related terms in the scale to athletic injury terms. An original HLC question reads, "I am directly responsible for my health" and the revised question reads, "I am directly responsible for avoiding injury" (Wallston, 1976, p. 581).

The data were examined for both reliability and validity. A reliability analysis was performed for data yielded by the adapted HLC scale. The resulting Cronbach's alpha was .670. In order to examine validity, a factor analysis was performed. A principal components factor analysis with a Varimax rotation was performed. Results revealed 3 components to the adapted HLC scale. Five variables were grouped in component 1, labeled as internal Locus of Control. (Factor weights ranged from .569 to .768.) The variables that were expected to measure external Locus of Control loaded on two components. The two components were split with three variables in component 2 (factor weights ranged from .523 to .662), and two variables in component 3 (factor weights ranged from .679 to .762).

The third section consisted of athletes reporting their frequency of injury. Athletic injury was defined to the respondents as "an injury sustained due to participation in your sport". Respondents were asked to recall athletic injuries which occurred in the 12 month period prior to their participation in the study. An example of a question from this section is, "Estimate how many days you were kept out of practice due to athletic injury". There were 5 total questions in this section.

Data Collection

The surveys were e-mailed to all Texas A&M Varsity athletes on three occasions corresponding with class registration dates. The e-mail contained information about the purpose of the study, the primary investigator, and instructions for completing the survey. The contents of the e-mail acted as the informed consent, which the primary investigator prepared using an example provided by the IRB at Texas A&M University (information sheet). A web-link was provided to redirect respondents to the survey. Concurrently, on the third e-mail distribution date, coaches were also asked to distribute a hard copy of the information sheet with a link to the survey to their athletes (see Methods). The hard copy was provided to the coaches by the primary investigator.

The survey operated using a web-based interface. The survey software lead respondents through the 24-item questionnaire while feeding responses into a data bank. These data are compatible with SAS and SPSS software for analyzing data. While the software was useful due to it's compatibility with data analysis software, it was unreliable due to its failure on several occasions, leaving respondents with "stale" internet page and rendering the survey inaccessible. Inaccessibility often lasted several weeks at a time.

RESULTS

Demographic Characteristics

The sample consisted of 74 athletes. In this sample 33.8% (n = 25) were male and 63.5% (n = 47) were female with two not responding. The racial composition for this population was 78.4% (n = 58) Caucasian, 2.7% (n = 2) African-American, 6.8% (n = 5) Hispanic, 1.4% (n = 1) Asian-American, 2.7% (n = 2) Pacific-Islander, and 2.7% (n = 2) classified as “other”. Mean age was 20.3. The percent of athletes that reported being classified as having a “full-scholarship” was 21.6% (n = 16); percentage reported being classified as “partial-scholarship” was 45.9% (n = 34); and percentage reported being classified as “non-scholarship” was 25.7% (n = 19).

Scores ranged from 26 to 58, with lower scores indicating external and higher scores indicating internal Locus of Control. Mean score for the sample was 40.74 (SD = 7.15), which falls on internal side of the scale. In order to answer to answer the research questions, respondents were classified as having an internal or external Locus of Control based on their total score on the adapted Locus of Control scale. Possible scores on the scale ranged from 11 to 66. Scores of 11 to 38 were classified as external. Scores of 38 to 66 were classified as internal. The percent of athletes showing an internal Locus of was 59.7% (n = 37), while 40.3% (n = 25) showed an external Locus of Control. Twelve respondents did not complete the Locus of Control scale, and were not included in the correlation and regression analyses.

In order to test for normality, skewness and kurtosis were examined for each variable. All variables displayed a normal distribution except for race, and questions (a) and (d) in the self-reported injury section. Due to the extreme non-normal distributions associated with questions one and two, a square root transformation was applied to those variables. The following analyses were conducted on the transformed data.

Correlation Analyses

In order to test the hypothesis that *athletes characterized by an internal Locus of Control are injured less frequently than athletes characterized an external Locus of Control*, a Pearson's correlation was run with Locus of Control type and each of the frequency of injury variables. An alpha level of .05 was used to determine statistical significance.

Locus of Control type was not significantly correlated with the results from any of the questions regarding self-reported athletic injuries; question (a), "*Please indicate how many times you have suffered an athletic injury in the past 12 months.*" ($r = -.163$; $p = .210$); question (b), "*Please indicate how many times you have suffered an athletic injury in the past 12 months which has kept you from participating or practicing for your sport (weight lifting, sanctioned practice, etc.).*" ($r = -.081$; $p = .536$); question (c), "*Please estimate how many days you were kept out of practice due to athletic injury.*" ($r = -.053$; $p = .685$); question (d), "*Please estimate how many times you have suffered an athletic injury that has kept you out of athletic competition for your sport (games, exhibitions, etc.).*" ($r = -.249$; $p = .053$); and question (e), "*Please estimate how many days you were kept out of athletic competition due to athletic injury*." ($r = -.200$; $p = .123$). Although these findings were not significant, a negative correlation (inverse) indicates a higher number of injuries were associated with an external Locus of Control.

