EFFECT OF COLLEGIATE ATHLETES' PERSONALITY TRAITS ON OCCURRENCE OF ATHLETIC INJURY

A THESIS

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Annually in the United States, 2.6 million emergency room visits occur due to athletic injuries of people between the ages of five and twenty-four.[1] This does not account for the numerous injuries that are not seen in the emergency room. While it is impossible to eliminate these injuries, a significant number of these injuries may potentially be prevented. Prevention requires an understanding of the many different risk factors for athletic injury. Some of these factors include poor biomechanics, nutrition, and psychological issues.

Psychology has been found to have a great influence on the occurrence and recovery from injury and illness.[2-9] One main component of sport psychology that has been found to influence the occurrence of injury is life stress. Contributing stressors include social support, coping skills, and personality.[6] Personality is the basis of these three stressors. Personality determines how a person will normally think, feel, and act. When put in a particular situation, a person's personality will influence how they respond to the circumstance.[10]

Dr. Hans J. Eysenck (1916-1997), a British psychologist of German origin, is credited as being one of

the top specialists on personality. Writing over 1,600 publications during his lifetime, he was an advocate of researching the theory of personality. His many accomplishments developed his credibility and eventually he came to be seen as an iconic figure in British psychology.[11]

According to Eysenck, personality has three central elements. In his research he mainly focuses on extraversion (vs. introversion) and neuroticism, but also includes psychoticism as a key trait. These characteristics are what make each individual unique and separate the various personalities.[12] Extraversion refers to a person who is drawn towards active events and has a tendency to become energized by them.[8] This is due to the fact that individuals that are extraverted generally have lower arousal levels and therefore need to find stimulation in external sources. People who are introverted are the opposite; they tend to be more reserved and have higher internal arousal levels, decreasing the need for them to seek out stimulation.[12] Neuroticism is a mental state where an individual has a predisposition to be overly emotional. These excessive emotions can lead to psychological distress.[8] Individuals who have neurotic tendencies normally will have a reactive autonomic nervous system

which makes them more emotionally unstable than individuals lower in neuroticism.[12]

Research examining the effect of Eysenck's personality traits on an individual's health has been analyzed, but infrequently. One study examined the influence extraversion and neuroticism had on mortality rate. Performed by Shipley et al[8], the study used the Eysenck personality inventory in a prospective cohort study. Twenty-one years after the inventory was originally distributed, researchers found those people who ranked higher in neuroticism were at an increased risk of death from heart disease. However, they were unable to document any significant findings attributing mortality rate to extroversion.[8]

A similar study considered neuroticism and extraversion in relation to burnout. Burnout is a syndrome that stems from excessive mental demands which create emotional exhaustion. This syndrome can lead a deterioration of a person's physical health. In the study, Shimizutani et al[9] used a version of Eysenck's personality questionnaire when looking into causes of burnout. They found that burnout and neuroticism are strongly associated.[9] According to the researcher, Piedmont, burnout is an

induced stress reaction in which personality can be correlated with.[13]

A substantial amount of research suggests that peoples' personalities influence their mood and life stress[3,6-9,13]. It is important to understand what aspects of personality promote stress in order to avoid injury. Little research has actually been done that demonstrates which of these aspects put individuals at greater risk of injury. By better understanding which personality traits lead to a higher incidence of injury, clinicians will be more prepared to prevent injuries. They will be able to recognize the athletes who have personality traits which classify them at a higher risk for injury.

The potential prevention of these injuries can be accomplished by using techniques geared around coping with stress and over-intensity. Some psychological techniques that have been shown to work include self-talk, breathing, and imagery. Each of these skills allows the athlete to relax and create a positive frame of mind.[14]

The purpose of this study was to examine the collegiate athletes' extraversion and neuroticism levels and determine if there is a relationship when compared to their injury occurrence. This study will also look at other factors such as individual sports verses team sports,

gender, and specific sports in order to determine what role personality plays in injury occurrence.

METHODS

The purpose of this study was to determine if the personality type of NCAA Division II athletes is related to injury rate. The study also looked into certain demographics to find any correlations. These demographics include questions such as age, gender, sport, and sport type (team or individual). This section will include the following subsections: research design, subjects, preliminary research, instruments, procedures, hypothesis, and data analysis.

Research Design

The research design for this study was descriptive. The design had three independent variables of sport and extroversion and neuroticism scales as measured by the Eysenck Personality Questionnaire Brief Version (EPQ-BV). The dependent variable in this research was injury occurrence. The strength of this study was in the internal consistency and reliability of the personality portion of the survey. Values found by Sato[11] on the test-retest reliability of the EPQ-BV were .92 for each scale. Internal consistency, measured by correlating results with

the with the Eysenck Personality Questionnaire-Revised Short (EPQR-S) form, found the two highly correlated (.88 and .89).[12] Limitations of this study were caused primarily from the injury occurrence portion of the questionnaire. This portion of the survey had not previously been used in any other research and was an original tool created by the researcher of this study. Another limitation was related to the low number of schools participating in the study. Each school used was comprised of similar students which decreased the diversity of this study.

Subjects

The subjects used in this study consisted of 71 NCAA Division II collegiate athletes currently participating in their sport. This sample of subjects came from two universities in Pennsylvania. These schools included California University of Pennsylvania and Lock Haven University of Pennsylvania (chosen due to convenience). The institutions' athletic director distributed surveys or allowed the researcher permission to distribute them online via email and survey link. All participation was voluntary and responses were kept confidential. The age subjects ranged from 18-24 year old with a mean of 20.32. There

were 27 males and 44 females that participated that competed in a total of sixteen sports. Team sports were represented by 26 of the subjects, while 45 competed in an individual sport.

Preliminary Research

Preliminary research consisted of creating the injury occurrence portion of the questionnaire and determining its reliability and validity. Once the questionnaire was created it was sent to a panel of experts who reviewed it for validity. The panel of experts included five certified athletic trainers with experience in survey construction. Feedback was given and the appropriate changes were made. After the study was approved by the California University of Pennsylvania Institutional Review Board(IRB) and the survey was edited by the panel of experts, the questionnaire was then distributed to athletes at Penn State Fayette (N=6) to begin the pilot study. These select athletes were volunteers who allowed the researcher to email them the survey. The athletes completed the questionnaire twice for comparison to show the results are repeatable. A consent form (Appendix C1) was given to each volunteer by the institution’s athletic trainer. This form

was similar to the primary study's consent form, however on the preliminary consent form participants were made aware of the study and their involvement in its preliminary research. There was also a space at the bottom of the consent form for athletes to include their email address. The consent form also notified participants that they would receive a code to type in a space provided at the beginning of the survey (Appendix C2). This made it possible for the researcher to link the two questionnaires during data collection. All information was kept in a password protected file on the California University of PA server. After the completion of the preliminary research, all data connecting the email address with the specific questionnaires was deleted. Participants were given three days to complete the survey once the link was initially emailed to them, with a reminder email each day. One week after the completion of the initial survey they received the survey link again as an email, to be completed within three days. This process helped determine the questionnaire's reliability (Appendix C3). Athletes who participated in this procedure were not subjects in the research study.

Instruments

The instrument used in this study was comprised of both a questionnaire created by the researcher and the Eysenck Personality Questionnaire Brief Version (Appendix C4). This questionnaire included three sections; 1) demographics, 2) personality type, and 3) injury occurrence. The demographics section included questions concerning age, current year in college, sport, and the number of years they have competed collegiately. The personality type section was composed of the Eysenck Personality Questionnaire Brief Version (EPQ-BV), which has been previously researched. On the EPQ-BV all even numbered questions are for the neuroticism scale and odd numbered questions are for the extroversion scale. Answers are scored where A=1 B=2 C=3 D=4 E=5, except for two reversed items (#13 and #19). The answers were then added together to obtain the extraversion and neuroticism score.

Injury occurrence was the final portion of the survey and was designed by the researcher of this study. Each participant was asked how many injuries they sustained in the past 12 months, how long the injury kept them from participating in practice/competition, and if the injury required surgery. For each injury they received a point.

They also received a point if the injury required surgery. In relation to how long the injury kept the athlete from participating, a point was awarded if they chose 1-2 weeks or 2-3 weeks and two points were given if they chose a month or more. All points were then added to create an injury severity score.

Procedures

Approval was first required from the California University of Pennsylvania Institutional Review Board (IRB) before any research was conducted (Appendix 5). Once approval was granted from the primary institution, the athletic directors of each school were contacted by email from the researcher to determine if they would be interested in participating in the study (Appendix 6). If they agreed to participate, the athletic directors were then emailed a cover letter and link to the survey (Appendix 6) to forward by email to the athletes at their school. By submitting the questionnaire, the athlete consented to allowing the researcher use of the data. In the introduction of the survey all athletes were given a briefing explaining the procedure and purpose of the study. They were also informed their participation was voluntary

and would be kept confidential. Contact information of the researcher was provided if participants had further questions or concerns.

As each participant submitted the questionnaire, the survey site kept track of all the data collectively. This data was then analyzed by the researcher and results were determined.

Hypotheses

The following hypotheses were based on previous research and the intuition of the researcher from using these resources.

1. Athletes that score high on the neuroticism scale will have an increased likelihood of injury.
2. Athletes that score high on the extroversion scale will have an increased likelihood of injury.
3. Individuals in a particular sport will have similar personality traits.

Data Analysis

All data was found using PASW statistics 18. The level of significance was set at $\alpha \leq .05$ while testing the hypotheses.

A MANOVA was used when analyzing the relationship between sport and personality traits. A Pearson product correlation was then used looking at the neuroticism scale and injury occurrence. The same correlation was used to examine injury occurrence and the extroversion scale.

RESULTS

The purpose of this study was to determine if an athlete's personality type influences the occurrence of injuries by using a survey. The following section contains the data collected from the survey and is divided into the following four subsections: preliminary results, demographic information, hypothesis testing, and additional findings. Analysis of the data was obtained using the PASW Statistics 18 program.

Preliminary Results

A pilot study was first performed to determine the survey's test-retest reliability. Participants from Penn State Fayette (N=6) were utilized. The ages of these individuals ranged from 18-22 with a mean of 20.0. All participants of this pilot study were female. The primary sports played were volleyball (n=2), outdoor track (n=2), field hockey (n=1), and basketball (n=1). The statistics and results for each question in the injury occurrence portion of the pilot study is listed in Appendix C3.

Demographic Information

Subjects that completed this survey consisted of collegiate athletes at Division II schools (n=2) in Pennsylvania. A total of 73 student athletes completed the survey. Two surveys were discarded for not meeting minimal age limit requirements or not providing sufficient answers. Twenty-seven participants were male (38%) and 44 were female (62%).

The age of the participants ranged from 18-24 years old with a mean of 20.32 and standard deviation of 1.371. The largest percent of students described themselves as being juniors (32.4%) and the lowest categories were sophomores and seniors, both with 21.1% (Table 1).

Table 1. Frequency for Academic Year

Academic Year	F	Percent
Freshman	18	25.4
Sophomore	15	21.1
Junior	23	32.4
Senior	15	21.1

Individuals from 16 sports participated, with the highest percentage of athletes in men’s and women’s outdoor

track and field (Table 2). These sports were divided into categories of individual sports or team sports. Individual sports included cross-country, outdoor track, swimming & diving, tennis, and wrestling. The sports that were considered team sports were baseball, basketball, field hockey, football, soccer, softball, and volleyball. When divided into two categories it was calculated that the most athletes participating in the study were involved in an individual sport with a frequency of 45 (63.4%).

Table 2. Frequency of Primary Sports

Primary Sport	**F**	**Percent**
Baseball	3	4.2
Basketball(M)	1	1.4
Basketball(W)	3	4.2
Cross Country(M)	4	5.6
Cross Country(W)	6	8.5
Field Hockey	2	2.8
Football	2	2.8
Outdoor Track(M)	12	16.9
Outdoor Track(W)	12	16.9
Soccer(M)	2	2.8
Soccer(W)	7	9.9
Softball	5	7.0
Swimming & Diving(W)	4	5.6
Tennis(W)	4	5.6
Volleyball(W)	1	1.4
Wrestling(M)	3	4.2

Hypothesis Testing

The hypotheses listed below were tested in this study. Each was tested using a significance level set at $\alpha \leq 0.05$.

Hypothesis 1: Athletes that score higher on the neuroticism scale will have an increased likelihood of injury.

Conclusion 1: A Pearson correlation was calculated examining the relationship between participants' injury score and level of neuroticism. A weak negative correlation that was not significant was found ($r(2)= -.092$, $p>.05$). Injury score is not related to neuroticism.

Hypothesis 2: Athletes that score high on the extroversion scale will have an increased likelihood of injury.

Conclusion 2: A Pearson correlation was used to determine whether there was a relationship between the participants' injury score and level of extroversion. A weak non-significant correlation was found ($r(2)= .212$, $p>.05$). Injury score is not related to an extroversion scale.

