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Assessing the Relationship Between Psychological Readiness and Physical Performance in Secondary School Physical Education

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Preparing for Success: The Relationship Between Preparedness and Performance in Secondary Physical Education

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Abstract

The purpose of this project was to analyze the relationship between a psychological preparedness survey and physical performance tests. Perceived preparedness is a valid measure for determining readiness to train, however, there is a lack of studies evaluating high school-aged students and the relationship these scales have with physical performance tests. 41 high school students were recruited and participated in a single session including a 6-point preparedness survey, an aerobic capacity test, and a power test. Demographic, perceptive, and performance data were recorded and analyzed. Pearson correlations were used to determine the relationship between the performance and preparedness variables. Significant correlations were observed for preparedness metrics stress, soreness, and energy with power and aerobic capacity test performance. The results provide evidence for a valid method of determining student preparedness before an exercise bout and offering ideas to promote positive student experiences during assessments.

Keywords: *K-12, high school, physical education, fitness, health education, readiness to train, preparedness, perception, aerobic capacity, power*

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Chapter 1: Introduction

Background Information

Secondary education in the United States occurs with individuals between the ages of 13-19 and spans multiple subject areas in order to prepare students for joining society. Students are, therefore, provided with the tools necessary to join the workforce, pursue trade skills, or progress to the next level of higher education. Physical education is a fundamental topic in secondary education that is geared towards physical literacy. This coursework prepares students to practice proper physical and emotional structures throughout life. SHAPE America (2013) provides the following national standards for physical education in the United States:

- The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.
- The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.
- The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.
- The physically literate individual exhibits responsible personal and social behavior that respects self and others.
- The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

This project will take place in Southern California at a secondary school and thus will be associated with the Model Content Standards for Physical Education in California. According to the state of California, two years of physical education is required to progress past high school

(Physical Education Model Content Standards for California, n.d.). In the first and second-year courses, there are three main standards employed:

- Students demonstrate knowledge of and competency in motor skills, movement patterns, and strategies needed to perform a variety of physical activities,
- students achieve a level of physical fitness for health and performance while demonstrating knowledge of fitness concepts, principles, and strategies, and
- students demonstrate knowledge of psychological and sociological concepts, principles, and strategies that apply to the learning and performance of physical activity.

The third standard for all high school physical education courses states that students should be able to demonstrate sociological and psychological knowledge as it pertains to physical activity. A substandard of this is the student evaluating personal psychological responses to physical activity. It is within this model content standard the need for a perceived preparedness survey in physical education is defined. However, the main topic that needs to be addressed before the continuation of this project is a brief synopsis of the literature alluding to preparedness surveys.

Taking into consideration the necessity for social-emotional instruction in physical education, what would be the best way to integrate this concept, build relationships with the student, and empower the student to take control of their individual fitness performances. Past literature from Hooper et al. (1995) indicates the use of preparedness surveys as a means for identifying overtraining syndrome in athletes. Psychological scales can be used to identify mood states, self-reported fatigue, and signs of distress. These metrics can also be compared to physiological factors or total volume in program design to determine the athletes' abilities to

validly measure themselves. Scales can also be used for daily analysis of training and contain questions covering soreness, irritability, stress, sleep, and diet quality. One of the common psychological scales is the Profile of Mood States (POMS) and indicates its score termed the Total Mood Disturbance (TMD) (Hooper, 1995).

A more recent study by Kellman (2010) evaluated the Recovery-Stress state in various athletes and countries using a RESTQ-Sport questionnaire. This scale subjectively measures general/emotional/social stress, conflict, fatigue, lack of energy, complaints, success, social/physical recovery, well-being, sleep quality/disturbances, emotional exhaustion, injury, in-shape, accomplishment, and self-efficacy/regulation on a scale of 1-6. Similar to the previous study this scale is aimed at addressing overtraining and the perceived state of recovery in active training athletes. The authors deemed this an appropriate tool for monitoring fatigue of athletes over the course of a season.

McGahan et al (2019) published and illustrated a readiness to train survey using the previous literature to develop the scale. This established scale was used to measure wellness for the day of a workout as well as the previous day's training. The scale represented a negative to positive paradigm from 1-5 and addressed topics such as the mood state, the sleep quality, the energy level, the muscle readiness, the previous day diet, and the stress level. Each number had a corresponding qualitative phrase for each of the categories to make selection of the choice easier. The study used various internal measures and concluded that athletes provided meaningful information in the process of training monitoring. The authors concluded the countermovement jump, readiness to train survey, rate of perceived exertion, and GPS monitoring was suitable for monitoring athletes. These studies can be applied daily to high school-aged students.

Assigning activities and workouts on an individual basis can be a strenuous task, especially when there are several dozen individuals per class. Using a simple psychosocial preparedness scale can give information relating to the students culture, habits, and individual implications relating to the class. Merriam Webster (n.d.) refers to preparedness as the state of being prepared or the quality of being prepared. According to Hooper et al. (1995), preparedness surveys can indicate the level of recovery or overtraining in athletes. When further stratifying the factors that affect recovery and overtraining, topics such as mood, fatigue, stress, irritability, diet, and sleep are introduced. Every student comes to class with positives and negatives related to mood, energy, soreness, sleep, diet, and stress. The third standard from the Physical Education Model Content Standards for California (n.d.) informs that students should be able to demonstrate a knowledge of psychological concepts and strategies in an applied physical activity setting. This information can help instructors and the students determine the appropriate lessons, activities, and direction a student needs to take before class, after a semester, or even in longitudinal quadrennial settings such as high school.