Regression Analyses

Two multiple regression models were conducted to examine each of the injury variables. In each case, the first model contained demographic variables as predictors, and the second model added Locus of Control type as an independent predictor variable. An alpha level of .05 was used to determine statistical significance.

For question (a), the Model 1 reveled gender was the only demographic variable that significantly predicted the number of athletic injuries sustained within the past 12 months. When Locus of Control was added in Model 2, gender remained the only significant predictor (see Appendix, Table 1). Table 2 illustrates gender being the only significant predictor of athletic injury in Model 1, pertaining to question (b). Gender remained a significant predictor when Locus of Control was added (see Appendix, Table 2). Table 3 showed similar results for question (c), with gender being a significant predictor in Model 1. Model 2 showed when Locus of Control was added gender continued to be a significant predictor (see Appendix, Table 3). Table 4 showed no significant predictors pertaining to question (d). Table 5, relating to question (e), showed that gender predicted athletic injury in Model 1. Model 2 showed no significance (see Appendix, Table 5).

Limitations

This study was limited in three respects. First, the response rate for such a larger group was low (n = 11.5%). This may be due to the way in which the survey was distributed (via e-mail). Response rate could have been increased through a one-on-one interaction with the athletes, and offering an incentive. The Texas A&M Compliance

Office advised against the use of both of these methods due to rules set forth by the NCAA. As discussed in the Data Collection section, the survey software experienced technical difficulties which encumbered athlete's response. Many of the problems with the software occurred during critical periods; i.e. periods directly after the survey had been distributed. Technical difficulties are almost impossible to foresee and correct.

Locus of Control type was correlated with the number of self-reported injuries in order to answer the research question. Due to confidentiality associated with collegiate athletes as set forth by the NCAA, frequency of injury was limited to self-reported data. Self-reported data tends to be limited by the respondent's ability to correctly recall information.

The final limitation concerned wording of the questions regarding self-reported athletic injuries. The final three questions regarding self-reported injury [question (c), (d), and (e)] never included a time-reference. The first two questions used a time-frame of 12 months prior to participating in the survey. It was the author's belief that the 12 month time frame would be naturally inferred to the later questions. A time-frame should have been provided, to insure that respondents answered questions pertaining to the allotted time period of 12 months prior to participating in the survey. This error likely skewed data distributions, and subsequently distorted correlation and regression analysis.

CONCLUSIONS

The examination of the data received from the 74 respondents in this study revealed that Locus of Control type does not predict athletic injury. A negative correlation was found through correlation analyses, which indicates a higher number of injuries were associated with an external Locus of Control. This result must be approached with caution due to the small (n = 74) sample size.

Data were skewed, possibly due to the small sample size (n = 74). Despite using a square root transformation, data from two variables remained skewed [results of question (a) and (d)]. Results from the regression analyses in Table 5 approached significance. It is the author's belief that if the sample size was larger, significance would have been captured.

Conversely, adjusted r^2 scores from the regression analyses dropped when Locus of Control was added into the model, except for Table 4. This suggests that Locus of Control could not account for additional variance in the dependent variables.

Results from this study show that Locus of Control cannot accurately predict the frequency of athletic injury. This study was limited in 3 significant ways (see Limitations). Consequently, the hypothesis that *athletes characterized by an internal Locus of Control are injured less frequently than athletes characterized an external Locus of Control* is proven to be false in this case.

The most promising results came from the correlation analyses which indicated an inverse correlation between frequency of injury and Locus of Control scores. This finding implied that athletes reporting a higher frequency of injury showed a lower Locus of Control score, indicating an external Locus of Control.

This study shows that Locus of Control cannot predict athletic injury frequency. The author failed to reject the null hypothesis. Many flaws regarding sample size, self-reported data, and wording of the survey must be taken into consideration when utilizing these results. More research must be done in order to understand psychological antecedents of athletic injury.

REFERENCES

Albinson, C.B., & Petrie, T.A. (2003). Cognitive Appraisals, Stress and Coping: Preinjury and Postinjury Factors Influencing Psychological Adjustment to Sport Injury. *Journal of Sport Rehabilitation,* **12**, 306-322.