Hypothesis 3: Individuals in a particular sport will have similar personality traits.

Conclusion 3: Mean neuroticism and extroversion scores for each sport can be found in Table 3 and Table 4. A MANOVA was calculated examining the effect of the participants' primary sport on their extroversion and neuroticism scores. No significant effect was found (*Lambda*(30,108)=.593, p>.05). Neither extroversion (p=.481) nor neuroticism (p=.178) scores were significantly influenced by primary sport.

Table 3. Primary Sports Mean Neuroticism Scores

Primary Sport	**Mean**	**SD**	**N**
Baseball	20.6	3.05	3
Basketball(M)	28.0		1
Basketball(W)	18.0	3.00	3
Cross Country(M)	29.2	3.86	4
Cross Country(W)	30.3	11.25	6
Field Hockey	27.0	2.82	2
Football	27.5	12.02	2
Outdoor Track(M)	22.7	6.07	12
Outdoor Track(W)	27.6	6.70	12
Soccer(M)	37.5	13.43	2
Soccer(W)	26.2	8.13	7
Softball	30.2	5.01	5
Swimming & Diving(W)	23.5	6.55	4
Tennis(W)	30.5	7.14	4
Volleyball(W)	31.0		1
Wrestling(M)	26.0	4.00	3

Table 4. Primary Sports Mean Extroversion Scores

Primary Sport	Mean	SD	N
Baseball	39.6	3.78	3
Basketball(M)	33.0		1
Basketball(W)	52.0	2.64	3
Cross Country(M)	42.7	7.93	4
Cross Country(W)	37.8	13.77	6
Field Hockey	46.0	5.65	2
Football	34.5	6.36	2
Outdoor Track(M)	47.3	9.99	12
Outdoor Track(W)	41.1	10.46	12
Soccer(M)	40.5	6.36	2
Soccer(W)	48.8	6.69	7
Softball	45.8	9.85	5
Swimming & Diving(W)	45.2	14.45	4
Tennis(W)	39.5	3.69	4
Volleyball(W)	46.0		1
Wrestling(M)	46.6	4.50	3

Additional Findings

Additional tests were performed using the data found in the personality and demographic portion of the questionnaire and injury scores.

The first additional test compared the type of sport (team or individual) and the extroversion and neuroticism scores. The mean scores can be found in Table 5. An independent samples t-test was used to examine the effect of the type of sport with the two personality scores. No

significant difference was found between sport type and neuroticism (t(69)=-.038, p=.970). No significant difference was found between sport type and extroversion (t(69)=.766, p=.446). The means of neither extroversion nor introversion scores were significantly influenced by type of sport.

Table 5. Type of Sport Neuroticism and Extroversion Scale

Personality	Sport Type	Mean	SD	N
Neuroticism	Team	26.6	7.80	26
	Individual	26.6	7.22	45
Extroversion	Team	44.8	7.90	26
	Individual	43.0	10.31	45

The second test used for additional findings was a Pearson product correlation, used to determine the relationship between extroversion and neuroticism. A moderate negative correlation was found (r=(69)= -.375, p< .01), indicating a significant linear relationship between the two variables. Extraverted individuals are less neurotic.

DISCUSSION

The discussion of the findings is divided into the following four subs-sections: 1) Discussion of Results, 2) Implications to the Profession, 3) Recommendations, and 4) Conclusion.

Discussion of Results

This study focused extraversion and neuroticism as personality traits and how they relate to the occurrence of injuries in athletics. Studies such as this one, which focus on the underlying factors of athletic injuries, are important when developing injury prevention, treatment, and rehabilitation strategies.[15] Personality traits are one possible factor that has not been the focus of many studies and is lacking research. This study was designed to increase knowledge of personality and sport.

The current study found that injuries in athletics are not significantly influenced by the personality traits of neuroticism (H1) or extraversion (H2). Therefore, the first two hypotheses of this study were rejected.

Most previous studies conflict with the rejection of hypothesis one some of these studies include those

researched by Piedmont[13], Shimizutani et al[9], and Shipley et al[8]. A study by Raynor et al[2] however did conclude that neurotic individuals did not predict many risky health behaviors.

The rejection of hypothesis two (H2) is supported in previous studies by Shipley et al[8] and Shimizutani et al[9], but differed from the results found in the study by Raynor et al[2]. Although none of these studies looked directly at athletic injuries, they each attempted to relate extraversion with a decrease in physical health. Shipley et al[8] determined extraversion was not related to mortality rates while Shimizutani et al[9] found that people low in extraversion have a higher burnout rate. Both studies may be compared to injuries in athletics illustrating a lack of association between extraversion and injury occurrence. This is disputed in the study by Raynor et al[2] who determined that individuals high in extraversion are more inclined to engage in behaviors that are considered detrimental to an individual's health including cigarette use, alcohol use, binge drinking, etc.

The third hypothesis which examined each sport's personality trait was also not supported by the data collected in the sample of this study. There is very little research on this theory, but if a significant result

can be established that knowledge can be used to help coaches, sport medicine staff, athletic directors, referees, etc. understand what communication/motivation/treatment technique each individual team will respond to best.

Additional tests were also performed to determine any supplementary results. The first of these tests paired the primary sports into two larger categories of individual and team sports. These two categories were then compared with the personality traits. Results of analysis showed that neither extraversion nor introversion was significantly influenced by the type of sport. A study presented by Eagleton et al.[16] yielded results inconsistent with these findings. Eagleton et al[16] concluded that team sports are greater in extraversion than individual sports. Results of neuroticism however corresponded to the analysis of the current study, having no significant influence on type of sport.

The final additional analysis was used to determine if there was a relationship between extraversion and neuroticism. This evaluation established a moderate negative correlation which indicated that extraverted individuals are less neurotic and neurotic individuals are less extraverted.

The rejection of each hypothesis may have been impacted by the low useable response rate of N=71. The number of student athletes that received the questionnaire was 785 for a completion of 9%. With the small sample size the distribution of these athletes by team was not extremely accurate. For example, the category of football only had two responses while tennis (a much smaller team) had five responses. Even when categorized into sport type (team and individual) the number of respondents for each was not equivalent, with individual sports containing 63.4 percent of all participants.

The low response rate may also have influenced the results for the personality scales. The maximum scores for the neuroticism and extraversion scales were each a total of 60 points. The range for the neuroticism scale was 12-49 and the extraversion range was 21-60. This result does not include the entire range (12-60) for either personality trait.

Implications to the Profession

The findings of this study demonstrated that the personality traits of an individual do not reflect the severity of his/her sport injuries. Athletic Training

requires that people in the profession work with a multitude of personality types. However extreme the personality of an athlete, it is important that they all receive the same quality treatment. Like any human being, Athletic Trainers have the potential to judge their athletes and place them into categories of complainers or tough-minded athletes, etc. This study shows that no matter the category an athlete may be placed in, the severity of injury does not change. According to this study, personality traits, specifically extroversion and neuroticism, do not influence injury. Therefore an athlete's injury should not be judged by their personality.

Recommendations

There are many different personality traits other than extroversion and neuroticism that make up an individual's personality type. Future studies on this topic would benefit from a more thorough personality questionnaire such as the Myers-Briggs Type Indicator which places an individual into one of sixteen different personality types.[17] Also, subsequent studies may gain more insight to this topic if a larger, more complete, sample size is used.

Further comprehension on the topic can facilitate the reduction of athletic injuries.

Conclusions

The impact of personality traits on the occurrence of injuries is an area that requires more research. Overall this study found no significance relating the personality traits of neuroticism and extroversion to sport or injury occurrence. A moderate negative correlation was found between extroversion and neuroticism. If a correlation can be found between personality types and occurrence of injury preventative measures can be taken to help decrease athletic injury and ensure a safer environment. Understanding contributing factors to injury is crucial to decreasing injury rate in athletics.

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APPENDICES

APPENDIX A

Review of Literature

REVIEW OF LITERATURE

When participating in athletics, injuries are common and affect the athlete both physically and mentally. There are many different variables in sports that can influence the occurrence of injuries. This literature review will look specifically at how an athlete's personality type may be a factor that will increase their occurrence of injury. Athletes have a variety of personality traits. Personality and injury has not been a main focus most studies that look at contributing factors to injury. The following review is a compilation of personality questionnaires, injury surveillance techniques, and various studies that have looked at both personality and injury.

Personality Questionnaires

There are many different tools that can be used when trying to determine a person's personality type. Some have been shown more effective than others, but the Myers-Briggs Type Indicator, Big Five personality dimensions, and EPQ-BV are all reliable tests. The proceeding sub-sections will examine research studies that have used each of these personality assessment tools.

Myers Briggs

The Myers-Briggs Type Indicator (MBTI) is an assessment that categorizes personality into four sections, with two options in each section. These options are extroverts or introverts, sensing or intuition, thinking or feeling, and judgment or perception. This creates a total of sixteen different personalities. There are many different forms of the MBTI varying in length and specific uses but each has the same function.

Beginning its use during World War II, the Myers-Briggs Type Indicator is still being used as an insight into individuals and working relationships. There have been some problems with the MBTI, but many of these issues have been fixed statistically.[1] The MBTI is currently one of the most commonly used personality assessments. It has been researched and found to have good reliability and validity, being used in countless research studies that compare personality to different facets of life.

Allread and Marras[2] preformed a study that researched employees' personalities and how they related to manual materials handing jobs (warehouse work). They hypothesized that individuals whose work preferences did not match the nature of their job requirements would report more stress

and strain compared to those who did not match. All 133 participants were given the MBTI and other questionnaires relating to work environments. Results of this study showed when employees' personalities are matched to their work they report a decrease of anxiety and physical discomfort.[2]

A study by Wu et al[3] also implemented the Myers-Briggs Questionnaire (form G). Instead of comparing personality to work environments like the previous study, their aim was to determine if the Chinese culture of dentists differed from other cultures that had previously taken the assessment. A total of 317 high school seniors that applied to dental school completed the questionnaire. A chi-square analysis was performed to compare the dental student applicants with scores from applicants from other nations. Using MBTI these researchers showed that a dental school applicant's culture may reflect their personality.[3]

Another study done by Sefcik, Prerost, and Arbet[4] also used the Myers-Briggs Type Indicator (form M) to determine the effect of personality. This study looked at the effect of personality on test performance of osteopathic medical students. The scores on the Medical College Admissions Test (MCAT) and COMPLEX-USA Level 1 were used to compare with the results of the MBTI using ANOVA using 264 participants. The results of this study did not show much

statistical significance other than in the TF (thinking or feeling) group that showed lower scores with COMPLEX-USA Level 1.[4]

The Big 5

The Big 5, Five Factor Personality Questionnaire, and Five Factor Model are all forms of the same assessment that measure five different dimensions of personality. These dimensions include extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. Each dimension is then split into a higher degree or a lower degree depending on a person's intensity in that specific personality factor. There have been several studies using these dimensions to compare personality to multiple life events.

The study by Clark and Robertson[5] is a meta-analysis of the relationship between accident involvement and the Big Five personality dimensions. These five dimensions are extraversion, neuroticism, conscientiousness, agreeableness, and openness. Articles were found using PsycInfo and ABI-Inform databases along with a manual search of review articles. The inclusion criteria of articles was that they must contain a measure of personality which could be classified as one of the five,

and a criterion measure in terms of accidents or injuries. Using these criteria 47 articles were found. Data from the articles were then coded and placed under one of the five dimensions. Correlations were done so that a positive correlation indicated a high score on the personality category, and low had high accident rates. Results showed that individuals low in agreeableness and conscientiousness are more liable to be accident-involved.[5]

An article by Albu[6] analyzed the Five Factor Personality Questionnaire (CP5F). This Questionnaire included six different scales instead of five, adding autonomy. The final scale assesses the participants' tendency to five socially desirable answers. The results of this questionnaire were correlated with the Five-Factor Personality Inventory (FFPI), and Eysenck Personality Questionnaire (EPQ). The social desirability was accounted for by having two separate groups, one that participants were motivated to show a favorable image of themselves and a group that had no reason to give untruthful answers. Results reflected a good internal consistency and concluded the CP5F would be a good tool to use in the educational, organizational, clinical, and health care domains.[6]

Raynor and Levine[7] used the five-factor model of personality to see how personality related to health

behaviors. The researchers used 583 college students and administered the American College Health Association-National College Health Assessment and the five-factor model questionnaire. Researchers used SPSS for descriptive and inferential analysis. They also performed multiple linear regression analyses in order to determine if personality factors were related to health various health behaviors. The results showed that highly conscientious people were more likely to engage in healthy habits and not destructive ones whereas highly extraverted had the opposite habits.[7]

An article by Hudek-Knezevic and Kardum examined how the 5-factor personality traits along with 3 higher-order health-related personality constructs (negative experience, optimistic control, and passivity) relate to subjective health outcomes and objective health conditions. Eight hundred twenty-two participants were used. They were each given the Big Five Inventory (BFI) to measure personality dimensions. Other previously researched scales were given to assess their subjective and objective conditions. Results showed that the three health-related personality constructs can significantly predict all subjective health measures. The researchers concluded that the five factor personality traits and three health related personality

constructs may be useful when trying to determine the personality-health relationship.[8]

The study performed by Mitchell, et al[9] looked at the relationship between the Reinforcement Sensitivity Theory (RST) and the Five-Factor Model (FFM). This was done using 668 undergraduate introductory psychology students as participants. The researchers predicted that Sensitivity to Reward (SR) would have a positive relationship with extraversion, neuroticism, and openness, and a negative relationship with conscientiousness and agreeableness. Sensitivity to Punishment (SP) was predicted to have a positive relationship with neuroticism, agreeableness, and conscientiousness, and a negative relationship with extraversion and openness. SPSRQ was used to assess SP and SR of participants. NEO-PI-R was administered to measure the FFM personality domain and facet variables. A regression analysis was calculated with the findings and indicated that SP was positively associated with neuroticism and agreeableness, and negatively associated with extraversion, openness, and conscientiousness. SR was positively associated with extraversion and neuroticism, and negatively associated with agreeableness and conscientiousness. Researchers also found that at the facet level there is a relationship between SP, SR, and

each domain. These findings suggest there is an overlap between RST and FFM.[9]

Lluis-Font reviews[10] the Systems Net Theory in this article. This theory is an ideological and evolutionary interpretation of the human mind and personality. There are two types of systems; horizontal and vertical (general and specific). The idea of a system's net comes from these horizontal and vertical systems intertwining, forming a net. The origin of traits and factors occurs where the systems meet. The rest of the net then describes the structure of personality.[10]

EPQ-BV

The EPQ-BV is the brief version of the Eysenck Personality Questionnaire. This version is said to be accurate and reliable, while making it more acceptable to use in research because of its shortened length[11,12].

Hans Jurgen Eysenck (1916-1997) was an advocate of clinical psychologists filling a strictly scientific role. As a prominent writer and researcher he was the author of approximately 1600 publications, including editing a large number of books and journals. His research mainly consisted of his dimensional theory of personality. Considering all of his accomplishments during his lifetime

Eysenck came to be seen as an iconic figure in British psychology.[13]

Sato[11] describes the Eysenck Personality Questionnaire Brief Version (EPQ-BV) in this article. Studies showed however that the EPQR-A, abbreviated version of Eysenck's questionnaire, may be too brief decreasing the reliability factor. Sato then created a new shortened version hoping to increase the reliability. To test this new version the researcher had 268 participants take the original and the briefer version twice. Results showed that the brief version has a good internal consistency, test-retest reliability, and concurrent validity.[11]

A few studies have used this questionnaire to examine an individual's health. One such study looked at the influence of neurotic and extroverted traits on mortality rate. Participants of this study began with baseline testing that consisted of a sociodemographic and health questionnaire, underwent a physical examination, and completed the EPQ-BV. Twenty years later the mortality of the participants was assessed. Results showed that high neuroticism increased the risk of death due to cardiovascular disease. However, the researchers found a lack of significant results associating extroversion to mortality.[14]

Another study performed used 149 undergraduate college students and gave them a survey on introversion-extraversion (using the Eysenck personality questionnaire brief version) and Residential Life Questionnaire. In doing so the researchers were looking at a relationship between the two scales and how it affected the individual's feelings/reactions toward living on campus. Correlations were performed (using the results of the survey) that related to personality, alcohol, community involvement, and gender. Results found that extraversion is associated with drinking alcohol leading to risky behaviors including infractions of residential life rules and negative opinions of it.[15]

Burnout has been the topic of other studies relating health issues to personality. Burnout is a state of emotional exhaustion that contributing factors include overwork resulting in an individual's inability to perform their job. It has been stated that there are three elements to burnout; emotional exhaustion, depersonalization of others, and feelings of reduced personal accomplishment[16]. Ralph L. Piedmont[16] conducted a longitudinal analysis of burnout in the health care setting. He used a few different questionnaires to determine if personal dispositions play a role in burnout. Moderately strong

correlations were found between scores of the personality questionnaires and burnout. These findings show that personality does influence burnout.[16]

One study examined the relationship of nurse burnout with personality and coping behaviors. The researchers of this study used the Copenhagen burnout inventory, nursing job stressor scale, EPQ-BV, and the sort Japanese version of Brief COPE to assess burnout and personality. Their analysis showed that neuroticism was more closely related to personal, work-related, and client-related burnout then extroversion. Results imply that personality traits of an individual are factors that may cause burnout and should be addressed further.[12]

Instead of using the Eysenck Personality Inventory to compare health hazards with personality, a study performed by Eagleton et al[17] compared personality types with participants of team sports, individual sports, and non-sport participants. A short questionnaire was used to gather results from 90 university undergraduates. Results showed that extroversion scores were higher for team sport participants than for individual sport participants and nonparticipants. No significance was found between high neuroticism scores and team or individual sports.[17]

Other

Although the Myers-Briggs Personality Questionnaire, Big 5, and EPQ-BV are all good tools to use to assess personality types there are also many other assessments that can be used as well. Each assessment is a different in many aspects. The test that is used depends upon what the purpose of a study is.

One study used multiple assessment tools in order to look at ten personality traits and mortality from all causes and specific causes. Participants of this study were employees of France's national gas and electric companies (EDL and GDF). Those who chose to participate were given an annual questionnaire that contained data on health, lifestyle, individual, familial, social, and occupational factors and life events. The Bortner Type-A scale, the Buss-Durkee Hostility Inventory, and the Frossarth-Maticek-Eysenck Personality Stress Inventory were used as personality questionnaires. Statistics were assessed using one way-ANOVA, with a linear trend fitted across the hierarchical variables. Mortality differences were assessed using a chi square test. After analysis the researchers found that neurotic hostility was a personality predictor of excess mortality. Antisocial personalities were found to be associated with cardiovascular mortality

and with mortality from external causes. The results from this study suggest that realizing personality traits can help form prevention strategies. However more research should be done for evidence based prevention.[18]

Another study of personality and health by Liu et al[19] looked into how psychosocial variables influence people with multiple sclerosis (MS). Forty-one subjects diagnosed with MS for the first time were used. Their level of disability was assessed by neurologists, cognitive function was assessed by psychologists. Once these requirements were fulfilled participants completed a life event scale. Later an Eysenck Personality Questionnaire was administered to analyze characteristics of personality structure. It is composed of 88 questions assessing four different components of personality by an answer of yes or no. SPSS was used for statistical analysis of a t-test and correlation between psychosocial factors and MS. There was a control group of healthy patients used and this analysis showed a statistical difference between the control group and group with MS. People with MS have an increase of depression, anxiety, obsession, phobia which may play an important role in the progression of the disease. Negative emotions in the MS group showed a positive correlation for

neuroticisms in personality type and negatively for those with introverted and extroverted personalities.[19]

Injury Surveillance

Injuries are a common occurrence in competitive sports. Throughout an athlete's career they are likely to sustain a number of injuries. These injuries can range in severity from a bruise, to broken bones, ruptured ligaments, and possible paralysis. There are so many injuries that the National Collegiate Athletic Association (NCAA) actually developed a system to track injuries in particular sports.

National Collegiate Athletic Association ISS

The NCAA created an injury surveillance system (ISS) in 1982. This system helps with policies and risk management. It became web-based in 2005. Along with the change in format came many new goals. Some of these goals include providing tracking of every NCAA sport and also detailed national, divisional, and conference summary reports for comparison. This surveillance system has several uses such as allocation of sports-medicine

personnel and resources, grants, conference participation, and research.[20]

An introduction and methods article was written explaining the history and methods used by the NCAA ISS for all sport-specific articles. The ISS collects injury and exposure data from a variety of NCAA institutions and sports (sixteen total sports). The data is then shared in order to provide evidence-based decisions on health and safety. The entire NCAA athletic population is not used, instead the ISS uses a proportioned sample. Data is collected through certified athletic trainers and is voluntary. Every spring the head athletic trainer at every NCAA institution receives a letter requesting participation. They are asked to choose one primary sport and any secondary sports for data collection in the three collegiate seasons. Secondary requests were randomly selected, but all primary were selected. The schools selected were then sent instructions and a packet of injury and exposure forms. Inclusion criteria were number of participants, number of events, and injuries. During statistical analysis injury rates, rate ratios, and rate differences were used. All had a 95% confidence interval. Negative binomial regression was used to assess injury rates over time. It was also used to generate P values

comparing rates among divisions for competitions and practices and to compare the pre/in/post seasons. These techniques were used on all sports and results can be found in their subsequent articles.[21]

Prevalent Sports

Using the NCAA ISS professionals can predict injuries not only collectively, but also by sport. Many studies have been done relating the different sports to the number, severity, and common injuries athletes playing the sport sustain among other things. The studies performed using NCAA ISS helps to educate sports medicine professionals as to what injuries they need to focus prevention strategies on.

Hootman, Dick, and Agel[22] wrote an article summarizing the data from the NCAA injury surveillance and in doing so identify preventable risks. Data that accumulated over 16 years (beginning in 1982) from 15 sports was used in the research. The total number of injuries calculated was 182,000. These injuries include both game and practice injuries that required medical attention and the loss of at least one day in sport participation. Results were combined for all sports and game/practice was compared. Games showed a significantly higher injury rate then

practices. Practice injuries were further broken up into pre/in/post season. From these three practices preseason showed the highest occurrence of injury. These results have a 95% confidence interval. Of all the injuries documented, more then 50% were to the lower extremity, the ankle being the most common. Conclusions were that by using this surveillance system health care providers may be able to use the results to help shape their injury prevention strategies.[22]

Research was then performed looking at each sport individually. The sports used were baseball, women's field hockey, men's football, men's basketball, men's lacrosse, men's soccer, women's softball, women's volleyball, women's basketball, women's lacrosse, and men's wrestling.

The NCAA article summarizing results for baseball reviewed 16 years of data found on baseball injuries using the Injury Surveillance System (ISS). The results of the ISS for baseball show that when compared to other NCAA collegiate sports it has a low injury rate. Baseball players are most likely to have an injury during a game then at practice. Preseason practice showed injury rates almost twice as high then regular season practice. The highest injury percentages occurred from sliding (13%) or from the impact of a batted ball (10%). Twenty-five

percent of all baseball injuries are severe and result in 10 or more days out of participation.[23]

Fifteen years of women's field hockey injuries was reviewed using the NCAA ISS. It was found that injury rates during games were twice as high as those in practice. Most of these injuries occurred when the player was near the goal or within the 25-yd line. The cause of the majority of injuries was contact with the ball or stick. Game injury rates have been shown to be decreasing 2.5% over the course of the study. Concussion and head lacerations increased.[24]

Sixteen years of football injuries were reviewed using the NCAA ISS in hopes to identify potential areas for injury prevention. Football was found to have some of the highest injury rates of all sports reviewed by ISS. Results of this study found that for every 1000 athlete exposures there were 36 injuries found during games. The number of injuries was reduced during practices. The injury rate during a game was found to be 9 times higher then practice in season. Most injuries that required removal from participation for longer then 10 days were to the knee, ankle, or upper leg and were caused by contact with another player.[25]

Another article using the ISS created by the NCAA to review collegiate men's basketball injuries over a 16 year span. Many of the injuries found in this sport were to the lower extremity (60%). The most common injury was ankle ligament sprains; however knee internal derangements were the most common serious injuries. The results showed that there were more injuries during games then practices. In games there were 9.9 injuries per 1000 athlete-exposures and only 4.3 during practices. During the 16 calculations showed an increase in head and face injuries. The types of injuries show clinicians that preventative measures can be taken to avoid ankle and knee injuries. Also with an increase of head/face injuries steps need to be taken to watch how much physical contact there is during this game.[26]

The researchers studying men's lacrosse injuries reviewed the results found by NCAA ISS. The results found that it is 4 times more likely for an athlete to get injured during a men's lacrosse game then it is during practice. Most of these injuries (about 50%) were to the lower extremity. The most common of the injuries were ankle ligament sprains. The occurrence of concussions has increased, most likely from the changes in helmets that occurred in 1995. From these results researchers suggest that the design of lacrosse helmets is investigated.[27]

The rate and occurrence of injuries in collegiate men's soccer was also discussed and reviewed by researchers. Data for this review was found using the NCAA ISS. The data from ISS found that the injury rate in men's soccer is 4 times higher during games then in practices. Also when comparing practices, preseason was found to have more injuries then in season and post season practice. Lower extremity injuries were the most common, making up two-thirds of all injuries. These injuries during games were usually the result of player-to-player contact. However injuries during practice were usually noncontact. The most common injury was ankle ligament sprains, although internal knee derangements were the most common serious injuries.[28]