Anderson, M.B., & Williams, J.M. (1988). A Model of Stress and Athletic Injury: Prediction and Prevention. *Journal of Sports and Exercise Psychology,* **10**(3), 294-306.

Anderson, M.B., & Williams, J.M. (1999). Athletic Injury, Psychosocial Factors and Perceptual Changes during Stress. *Journal of Sport Sciences,* **17**, 735-741.

Bergandi, T. (1985). Psychological Variables Relating to the Incidence of Athletic Injury: A review of the Literature. *International Journal of Sport Psychology,* **16**(2), 141-149.

Bergandi, T. (1988). Attentional Style as a Predictor of Athletic Injury. *International Journal of Sport Psychology*, **19**(3), 226-235.

Greg, R.L., Banderet, L.E., & Reynolds, K.L. (2002). Psychological Factors that Influence Traumatic Injury Occurrence and Physical Performance. *Work* **18**, 133-139.

Gunnoe, A.J., Horodyski, M.B., Tennant, L.K., & Murphey, M. (2001). The Effect of Life Events on Incidence of Injury in High School Football Players. *Journal of Athletic Training,* **36**(2), 150-155.

Hanson, S. (1992). The Relationship of Personality Characteristics, Life Stress, and Coping Resources to Athletic Injury. *Journal of Sport and Exercise Psychology*, **14**(3), 262-272.

Heil, J. (1993). *Psychology of Sport Injury*. Champaign, IL: Human Kinetics.

Kolt, G.S. (1994). Injury, Anxiety, and Mood in Competitive Gymnasts. *Perceptual and Motor Skills,* **78**, 955-962.

Kontos, A.P. (2004). Perceived Risk, Risk Taking, Estimation of Ability and Injury Among Adolescent Sport Participants. *Journal of Pediatric Psychology,* **29**(6), 447-455.

Leunes, A., & Nation, J.R. (1982). Saturday's Heroes: A Psychological Portrait of College Football Players. *Journal of Sport Behavior,* **5**, 139-149.

Meyers, M. (2001). Pain Coping Response of Collegiate Athletes Involved in High Contact, High Injury Potential Sport. *International Journal of Sport Psychology*, **32**(1), 29-42.

McLeroy, K.R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological Perspective on Health Promotion Programs. *Health Education Quarterly*, **15**(4), 351-377.

Nonfatal Sports-and Recreation – Related Injuries Treated in Emergency Departments – United States, July 2000-June 2001. (2002). *Morbidity and Mortality Weekly Report,* **51**(33), 736-740.

Parham, W.D. (1993). The Intercollegiate Athletes: A 1990s Profile. *The Counseling Psychologist*, **23**(3), 411-429.

Passer, M. (1983). Life Stress and Athletic Injury: Examination of Positive versus Negative Events and Three Moderator Variables. *Journal of Human Stress,* **9**(4), 11-16.

Petrie, T. (1992). Psychosocial Antecedents of Athletic Injury: The Effect of Life Stress and Social Support on Female Collegiate Gymnasts. *Behavioral Medicine*, **18**(3), 127-138.

Pinkham, J.R. (1991). Epidemiology and Prediction of Sports-Related Traumatic Injury. *Sports Dentistry,* **35**(4), 609-626.

Rotter, J.B. (1966). Generalized Expectancies for Internal versus External Control of Reinforcement. *Psychological Monographs: General and Applied,* **80**(1), 1-28.

San Jose, A. (2003). Injury of Elite Athletes: Sport and Gender-Related Representation. *International Journal of Sport and Exercise Psychology*, **1**, 434-459.

Smith, A.M., Stuart, M.J., Weise-Bjornstal, D.M., Milliner, E.K., O'Fallon, M., & Crowson, C.S. (1993). Competitive Athletes: Preinjury and Postinjury Mood State and Self-Esteem. *Mayo Clinic Proceedings,* **68**, 939-947.

Udry, E., & Anderson, M.B. (2002). Athletic Injury and Sport Behavior. *Advances in Sport Psychology* (pp. 529-553). Champaign, IL: Human Kinetics.

Van Mechelen, W., Twisk, J., Molendijk, A., Blom, B., Snel, J., & Kemper, H.C.G. (1996). Subject-Related Risk Factors for Sports Injuries: A 1-yr Prospective Study in Young Adults. *Medicine and Science in Sports and Exercise,* **28**(9), 1171-1179.

Wallston, B.S. (1976). Development and Validation of the Health Locus of Control (HLC) Scale. *Journal of Counseling and Clinical Psychology*, **44**(4), 580-585.

APPENDIX

Table 1. Beta Coefficients and Probability Levels for Predictors of Self-Reported Athletic Injury Sustained within the Past 12 Months.