Sixteen years of collegiate softball injury surveillance was reviewed using the NCAA ISS for their data. Going over this data they attempted to determine evidence based recommendations for injury prevention in the sport. After looking at the results found in ISS the researchers determined that the most softball injuries occurred during preseason when compared to in season and post season. They also found that players were 1.68 times more likely to sustain an injury during a game then they were during in season practice. Most injuries found during

practice (55%) were from non contact and were ankle ligament sprains and knee internal derangements. Twenty-three percent of game injuries occurred because of sliding. Lower back strains, shoulder strains/tendinitis, and quadriceps and hamstring strains were also found to be common injuries. From the injuries found the researchers feel that equipment changes, neuromuscular training programs, and throwing programs should be researched further.[29]

Examining collegiate women's volleyball injury occurrences, researchers found that women's volleyball was more likely to have an injury during a game then at practice. Fifty-five percent of the sports injuries were to the lower extremity and ankle ligament sprains were the most common. Upper extremity injuries account for about 20% of all game injuries. Most injuries that occurred during a game were in the front line. Most of which were from contact with another player or the floor.[30]

By reviewing the epidemiology of injury in women's basketball, the researchers hope to be able to provide recommendations for the prevention of such injuries. Results of the surveillance system showed that women's basketball has more injuries during games then at practice. When looking at practices, more injuries occurred during

preseason then during regular season. The majority of injuries whether during practice or game was found to be to the lower extremity. Ankle ligament sprains, knee injuries, upper leg muscle-tendon strains, and concussions were the most common of these low extremity injuries. Researchers suggested proper preseason conditioning as a prevention technique after reviewing these findings.[31]

Researchers studied the injury occurrence of collegiate women's lacrosse players. Their purpose was to provide recommendations to prevent injuries in that particular sport. The NCAA ISS was the database used to collect and analyze injury data. Most injuries found by the researchers occurred to the lower extremity. Sixty percent of all serious injuries were sprains, strains and knee internal derangements. Most of these injuries were noncontact. Ball handle was one of the main causes of injury whether contact or no contact was involved. Researchers found that in order to avoid such injuries further research should look into proprioceptive, plyometric, and balance training.[32]

NCAA ISS also reviewed injuries of collegiate male wrestlers. The surveillance system found different concerns during practice and matches. In the practice environment the most prevalent health issue was found to be

skin infections. During competition research shows that the musculoskeletal system and head were most commonly injured. From these findings the researchers suggest that weight management be included in ISS data to make it more useable in wrestling. Also they suggest hygiene play a larger role in prevention of injury since many of the injury occurrences are skin related.[33]

Personality and Injury

It has been shown that there are many different influencing factors on injury occurrence. Few of these studies have looked at if personality can have an effect on injury. Determining cause of injury, which potentially could be personality, can then lead to preventative measures.

Personality Traits

Smith[34] reviewed cognitive-social-personality theory and how it relates to sport psychology. The cognitive-behavioral aspect to sports psychology is very important as an intervention technique. A greater understanding of cognitive social personality increases understanding of sport behavior. This can be used when dealing with

individual behavioral differences in situations and as a guide for beneficial coaching behaviors.[34]

Injury Occurrence

Goldberg, Moroz, and Smith[35] reviewed literature on injury surveillance. This review should help identify the key epidemiological and methodological issues that arise when reading or conducting an injury surveillance study. From the results recommendations can be made to guide clinicians in the interpretation of data of this type of study. Literature was found using MEDLINE and PubMed. Most literature used pertained to athletes, high school athletes in particular. The researchers came up with a few conclusions after going through the 91 articles found. The first conclusion was that a meaningful definition of injury must be found, including the severity and time lost from participation. Hours of exposure is also a key when looking at injury surveillance along with data collection that includes the greatest range of injuries (taking into consideration the first two conclusions).[35]

Another study by Malinauskas et al[36] looked at the incidence of sport related injuries and how athletes view supplements being related to treatment of injury. The researchers constructed a questionnaire that assessed sport

related injuries, supplements to treat injury, and sources of this supplement information. One hundred forty-five athletes involved in university-supported athletics completed this study (with the exception of golf and club sports.) Results showed that 93% of males and 88% of females reported injury. Seventeen percent to 34% of these injured athletes showed an interest in using supplements as a treatment method. This shows that athletes would benefit from learning more about the use of supplements.[36]

A study by Brooks and Fuller[37] examined a variety of epidemiological studies of sport injuries. They state the importance of understanding the causes of sport injuries in order to develop injury prevention, treatment, and rehabilitation strategies. Appropriate procedures should be considered in research designs to reflect the true risks of an injury within a study population. If there is too much variation in data analysis, with no consensus agreements on methodology, studies will result in conflicting conclusions.[37]

Personality and Incidence of Injury

Psychology has been found to contribute to the occurrence and recovery from athletic injury. Life stress is one component of psychology, and influences sport

injury. Factors of this stress-injury relationship are social support, coping skills, and personality. Therefore, decreasing stress can lower the risk of injury. Some reasons for this include decreasing muscular tension, reducing stress-induced narrowing of peripheral vision, and enhancing concentration.[38]

One study looked further into the psychological factors leading athletic injury. The objective was to establish injury rates among elite athletes and compare the mood, perceived life stress, and injury characteristics. In doing so psychological interventions may be created, decreasing injury. The study found that athletes who had sustained an injury in the previous twelve months showed significant mood disturbances and elevated life stress when compared to athletes who had not been injured.[39]

Adjusting Personality, Decreasing Injury Risk

If personality does influence injury then it may be beneficial to find a way to adjust personality in a way that would decrease injury risk. The article “Can personality be changed?”[39] reviews results found by multiple studies and discusses how these results impact the idea that a person’s personality may be altered. Personality is

flexible and can change over a person's lifetime. Beliefs can shape a personality and how a person functions (self theory). Therefore beliefs need to be changed in order for personality to be altered. Studies show that people either have a fixed or malleable theory. People with malleable personalities tend to function better in life. A study by Blackwell, Trzesniewski, and Dweck[39] shows evidence that this malleable personality can be taught.[39] Knowing what personalities are more susceptible to injury can help healthcare providers focus in on these traits and teach individuals how to rethink and mold certain beliefs, decreasing the likelihood of injury.

Another way to potentially prevent injuries is by using techniques geared around coping strategies according to Clark and Lucett.[40] Tools such as self-talk, breathing, and imagery can be used to help cope with stress and over-intensity. These coping skills allow an individual to calm himself or herself and create a positive frame of mind.[41]

Summary

Personality influences a person's everyday actions and contributes to how they will react and cope with certain situations. Different reactions and coping strategies can

alter the outcome of particular situations. Some of these situations include the occurrence and recovery from injury.

In athletics injury is a common occurrence. There have been many studies that have researched the causes of these injuries. Determining an underlying origin of injury can help sports medicine professionals and others working with athletes decrease the risk of sports related injury.

APPENDIX B

The Problem

THE PROBLEM

Statement of the Problem

The purpose of this study was to examine the effect personality traits have on the injury occurrence of Division II collegiate athletes. This study also analyzed each sport to see if a particular personality type could be found associated with a certain sport. It is important to understand all aspects of injury in order to decrease their occurrence. If a certain personality type is more prone to injury it should be adjusted in order to decrease injuries. Also, knowing which personality a sport is likely to have can help the medical staff and coaches associated with that team prevent injuries.

Specifically, this study examined the personality traits of neuroticism and extraversion vs. introversion. Individuals that do not have neurotic tendencies have been found to be emotionally stable compared to individuals that are high in neuroticism. Extraverted individuals differ from introverts due to their natural arousal level. Extraverted individuals have a lower arousal level then introverted individuals which forces them look for more sources of stimulation to increase their arousal level.[11] The neurotic individual's unstable emotions and the

increased external stimulation of extraverts may be a link to an increased injury rate of people with those traits. Therefore, it is important to determine the effect these traits have on injury occurrence in order to prevent injury.

Definition of Terms

The following terms were used in this research and are defined for this study:

1) Injury - National Collegiate Athletic Association's Injury Surveillance System (NCAA ISS) (1) Occurred as a result of participation in an organized intercollegiate practice or competition *and* (2) required medical attention by a team certified athletic trainer or physician *and* (3) resulted in restriction of the student-athlete's participation or performance for one or more calendar days beyond the day of injury.[20]

2) Personality - Individual behavioral patterns which help define a person's identity.[33]

3) Introvert - A personality trait where the individual has a naturally high arousal level causing them to avoid stimulation.[11]

4) Extravert - A personality trait where the individual has a naturally low arousal level causing them to seek stimulation.[11]

5) Neuroticism - A personality trait where the individual has a highly reactive autonomic nervous system, making them emotionally unstable.[11]

6) Burnout - Emotional exhaustion caused by overwork and continued exposure to excessive demands placed on mental energy which results in a gradual decline with the ability to perform job responsibilities.[14,15]

Basic Assumptions

The following are basic assumptions of this study:

1) The subjects answered all parts of the questionnaire accurately and honestly.

2) Only injuries that occurred in the past year (12 months) were recorded.

3) Injuries that were recorded occurred during sport play.

Limitations of the Study

The following are limitations of the study:

1) Only injuries that occurred in the past year could be used due to memory recall.

2) Injury portion of the questionnaire had not previously been used in research.

Delimitations of the Study

The following statement reflects the potential delimitation of the study:

1) Only 785 subjects with a valid e-mail address as recorded by the athletic director were able to view the survey.

Significance of the Study

All athletes are at risk of sustaining an injury because of the nature of athletics. In one year 2.6 million people between the ages of 5 and 24 are sent to the emergency room due to sport-related injuries.[34] It is important to understand factors that may contribute to injury in order to help prevent it's occurrence. If neuroticism and extraversion are linked to injury then it is important to use this information to decrease the number of incidents caused by those traits. In order to determine what trait an athlete has, it may be useful to understand if particular sports are higher in that trait. This can be done by looking at each sport individually and what the most prevalent personality of that sport is, as found in this study. Some suggestions which may help increase

introversion and reduce neuroticism are decreasing player anxiety, finding other sources of stimulation, and utilizing sport psychology. Using this knowledge, health care professionals will be able to work with these athletes and adjust the aspect of their personality that puts them at an increased risk.

APPENDIX C

Additional Methods

APPENDIX C1

Preliminary Study Informed Consent Form & Email

California University of Pennsylvania
250 University Avenue
California, PA 15419-1394
www.calu.edu

DEPARTMENT OF HEALTH SCIENCE
724-938-4562 | 724-938-4342 FAX

Building Character. Building Careers.

Dear Student Athlete:

My name is Kallie Balajthy and I am currently a graduate student at California University of Pennsylvania pursuing a Master of Science in Athletic Training. Part of the graduate study curriculum is to complete a thesis through conducting research. I am conducting survey research to determine if the occurrence of athletic injuries is affected by a person's personality type. Understanding factors that may increase the likelihood of injury will better prepare medical professionals to prevent and treat injury. The current study will help expand upon this understanding and allow health care professionals to provide better medical care.

Collegiate athletes in Pennsylvania are being asked to participate in the preliminary portion of this research; however, your participation is voluntary and you do have the right to not participate. You also have the right to discontinue participation at any time during the survey completion process at which time your data will be automatically discarded. The California University of Pennsylvania Institutional Review Board has reviewed and approved this project. The approval is effective 03/15/11 and expires 03/14/12.

By writing down your email address at the bottom of this form I will be able to directly send you a link to the survey. You will receive this survey twice, a week apart. The email will contain a link to the survey and a code which you will put into the appropriate space in the survey. This code will link your email address to your questionnaire, but will be kept on password protected California University of PA server and will be deleted after data is collected. After receiving the link you will have three days to complete the survey and will be given reminder emails until you do so. After completion of the first survey you will receive another link 7 days later and have three days to complete it. This process will help me determine the reliability of the survey for the primary study.

All survey responses are anonymous and will be kept confidential, and informed consent to use the data collected will be assumed upon return of the survey. Aggregate survey responses will be housed in a password protected file on the CalU campus server. Minimal risk is posed by participating as a subject in this study. I ask that you please take this survey at your earliest convenience as it will take approximately 10 minutes to complete. If you have any questions regarding this project, please feel free to contact the primary researcher, Kallie Balajthy at bal3276@calu.edu, or by calling (610)698-1498. You can also contact the faculty advisor for this research, Ellen West, EdD, ATC by email at west_e@calu.edu. Thanks in advance for your participation.

Sincerely,

Kallie Balajthy, ATC

Primary Researcher
California University of Pennsylvania
250 University Ave.
California, PA 15419

Your Email Address:_____

California University of Pennsylvania
250 University Avenue
California, PA 15419-1394
www.calu.edu

DEPARTMENT OF HEALTH SCIENCE

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724-938-4562 | 724-938-4342 FAX

Dear Student Athlete:

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Collegiate athletes (from Penn State Fayette) in Pennsylvania are being asked to participate in the preliminary portion of this research; however, your participation is voluntary and you do have the right to not participate. You also have the right to discontinue participation at any time during the survey completion process at which time your data will be automatically discarded. The California University of Pennsylvania Institutional Review Board has reviewed and approved this project. The approval is effective 03/15/11 and expires 03/14/12.

You will receive this survey twice by email, a week apart. The bottom of this email contains a link to the survey and a code which you will put into the appropriate space in the survey. This code will link your email address to your questionnaire, but will be kept on a password protected California University of PA server and will be deleted after data is collected. After receiving this email you will have three days to complete the survey and will be given reminder emails until you do so. After completion of the first survey you will receive another link 7 days later and have three days to complete it. This process will help me determine the reliability of the survey for the primary study.

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Thank you for taking the time to take part in my thesis research. I greatly appreciate your time and effort put into this task.

Sincerely,

Kallie Balajthy, ATC
Primary Researcher
California University of Pennsylvania

APPENDIX C2

Preliminary Survey Code Page

Personality and Injury Occurence Preliminary Survey

2. Demographic Information

* 1. Please type in the code you were given in the email with the link to this survey.

* 2. What is your age? (Must be over 18)

- ◯ <18
- ◯ 18
- ◯ 19
- ◯ 20
- ◯ 21
- ◯ 22
- ◯ 23
- ◯ 24
- ◯ >24

APPENDIX C3

Reliability Testing

Injury Occurrence Survey

The injury occurrence portion of the survey was created by the primary researcher of this study. Having never been used before, analysis of this section was implemented to determine the reliability of each question. The injury occurrence section consisted of four questions; (1) How many athletic injuries have you suffered from in the last 12 months (injury)? (2) What sport were you participating in when this injury occurred (sport)? (3)How long did this injury keep you from practice/competition (time)? and (4) Did it require surgery (severity)?. The following tables demonstrate the correlations between the two answers given for each question in the preliminary research study (N=6).

A Pearson correlation coefficient was calculated for the relationship between participants' initial and final response to the injury question of the survey. A strong positive correlation was found ($r(4)=1.00, p<.001$), indicating a significant linear relationship between the two variables (Figure 1).

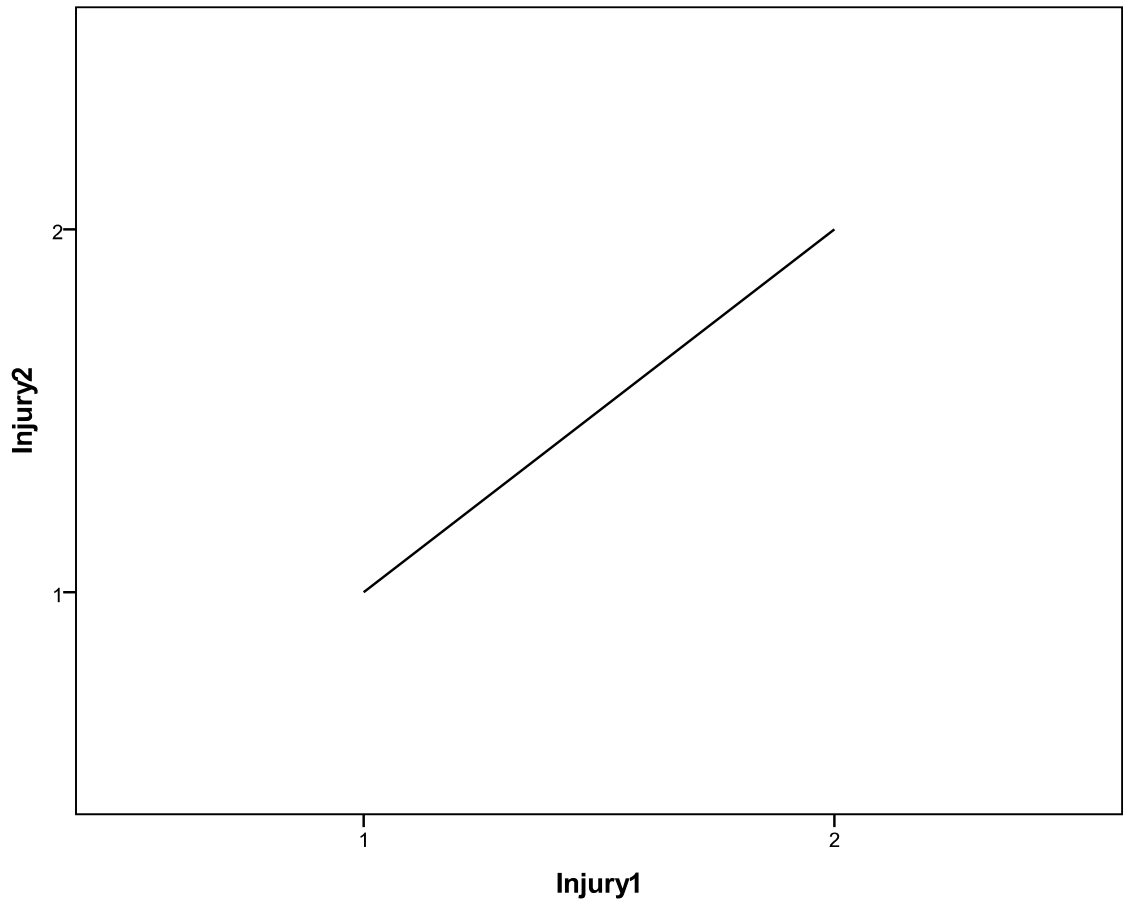


Figure 1: Pearson correlation coefficient of Injury

A Pearson correlation coefficient was calculated for the relationship between participants' initial and final response to the sport question of the survey. A strong positive correlation was found ($r(4)=1.00, p<.001$), indicating a significant linear relationship between the two variables (Figure 2).

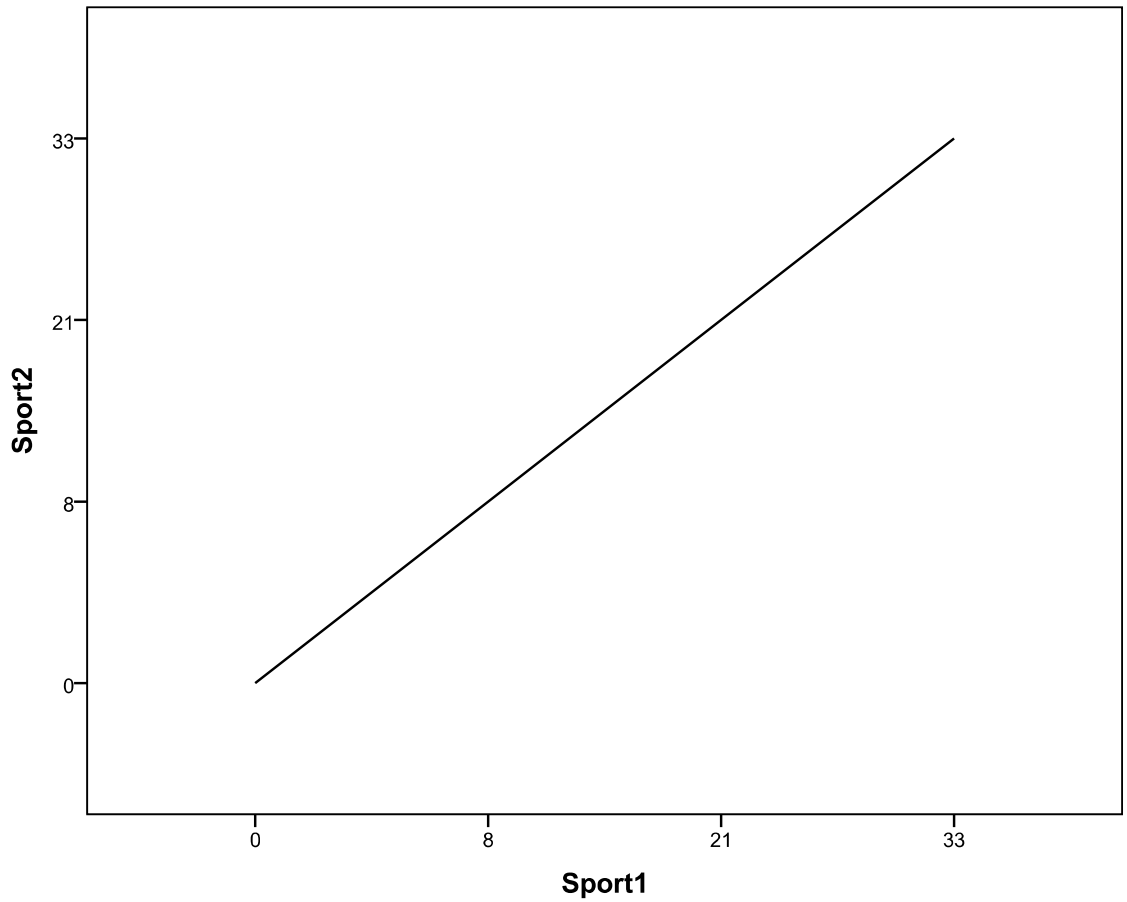


Figure 2: Pearson correlation coefficient of Sport

A Pearson correlation coefficient was calculated for the relationship between participants' initial and final response to the time question of the survey. A strong positive correlation that was not significant was found ($r(4)=.724, p=.103$ (Figure 3).

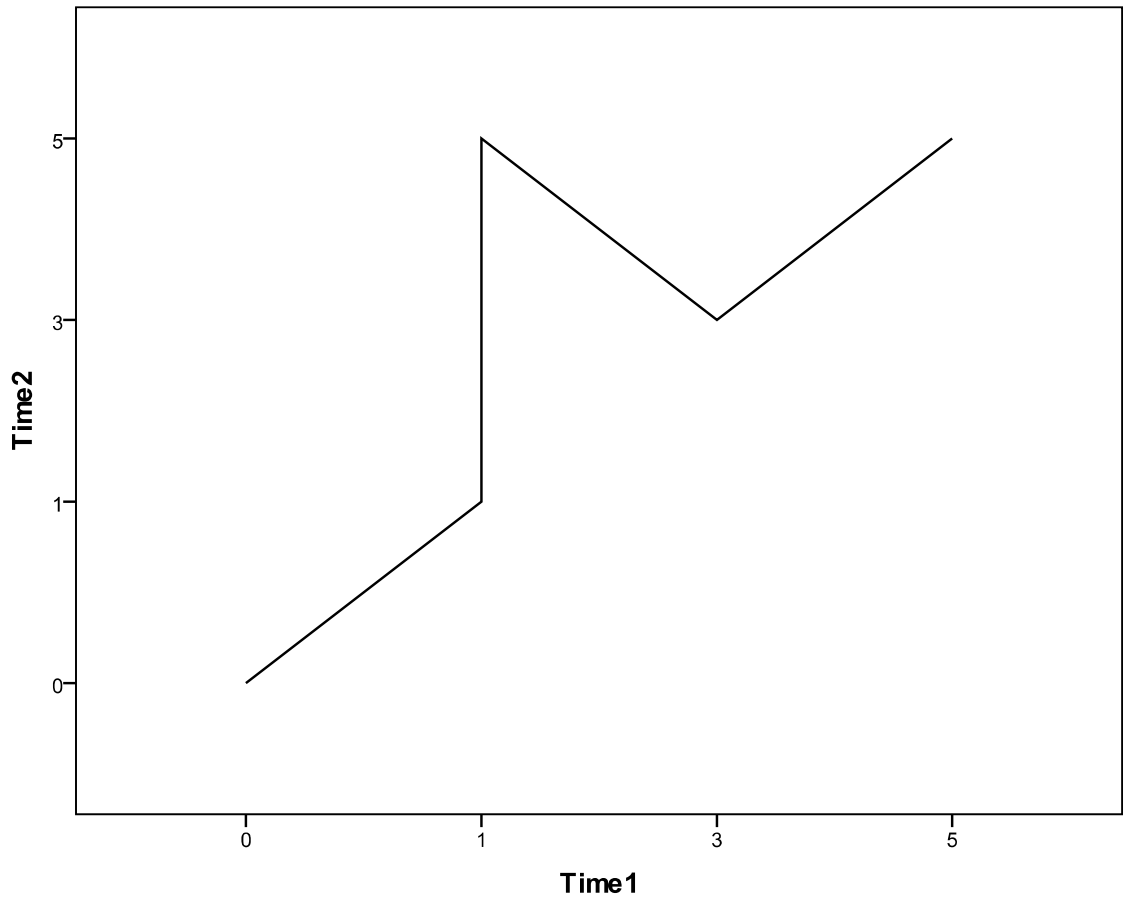


Figure 3: Pearson correlation coefficient of Time

A Pearson correlation coefficient was calculated for the relationship between participants' initial and final response to the severity question of the survey. A strong positive correlation was found ($r(4)=1.00, p<.001$), indicating a significant linear relationship between the two variables (Figure 4).