Predictors	**Model 1** Adj. R^2 = .049 **Beta**	 **p**	**Model 2** Adj. R^2 = .040 **Beta**	 **p**
Gender	.334	.017	.284	.048
Age	.027	.839	.031	.817
Race	.158	.254	.158	.270
Scholarship Status	.165	.214	.193	.168
LOC type			-.180	.193

Table 2. Beta Coefficients and Probability Levels for Predictors of Self-Reported Athletic Injury Sustained within the Past 12 Months (Keeping the Athlete from Practicing).

Predictors	**Model 1** Adj. R^2 = .086 **Beta**	 **p**	**Model 2** Adj. R^2 = .061 **Beta**	 **p**
Gender	.349	.011	.316	.027
Age	.158	.223	.169	.210
Race	.163	.230	.177	.213
Scholarship Status	.011	.934	.027	.843
LOC type			-.106	.437

Table 3. Beta Coefficients and Probability Levels for Predictors of Self-Reported Number of Days Being withheld from Practice due to Athletic Injury.

Predictors	**Model 1** Adj. R^2 = .124 **Beta**	 **p**	**Model 2** Adj. R^2 = .078 **Beta**	 **p**
Gender	.349	.010	.325	.022
Age	.207	.104	.177	.185
Race	.159	.231	.178	.205
Scholarship Status	-.060	.636	-.054	.692
LOC type			-.058	.667

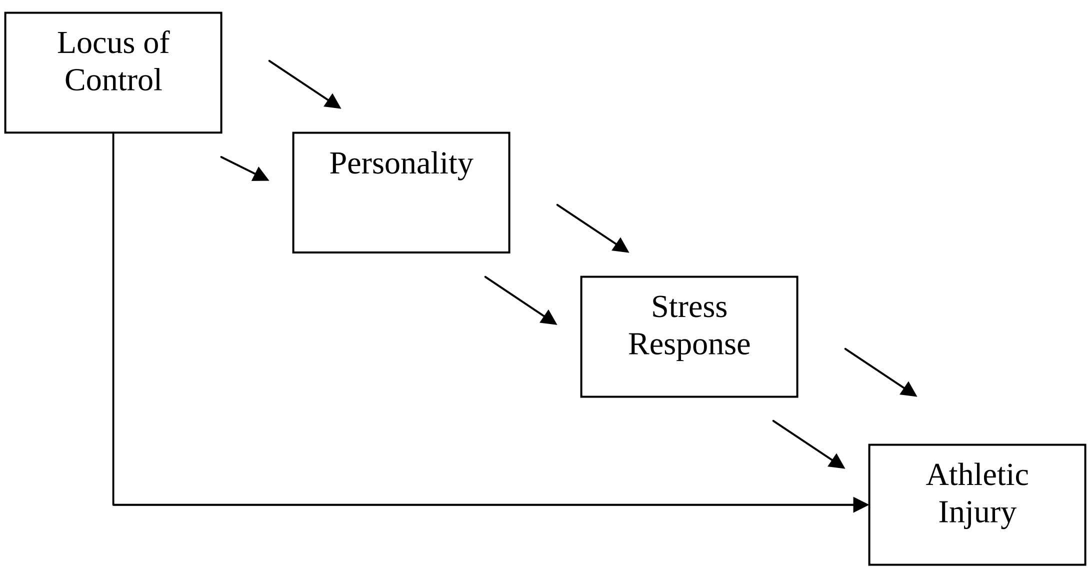
Table 4. Beta Coefficients and Probability Levels for Predictors of Self-Reported Athletic Injury Sustained within the Past 12 Months (Keeping the Athlete from Competing).

Predictors	**Model 1** Adj. R^2 = .007 **Beta**	 **p**	**Model 2** Adj. R^2 = .055 **Beta**	 **p**
Gender	.278	.051	.247	.083
Age	-.008	.951	.013	.921
Race	.169	.233	.176	.217
Scholarship Status	.069	.611	.117	.394
LOC type			-.268	.053

Table 5. Beta Coefficients and Probability Levels for Predictors of Self-Reported Number of Days Being withheld from Competition due to Athletic Injury.

Predictors	**Model 1** Adj. R^2 = .059		**Model 2** Adj. R^2 = .054	
	Beta	**p**	**Beta**	**p**
Gender	.318	.023	.278	.052
Age	.067	.609	.050	.711
Race	.074	.592	.092	.513
Scholarship Status	-.110	.403	-.082	.552
LOC type			-.183	.183

Figure 1. Linear Logic Model Representing Theoretical Relationship Between Locus of Control and Athletic Injury.



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