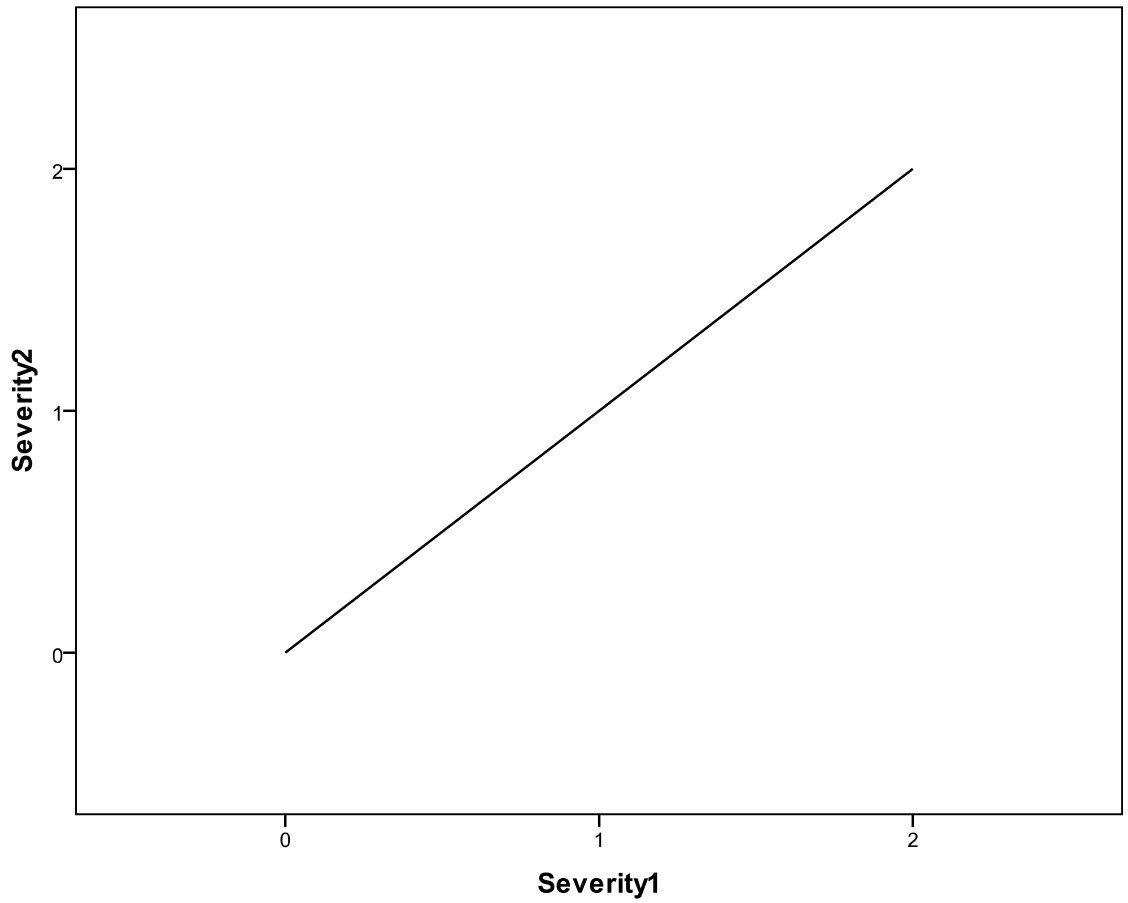


Figure 4: Pearson correlation coefficient of Severity

APPENDIX C4

Primary Survey

Personality and Injury Occurrence

1. Introduction

Dear Student Athlete:

My name is Kallie Balajthy and I am currently a graduate student at California University of Pennsylvania pursuing a Master of Science in Athletic Training. Part of the graduate study curriculum is to complete a thesis through conducting research. I am conducting survey research to determine if the occurrence of athletic injuries is affected by a person's personality type. Understanding factors that may increase the likelihood of injury will better prepare medical professionals to prevent and treat injury. The current study will help expand upon this understanding and allow health care professionals to provide better medical care.

Collegiate athletes (from select Division II and III schools) in Pennsylvania are being asked to participate in this research; however, your participation is voluntary and you do have the right to choose not to participate. You also have the right to discontinue participation at any time during the survey completion process at which time your data will be automatically discarded. The California University of Pennsylvania Institutional Review Board has reviewed and approved this project. The approval is effective 03/15/11 and expires 03/14/12.

All survey responses are anonymous and will be kept confidential, and informed consent to use the data collected will be assumed upon return of the survey. Aggregate survey responses will be housed in a password protected file on the CalU campus. Minimal risk is posed by participating as a subject in this study. I ask that you please take this survey at your earliest convenience as it will take approximately 10 minutes to complete. If you have any questions regarding this project, please feel free to contact the primary researcher, Kallie Balajthy at bal3276@calu.edu, or by calling (724)938-5954. You can also contact the faculty advisor for this research Ellen West, EdD, ATC by email at west_e@calu.edu. Thanks in advance for your participation. Please click next to begin the survey.

Thank you for taking the time to take part in my thesis research. I greatly appreciate your time and effort put into this task.

Sincerely,

Kallie Balajthy, ATC

Primary Researcher
California University of Pennsylvania
250 University Ave
California, PA 15419
(724)938-5954
Bal3276@calu.edu

Personality and Injury Occurrence

2. Demographic Information

*** 1. What is your age? (Must be over 18)**

- ◯ <18
- ◯ 18
- ◯ 19
- ◯ 20
- ◯ 21
- ◯ 22
- ◯ 23
- ◯ 24
- ◯ >24

Personality and Injury Occurrence

3. Demographic Information

*** 1. What is your gender?**

- ◯ Male
- ◯ Female

*** 2. Which academic year best describes you?**

- ◯ Freshman
- ◯ Sophmore
- ◯ Junior
- ◯ Senior

*** 3. How many years have you competed at the collegiate level?**

- ◯ <1
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ >5

*** 4. What is your primary NCAA sport?**

Primary Sport

Answer

Personality and Injury Occurrence

4. Athletic Injury

To answer the following questions please refer to the definition below:

Athletic Injury- (1) Occurred as a result of participation in an organized intercollegiate practice or competition and (2) required medical attention by a team certified athletic trainer or physician and (3) resulted in restriction of participation or performance for one or more calendar days beyond the day of injury.

*** 1. How many athletic injuries have you suffered from in the last 12 months?**

- ◯ 0
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5

Personality and Injury Occurrence

5. One Athletic Injury

*** 1. Injury #1**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

Personality and Injury Occurrence

6. Two Athletic Injuries

*** 1. Injury #1**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 2. Injury #2**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

Personality and Injury Occurrence

7. Three Athletic Injuries

*** 1. Injury #1**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 2. Injury #2**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 3. Injury #3**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practicing/participation?	Did it require surgery?
Answers			

Personality and Injury Occurrence

8. Four Athletic Injuries

*** 1. Injury #1**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 2. Injury #2**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/participation?	Did it require surgery?
Answers			

*** 3. Injury #3**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 4. Injury #4**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

Personality and Injury Occurrence

9. Five Athletic Injuries

*** 1. Injury #1**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 2. Injury #2**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 3. Injury #3**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 4. Injury #4**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

*** 5. Injury #5**

	What sport were you participating in when this injury occured?	How long did this injury keep you from practice/competition?	Did it require surgery?
Answers			

Personality and Injury Occurrence

10. Personality

Instructions:

Please indicate your characteristics by clicking one of the letters below each question.

A - Not at all
B - Slightly
C - Moderately
D - Very much
E - Extremely

*** 1. Are you a talkative person?**

Answer: A B C D E

*** 2. Does your mood often go up and down?**

Answer: A B C D E

*** 3. Are you rather lively?**

Answer: A B C D E

*** 4. Do you ever feel miserable for no reason?**

Answer: A B C D E

*** 5. Do you enjoy meeting new people?**

Answer: A B C D E

*** 6. Are you an irritable person?**

Answer: A B C D E

*** 7. Can you usually let yourself go and enjoy yourself at a lively party?**

Answer: A B C D E

*** 8. Are your feelings easily hurt?**

Answer: A B C D E

*** 9. Do you usually take the initiative in making new friends?**

Answer: A B C D E

Personality and Injury Occurrence

*** 10. Do you often feel "fed-up"?**

Answer A B C D E

*** 11. Can you easily get some life into a rather dull party?**

Answer A B C D E

*** 12. Would you call yourself a nervous person?**

Answer A B C D E

*** 13. Do you tend to keep in the background on social occasions?**

Answer A B C D E

*** 14. Are you a worrier?**

Answer A B C D E

*** 15. Do you like mixing with people?**

Answer A B C D E

*** 16. Would you call yourself tense or "highly-strung"?**

Answer A B C D E

*** 17. Do you like plenty of action and excitement around you?**

Answer A B C D E

*** 18. Do you worry too long after an embarrassing experience?**

Answer A B C D E

*** 19. Are you mostly quiet when you are with other people?**

Answer A B C D E

*** 20. Do you suffer from nerves?**

Answer A B C D E

Personality and Injury Occurrence

*** 21. Do other people think of you as being very lively?**

Answer A B C D E

*** 22. Do you often feel lonely?**

Answer A B C D E

*** 23. Can you get a party going?**

Answer A B C D E

*** 24. Are you often troubled about feelings of guilt?**

Answer A B C D E

Personality and Injury Occurrence

11. Thank You

Thank you for completing this survey! Your participation is greatly appreciated. If you have any questions please contact Kallie Balajthy at BAL3276@calu.edu.

APPENDIX C5

Institutional Review Board –

California University of Pennsylvania

California University of Pennsylvania

Proposal Number
Date Received

PROTOCOL for Research Involving Human Subjects

Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects

(Reference IRB Policies and Procedures for clarification)

Project Title *The Effect of Collegiate Athletes' Personality Traits on Injury Occurrence*

Researcher/Project Director *Kallie Balajthy*

Phone # *(610) 698-1498* ***E-mail Address*** *BAL3276@calu.edu*

Faculty Sponsor (if required) *Dr. Ellen West*

Department *Health Science*

Project Dates *January 2011* ***to*** *January 2012*

Sponsoring Agent (if applicable) _____

Project to be Conducted at *Division II and III Universities*

Project Purpose: ☒ ***Thesis*** ☐ ***Research*** ☐ ***Class Project*** ☐ ***Other***

Keep a copy of this form for your records.

Please attach a typed, detailed summary of your project AND complete items 2 through 6.

1. *Provide an overview of your project-proposal describing what you plan to do and how you will go about doing it. Include any hypothesis(ses)or research questions that might be involved and explain how the information you gather will be analyzed. For a complete list of what should be included in your summary, please refer to Appendix B of the IRB Policies and Procedures Manual.*

The purpose of this study is to determine if the personality type of NCAA Division II and III athletes are related to injury rate. The study will also look into certain demographics to find any correlations. These demographics include questions such as age, gender, and sport. The project dates will be from 01 January 2011 to 31 December 2011.

The research design for this study is descriptive. The design has three independent variables of sport and extroversion and neuroticism scales as measured by the Eysenck Personality Questionnaire Brief Version (EPQ-BV). The dependent variable in this research is of injury occurrence. The strength of this study is in the internal consistency and reliability of the personality portion of the survey. Values found by Sato, creater of the EPQ-BV, on the test-retest reliability are .92 for each scale. Internal consistency, measured by correlating results with the with the Eysenck Personality Questionnaire- Revised Short (EPQR-S) form, found the two highly correlated (.88 and .89). Limitations of this study are caused primarily from the injury occurrence portion of the questionnaire. The injury occurrence portion of the survey has not previously been used in any other research and was created by the researcher of this study.

The subjects used in this study will consist of NCAA Division II and III collegiate athletes currently participating in their sport. This sample of subjects will come from four colleges and universities in Pennsylvania. These schools include California University of Pennsylvania, Lock Haven University of Pennsylvania, Washington and Jefferson College, and Lycoming College. They will receive these surveys online via email from their athletic director. All participation is voluntary and responses will kept confidential. Anonymity will be preserved.

Preliminary research will consist of creating an injury occurrence portion of the questionnaire and determining its reliability and validity. The questionnaire will be sent to a panel of experts to measure the validity. The panel of experts will include five ATCs with experience in survey construction. When feedback is given the appropriate changes will be made. The questionnaire will then be distributed to fifteen athletes at Penn State Fayette. These select athletes will be volunteers who allow the researcher to email them the survey. The athletes will complete the questionnaire twice for comparison to show the results are repeatable. A consent form (Appendix A) will be given to each volunteer by their Athletic Trainer. This form will be similar to the primary study's consent form however on the preliminary consent form participants will be made aware of the study and their involvement in its preliminary research. There will also be a space for them to place their email address at the bottom of the consent form. The consent form will also notify participants that they will be given a code to type in a space provided at the beginning of the survey (Appendix B). This will make it possible for the researcher to link the two questionnaires during data collection. All information will be kept in a password protected file on the California University of PA server. After the completion of this preliminary research all data connecting the email address with the specific questionnaires will be deleted. Participants will be given three days to complete the survey once the link has been emailed to them,with a reminder email each day. One week after the completion of the initial survey they will receive the survey link again in their email to be completed in three days. This process will help determine the questionnaire's reliability. All athletes who participated in this procedure are then disqualified from taking part in the actual study.

The instrument used in this study is a questionnaire (Appendix C). This questionnaire includes three sections; (1) demographics, (2) personality type, and (3) injury occurrence. The questionnaire begins with an information page of the cover letter. This cover letter explains the purpose of the survey and contains all statements found on the IRB survey checklist. Contact information of the researcher and faculty advisor is also given. The survey begins with demographic information, including a question about the participants age. If the participant answers <18 the survey will automatically end. The personality type section of the questionnaire used the Eysenck Personality Questionnaire Brief Version (EPQ-BV). On the EPQ-BV all even numbered questions are for the neuroticism scale and odd numbered questions are for the extroversion

scale. Answers are scored where A=1 B=2 C=3 D=4 E=5, except for two reversed items (#13 and #19). The answers are then added together to obtain the extraversion and neuroticism score.

Injury occurrence is the final portion and was designed by the researcher of this study based on the NCAA Injury Surveillance System. Each participant will be asked how many injuries they sustained in the past 12 months. For each injury they received a point. They are also asked if they had received surgery. If they responded yes they are given another point. All points are then added to create a severity score.

The athletic directors of each school will be contacted by email from the researcher as to whether they would be interested in participating or not after obtaining approval from those school's IRBs. If they agree to participate the athletic directors will then be emailed the link to the survey which they are to distribute by email to the athletes at that school. By submitting the questionnaire the athlete consented, allowing the researcher use of the data. In the introduction of the survey all athletes are given a briefing explaining the procedure and purpose of the study. They are also told their participation is voluntary and will be kept confidential. Contact information of the researcher was listed in case participants further questions or concerns.

As each participant submitted the questionnaire, the survey site will keep track of all the data collectively. This data can then be analyzed by the researcher and results determined.

The following hypothesis are based on previous research and the intuition of the researcher from using these resources.

- Athletes that score high on the neuroticism scale will be at greater likelihood of injury.
- Athletes that score high on the extroversion scale will be at greater likelihood of injury.
- Individuals in a particular sport will have similar personality traits.

All data will be analyzed using PASW statistics 18. The level of significance set at $\alpha \leq .05$ while testing the hypotheses. A MANOVA will be used when analyzing the relationship between sport and personality traits. A regression analysis will then be used to look at the neuroticism scale and injury occurrence. The same regression analysis will also be used to examine injury occurrence and the extroversion scale.

2. *Section 46.11 of the Federal Regulations state that research proposals involving human subjects must satisfy certain requirements before the IRB can grant approval. You should describe in detail how the following requirements will be satisfied. Be sure to address each area separately.*

   a. *How will you insure that any risks to subjects are minimized? If there are potential risks, describe what will be done to minimize these risks. If there are risks, describe why the risks to participants are reasonable in relation to the anticipated benefits.*

      i. There are minimal risks associated with this study.

   b. *How will you insure that the selection of subjects is equitable? Take into account your purpose(s). Be sure you address research problems involving vulnerable populations such as children, prisoners, pregnant women, mentally disabled persons, and economically or educationally disadvantaged persons. If this is an in-class project describe how you will minimize the possibility that students will feel coerced.*

      i. The subjects will constist of collegiate athletes from Division II and III schools. All NCAA athletes will be contacted at the four schools on a completely voluntary basis.

   c. *How will you obtain informed consent from each participant or the subject's legally authorized representative and ensure that all consent forms are appropriately documented? Be sure to attach a copy of your consent form to the project summary.*

i. Consent will be implied if participants complete and submit the survey.

d. Show that the research plan makes provisions to monitor the data collected to insure the safety of all subjects. This includes the privacy of subjects' responses and provisions for maintaining the security and confidentiality of the data.

i. Responses will be secured on SurveyMonkey where submissions cannot be traced back to individual respondents.

3. Check the appropriate box(es) that describe the subjects you plan to use.

☒ *Adult volunteers*	☐ *Mentally Disabled People*
☒ *CAL University Students*	☐ *Economically Disadvantaged People*
☒ *Other Students*	☐ *Educationally Disadvantaged People*
☐ *Prisoners*	☐ *Fetuses or fetal material*
☐ *Pregnant Women*	☐ *Children Under 18*
☐ *Physically Handicapped People*	☐ *Neonates*

4. Is remuneration involved in your project? ☐ *Yes or* ☒ *No. If yes, Explain here.*

5. Is this project part of a grant? ☐ *Yes or* ☒ *No If yes, provide the following information:*

Title of the Grant Proposal _____

Name of the Funding Agency _____

Dates of the Project Period _____

6. Does your project involve the debriefing of those who participated? ☐ *Yes or* ☒ *No*

If Yes, explain the debriefing process here.

7. If your project involves a questionnaire interview, ensure that it meets the requirements of Appendix___in the Policies and Procedures Manual.

California University of Pennsylvania Institutional Review Board
Survey/Interview/Questionnaire Consent Checklist (v021209)

This form MUST accompany all IRB review requests

Does your research involve ONLY a survey, interview or questionnaire?
☒ **YES**—Complete this form
☐ **NO**—You MUST complete the "Informed Consent Checklist"—skip the remainder of this form

Does your survey/interview/questionnaire cover letter or explanatory statement include:

☒ (1) Statement about the general nature of the survey and how the data will be used?

☒ (2) Statement as to who the primary researcher is, including name, phone, and email address?

☒ (3) FOR ALL STUDENTS: Is the faculty advisor's name and contact information provided?

☒ (4) Statement that participation is voluntary?

☒ (5) Statement that participation may be discontinued at any time without penalty and all data discarded?

☒ (6) Statement that the results are confidential?

☒ (7) Statement that results are anonymous?

☒ (8) Statement as to level of risk anticipated or that minimal risk is anticipated? (NOTE: If more than minimal risk is anticipated, a full consent form is required—and the Informed Consent Checklist must be completed)

☒ (9) Statement that returning the survey is an indication of consent to use the data?

☒ (10) Who to contact regarding the project and how to contact this person?

☒ (11) Statement as to where the results will be housed and how maintained? (unless otherwise approved by the IRB, must be a secure location on University premises)

☒ (12) Is there text equivalent to: "Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm"? (the actual dates will be specified in the approval notice from the IRB)?

☒ (13) FOR ELECTRONIC/WEBSITE SURVEYS: Does the text of the cover letter or explanatory statement appear before any data is requested from the participant?

☒ (14) FOR ELECTONIC/WEBSITE SURVEYS: Can the participant discontinue participation at any point in the process and all data is immediately discarded?

California University of Pennsylvania Institutional Review Board
Informed Consent Checklist (v021209)

This form MUST accompany all IRB review requests

Does your research involve ONLY a survey, interview, or questionnaire?
☒ **YES**—DO NOT complete this form. You MUST complete the "Survey/Interview/Questionnaire Consent Checklist" instead.
☐ **NO**—Complete the remainder of this form.

1. **Introduction** (check each)
   - ☐ (1.1) Is there a statement that the study involves research?
   - ☐ (1.2) Is there an explanation of the purpose of the research?

2. **Is the participant.** (check each)
   - ☐ (2.1) Given an invitation to participate?
   - ☐ (2.2) Told why he/she was selected.
   - ☐ (2.3) Told the expected duration of the participation.
   - ☐ (2.4) Informed that participation is voluntary?
   - ☐ (2.5) Informed that all records are confidential?
   - ☐ (2.6) Told that he/she may withdraw from the research at any time without penalty or loss of benefits?
   - ☐ (2.7) 18 years of age or older? (if not, see Section #9, Special Considerations below)

3. **Procedures** (check each).
   - ☐ (3.1) Are the procedures identified and explained?
   - ☐ (3.2) Are the procedures that are being investigated clearly identified?
   - ☐ (3.3) Are treatment conditions identified?

4. **Risks and discomforts**. (check each)
   - ☐ (4.1) Are foreseeable risks or discomforts identified?
   - ☐ (4.2) Is the likelihood of any risks or discomforts identified?
   - ☐ (4.3) Is there a description of the steps that will be taken to minimize any risks or discomforts?
   - ☐ (4.4) Is there an acknowledgement of potentially unforeseeable risks?
   - ☐ (4.5) Is the participant informed about what treatment or follow up courses of action are available should there be some physical, emotional, or psychological harm?
   - ☐ (4.6) Is there a description of the benefits, if any, to the participant or to others that may be reasonably expected from the research and an estimate of the likelihood of these benefits?
   - ☐ (4.7) Is there a disclosure of any appropriate alternative procedures or courses of treatment that might be advantageous to the participant?

5. **Records and documentation**. (check each)
   - ☐ (5.1) Is there a statement describing how records will be kept confidential?
   - ☐ (5.2) Is there a statement as to where the records will be kept and that this is a secure location?
   - ☐ (5.3) Is there a statement as to who will have access to the records?

6. For research involving more than minimal risk (check each),

☐ (6.1) Is there an explanation and description of any compensation and other medical or counseling treatments that are available if the participants are injured through participation?

☐ (6.2) Is there a statement where further information can be obtained regarding the treatments?

☐ (6.3) Is there information regarding who to contact in the event of research-related injury?

7. Contacts.(check each)

☐ (7.1) Is the participant given a list of contacts for answers to questions about the research and the participant's rights?

☐ (7.2) Is the principal researcher identified with name and phone number and email address?

☐ (7.3) FOR ALL STUDENTS: Is the faculty advisor's name and contact information provided?

8. General Considerations (check each)

☐ (8.1) Is there a statement indicating that the participant is making a decision whether or not to participate, and that his/her signature indicates that he/she has decided to participate having read and discussed the information in the informed consent?

☐ (8.2) Are all technical terms fully explained to the participant?

☐ (8.3) Is the informed consent written at a level that the participant can understand?

☐ (8.4) Is there text equivalent to: "Approved by the California University of Pennsylvania Institutional Review Board. This approval is effective nn/nn/nn and expires mm/mm/mm"? (the actual dates will be specified in the approval notice from the IRB)

9. Specific Considerations (check as appropriate)

☐ (9.1) If the participant is or may become pregnant is there a statement that the particular treatment or procedure may involve risks, foreseeable or currently unforeseeable, to the participant or to the embryo or fetus?

☐ (9.2) Is there a statement specifying the circumstances in which the participation may be terminated by the investigator without the participant's consent?

☐ (9.3) Are any costs to the participant clearly spelled out?

☐ (9.4) If the participant desires to withdraw from the research, are procedures for orderly termination spelled out?

☐ (9.5) Is there a statement that the Principal Investigator will inform the participant or any significant new findings developed during the research that may affect them and influence their willingness to continue participation?

☐ (9.6) Is the participant is less than 18 years of age? If so, a parent or guardian must sign the consent form and assent must be obtained from the child

- ☐ Is the consent form written in such a manner that it is clear that the parent/guardian is giving permission for their child to participate?
- ☐ Is a child assent form being used?
- ☐ Does the assent form (if used) clearly indicate that the child can freely refuse to participate or discontinue participation at any time without penalty or coercion?

☐ (9.7) Are all consent and assent forms written at a level that the intended participant can understand? (generally, 8th grade level for adults, age-appropriate for children)

California University of Pennsylvania Institutional Review Board
Review Request Checklist (v021209)

This form MUST accompany all IRB review requests.
Unless otherwise specified, ALL items must be present in your review request.

Have you:

☒ (1.0) FOR ALL STUDIES: Completed ALL items on the Review Request Form?
Pay particular attention to:

- ☒ (1.1) Names and email addresses of all investigators
  - ☒ (1.1.1) FOR ALL STUDENTS: use only your CalU email address)
  - ☒ (1.1.2) FOR ALL STUDENTS: Name and email address of your faculty research advisor
- ☒ (1.2) Project dates (must be in the future—no studies will be approved which have already begun or scheduled to begin before final IRB approval—NO EXCEPTIONS)
- ☒ (1.3) Answered completely and in detail, the questions in items 2a through 2d?
  - ☐ 2a: NOTE: No studies can have zero risk, the lowest risk is "minimal risk". If more than minimal risk is involved you MUST:
    - ☐ i. Delineate all anticipated risks in detail;
    - ☐ ii. Explain in detail how these risks will be minimized;
    - ☐ iii. Detail the procedures for dealing with adverse outcomes due to these risks.
    - ☐ iv. Cite peer reviewed references in support of your explanation.
  - ☒ 2b. Complete all items.
  - ☒ 2c. Describe informed consent procedures in detail.
  - ☒ 2d. NOTE: to maintain security and confidentiality of data, all study records must be housed in a secure (locked) location ON UNIVERSITY PREMISES. The actual location (department, office, etc.) must be specified in your explanation and be listed on any consent forms or cover letters.
- ☒ (1.4) Checked all appropriate boxes in Section 3? If participants under the age of 18 years are to be included (regardless of what the study involves) you MUST:
  - ☐ (1.4.1) Obtain informed consent from the parent or guardian—consent forms must be written so that it is clear that the parent/guardian is giving permission for their child to participate.
  - ☐ (1.4.2) Document how you will obtain assent from the child—This must be done in an age-appropriate manner. Regardless of whether the parent/guardian has given permission, a child is completely free to refuse to participate, so the investigator must document how the child indicated agreement to participate ("assent").
- ☒ (1.5) Included all grant information in section 5?
- ☒ (1.6) Included ALL signatures?

☐ (2.0) FOR STUDIES INVOLVING MORE THAN JUST SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

- ☐ (2.1) Attached a copy of all consent form(s)?
- ☐ (2.2) FOR STUDIES INVOLVING INDIVIDUALS LESS THAN 18 YEARS OF AGE: attached a copy of all assent forms (if such a form is used)?
- ☐ (2.3) Completed and attached a copy of the Consent Form Checklist? (as appropriate—see that checklist for instructions)

☒ (3.0) FOR STUDIES INVOLVING ONLY SURVEYS, INTERVIEWS, OR QUESTIONNAIRES:

- ☒ (3.1) Attached a copy of the cover letter/information sheet?
- ☒ (3.2) Completed and attached a copy of the Survey/Interview/Questionnaire Consent Checklist? (see that checklist for instructions)
- ☒ (3.3) Attached a copy of the actual survey, interview, or questionnaire questions in their final form?

☒ (4.0) FOR ALL STUDENTS: Has your faculty research advisor:

- ☒ (4.1) Thoroughly reviewed and approved your study?
- ☒ (4.2) Thoroughly reviewed and approved your IRB paperwork? including:
  - ☒ (4.2.1) Review request form,
  - ☒ (4.2.2) All consent forms, (if used)
  - ☐ (4.2.3) All assent forms (if used)
  - ☒ (4.2.4) All Survey/Interview/Questionnaire cover letters (if used)
  - ☒ (4.2.5) All checklists
- ☒ (4.3) IMPORTANT NOTE: Your advisor's signature on the review request form indicates that they have thoroughly reviewed your proposal and verified that it meets all IRB and University requirements.

☒ (5.0) Have you retained a copy of all submitted documentation for your records?

Project Director's Certification
Program Involving HUMAN SUBJECTS

The proposed investigation involves the use of human subjects and I am submitting the complete application form and project description to the Institutional Review Board for Research Involving Human Subjects.

I understand that Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects. If the Board grants approval of this application, I agree to:

1. Abide by any conditions or changes in the project required by the Board.
2. Report to the Board any change in the research plan that affects the method of using human subjects before such change is instituted.
3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary or would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional Research

Project Director's Signature

Department Chairperson's Signature

Student or Class Research

Student Researcher's Signature

Ellen J West EdD, ATC

Supervising Faculty Member's Signature if required

Department Chairperson's Signature

ACTION OF REVIEW BOARD (IRB use only)

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional harm.

☐ Approved[_____] ☐ Disapproved

Chairperson, Institutional Review Board

Date

Approved, September 12, 2005 / (updated 02-09-09)

IRB 10-027 approval
instreviewboard
Sent: Tuesday, March 15, 2011 1:33 PM
To: BAL3276 - BALAJTHY, KALLIE D
Cc: West, Ellen; Skwarecki, Robert

Institutional Review Board
California University of Pennsylvania
Psychology Department LRC, Room 310
250 University Avenue
California, PA 15419
instreviewboard@cup.edu
instreviewboard@calu.edu
Robert Skwarecki, Ph.D., CCC-SLP,Chair

Ms. Balajthy,

Please consider this email as official notification that your proposal titled "The Effect of Collegiate Athletes' Personality Traits on Injury Occurrence" (Proposal #10-027) has been approved by the California University of Pennsylvania Institutional Review Board as amended.

The effective date of the approval is 03-15-2011 and the expiration date is 03-14-2012. These dates must appear on the consent form.
Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

(1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)

(2) Any events that affect the safety or well-being of subjects

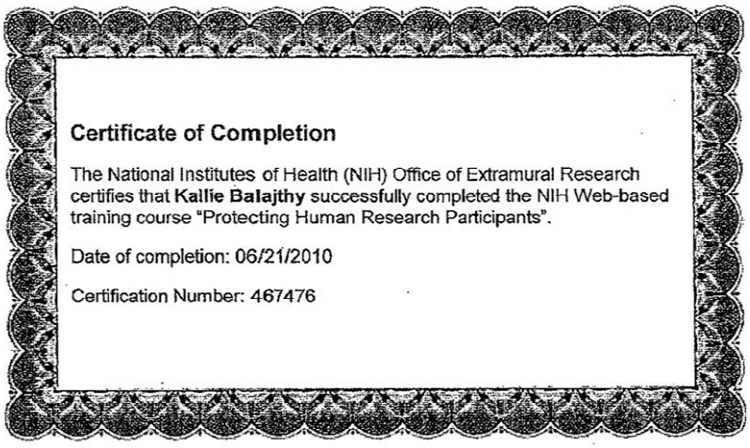
(3) Any modifications of your study or other responses that are necessitated by any events reported in (2).

(4) To continue your research beyond the approval expiration date of 03-14-2012 you must file additional information to be considered for continuing review. Please contact instreviewboard@calu.edu

Please notify the Board when data collection is complete.

Regards,

Robert Skwarecki, Ph.D., CCC-SLP
Chair, Institutional Review Board



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Kallie Balajthy** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 06/21/2010

Certification Number: 467476

APPENDIX C6

Primary Study Athletic Director & Student Athlete Email

California University of Pennsylvania
250 University Avenue
California, PA 15419-1394
www.calu.edu

DEPARTMENT OF HEALTH SCIENCE
724-938-4562 | 724-938-4342 FAX

Building Character. Building Careers.

Dear Athletic Director,

My name is Kallie Balajthy and I am currently a graduate student at California University of Pennsylvania pursuing a Master of Science in Athletic Training. Part of the graduate study curriculum is to complete a thesis through conducting research. I am conducting survey research to determine if the occurrence of athletic injuries is affected by a person's personality type. Understanding factors that may increase the likelihood of injury will better prepare medical professionals to prevent and treat injury. The current study will help expand upon this understanding and allow health care professionals to provide better medical care.

If it is possible I would like to use your university in this study. To do so I will need your cooperation in sending out an email with the survey link to the collegiate athlete's at your school. If you agree allow your school to participate please notify me and I will send you the email to forward on to the athletes.

Participation is voluntary and the athletes do have the right to choose not to participate. They will also have the right to discontinue participation at any time during the survey completion process. The California University of Pennsylvania Institutional Review Board had reviewed and approved this project. The approval is effective 03/15/11 and expires 03/14/12.

All survey responses are anonymous and will be kept confidential, and informed consent to use the data collected will be assumed upon return of the survey. Aggregate survey responses will be housed in a password protected file on the CalU campus. Minimal risk is posed by participating as a subject in this study. If you have any questions please feel free to contact the primary researcher, Kallie Balajthy at BAL3276@calu.edu. You can also contact the faculty advisor for this research Ellen West, EdD, ATC by email at west_e@calu.edu.

Thank you, I greatly appreciate your time and effort put into this task.

Sincerely,

Kallie Balajthy, ATC, PES

Primary Researcher
California University of Pennsylvania
250 University Ave
California, PA 15419
(724)938-5954

California University of Pennsylvania
250 University Avenue
California, PA 15419-1394
www.calu.edu

DEPARTMENT OF HEALTH SCIENCE

Building Character. Building Careers.

724-938-4562 | 724-938-4342 FAX

Dear Student Athlete,

My name is Kallie Balajthy and I am currently a graduate student at California University of Pennsylvania pursuing a Master of Science in Athletic Training. Part of the graduate study curriculum is to complete a thesis through conducting research. I am conducting survey research to determine if the occurrence of athletic injuries is affected by a person's personality type. Understanding factors that may increase the likelihood of injury will better prepare medical professionals to prevent and treat injury. The current study will help expand upon this understanding and allow health care professionals to provide better medical care.

Collegiate athletes (from select Division II and III schools) in Pennsylvania are being asked to participate in this research; however, your participation is voluntary and you do have the right to choose not to participate. You also have the right to discontinue participation at any time during the survey completion process at which time your data will be automatically discarded. The California University of Pennsylvania Institutional Review Board had reviewed and approved this project. The approval is effective 03/15/11 and expires 03/14/12.

All survey responses are anonymous and will be kept confidential, and informed consent to use the data collected will be assumed upon return of the survey. Aggregate survey responses will be housed in a password protected file on the CalU campus. Minimal risk is posed by participating as a subject in this study. I ask that you please take this survey at your earliest convenience as it will take approximately 10 minutes to complete. If you have any questions regarding this project please feel free to contact the primary researcher, Kallie Balajthy at BAL3276@calu.edu, or by calling (724)938-5954. You can also contact the faculty advisor for this research Ellen West, EdD, ATC by email at west_e@calu.edu. Please click the link at the bottom of the page to begin the survey.

Thank you for taking the time to take part in my thesis research. I greatly appreciate your time and effort put into this task.

Sincerely,

Kallie Balajthy, ATC, PES

Primary Researcher
California University of Pennsylvania
250 University Ave
California, PA 15419
(724)938-5954

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ABSTRACT

Title: EFFECT OF COLLEGIATE ATHLETES' PERSONALITY TRAITS ON OCCURRENCE OF ATHLETIC INJURY

Researcher: Kallie D. Balajthy ATC, PES

Advisor: Ellen J. West EdD, ATC

Date: May 2011

Research Type: Master's Thesis

Content: Sport psychology has been found to be linked to athletic injury. There are many components of sport psychology, one of these being personality. Currently there are no studies relating injury occurrence with personality type. If a correlation can be found, the results could be used to create prevention strategies to decrease injury risk.

Objective: To examine the relationship personality traits of neuroticism and extroversion vs. introversion have with the injury occurrence of Division II collegiate athletes.

Design: Descriptive web-based survey

Setting: Athletes (N=785) of two Division II schools in Pennsylvania.

Participants: Seventy three collegiate athletes at Lock Haven University and California University of PA completed the Personality and Injury Occurrence survey. Final count of participants N=71 (age= 20.32±1.371, 38% male, 62% female).

Interventions: A pilot study was conducted to determine test-retest reliability. Participants received a questionnaire that included a demographic, injury occurrence, and personality (EPQ-BV) section.

Measures: This study included a dependent variable of injury occurrence and three independent variables. The first two independent variables were of personality scales, extroversion and neuroticism, and the third of sport. Three hypotheses were tested. The first two stated that athletes that score high on the neuroticism/extroversion scale will have an increased likelihood of injury. The third hypothesis predicted that individuals in a particular sport will have similar personality traits. The survey questions were coded via the researcher, and a Pearson product correlation was used to predict each question's reliability.

Results: All hypotheses were tested using a significance level set at $\alpha \leq .05$. A Pearson product correlation was used when analyzing both personality scales and injury occurrence. A weak negative correlation that was not significant was found ($r(2)=-.092, p>.05$) when comparing the relationship between participants' injury occurrence and level of neuroticism. A weak non-significant correlation was found ($r=(2)=.212, p>.05$) when determining a relationship between participants' injury occurrence and level of extroversion. A MANOVA was calculated to examine the effect of the participants' primary sport on their trait scores. No significant effect was found (*Lambda*$(30,108)=.593, p>.05$). Additional findings included another Pearson product correlation between extroversion and neuroticism. A moderate negative correlation was found ($r=(69)=-375, p<.01$) indicating a significant linear relationship. Finally, the primary teams were sorted into two categories of team and individual sport. An individual samples t-test was used to examine these two categories and the personality traits. No significant difference was found with sport and neuroticism ($t(69)=-.038, p=.970$) or extroversion ($t(69)=.766, p=.446$).

Conclusions: This study revealed that no significant results were found concerning personality traits and injury occurrence or primary sport. The rejection of each hypothesis was most likely due to the low response rate (9%).

Word Count: 461