Gaps in Research and Scholarship

A major gap in the literature is the participation of high school-aged students in preparedness surveys. Most of the literature identified for this project is in young adults and spans most ages but not adolescents (Kellman, 2010; McLean, 2010; Gastin, 2013; McGahan, 2019). Moreover, there seems to be a focus on athlete populations and no studies addressing preparedness questionnaires in high school-aged physical education students. Nor are there any studies assessing the specific correlative nature of these scales toward performance tests such as broad jumping or progressive distance running ability.

In addition to the gap listed above, another major shortcoming is the amount of experimental studies. There are a few studies employing preparedness scales in athletic populations (Kellman, 2010; McLean, 2010; Gastin, 2013; McGahan, 2019), however, more studies including acute interventions and experiments utilizing a wider variety of subjects, could add evidence to the concepts surrounding preparedness scales such as sleep, diet, soreness, energy, mood and stress.

Another major gap in the literature would be longitudinal studies particularly in this age group and sub-population. The literature provided above indicates preparedness for a short period of time (week) and physical education students might benefit from a long-term study that spanned a semester, school-year, or the 4-year high school cycle. It would be beneficial having this gap filled by training studies to help understand if these individuals can subjectively predict their preparedness for a strenuous workout or lesson.

A third major gap in the literature would be the appropriateness of a scale assessing preparedness in a high school physical education setting. It may be appropriate to assume that students of this age have little experience in assessing social and emotional health, which would identify a need for a clear and concise scale using language understandable by the subjects in this age group. It would also be appropriate to have a shorter scale which students are more likely to fill out in a timely manner before the start of a daily workout that addresses multiple areas such as sleep, diet, stress, mood, energy, and soreness. This scale could then illustrate the individual's level of preparedness for the lesson and assist the instructor in accommodating the student or help the student autoregulate their efforts afforded toward the lesson.

Problem Statement

Despite the emphasis on physical literacy and the psychological aspects of physical education in secondary schools, there is a lack of research on the effectiveness of preparedness scales in high school physical education settings. Most existing studies focus on adult or athletic populations, leaving a significant gap in understanding how these tools can be applied to adolescents. This project aims to address this gap by examining the accuracy and utility of preparedness scales in relation to physical performance among high school students.

Hypothesis

This project hypothesizes that the individual perceptive points within this scale of sleep quality, mood quality, diet quality, energy level, soreness level, and stress level will correlate with a broad jump and aerobic capacity performance.

Definitions

High school aged- between 13-19 years

Preparedness- the state of being prepared or the quality of being prepared; can be assessed by sleep, diet, stress, mood, energy levels, and soreness as they pertain to physical activity

Assumptions and Limitations

The first assumption is that the scale created will accurately and precisely measure wellness and preparedness/readiness in physical education students. One assumption is that high school physical education students will have the cognitive awareness to accurately and precisely rate their wellness and preparedness/readiness. Another assumption of this study would be that

students are going to adhere to a wellness and preparedness/readiness survey over the course of the year and that they are going to continue to answer it accurately and precisely. Another major assumption is that wellness and preparedness/readiness scales will provide value to the physical education process and teach students the value of social/emotional health in physical education.

A major limiting factor is that with a brief and concise scale, there may be some components to wellness and preparedness/readiness that are not measured. One of the limiting factors of this study is that it will take place in a high school setting, which decreases the locust of internal control because it will be an applied setting. Another limiting factor is that the formulated scale may only be pertinent to the specific demographic in which it will be administered. A limiting factor could be that the training programs offered during the administration of the scale will not be challenging enough to cause changes in wellness or preparedness/readiness during the semester or school year planned for the study.

Significance of Study

The initial reason why this study is significant is that it adds emotional and psychological value to physical education teachings. Helping students find ways to express their needs appropriately and effectively is warranted in physical education. A scale that gives instructors and students a general idea of student preparedness and wellness allows instructors and administrators to develop a productive curriculum that engages and educates students (Bembenutty, 2016).

Another reason for this study's significance is giving students a personal stake in the physical education process. Part of adult life is understanding when you are reading for a challenge and when you need to rest. A preparedness/readiness and wellness survey allows

students to self-govern their physical activity needs and take responsibility for their actions. At a minimum students begin to become aware of their frequent mood states, their stress levels, the quality of foods they put in their bodies, the quality of their sleep, and how that affects their ability to exercise. At the highest level of recognition, students become aware of the daily fluctuations of these factors and how they can autoregulate their training and activity routines to positively or negatively affect wellness and preparedness/readiness. Bembenutty et al (2016) identifies this concept as self-evaluation and discusses the possibilities of using this reflective process including a high success rate, a growing independence, and a self regulatory nature.

The final reason this study provides significance is that it may successfully target the apathy and indifference that exist in this age group with respect to physical activity. Obesity/overweightness continues to rise, a sedentary lifestyle is becoming a major risk factor in health complications, and all-cause mortality will continue to rise in young individuals if an effort is not made to understand the barriers surrounding exercise in this population. It may be possible that physical education students are overtrained, not trained enough, or simply in need of monitoring. A simple survey like the one proposed in this project could be the right way to address this difficult equation through a psychological approach as opposed to another physical intervention.

Chapter 2: Literature Review

Introduction

Preparedness in high school physical education is not an extensively researched topic, although psychological, mental, and cognitive strategies are a part of the educational standards. The first body of literature outlines the concept and benefits of physical education (PE) in the Kindergarten-12th grade scholastic system. Next is the second body of literature which guides the reader through multiple studies detailing adolescents and the idea of perceptive wellness and prefaces to preparedness. Then it progresses to the third body of literature which draws a relationship between objective wellness/preparedness measures and performance. The final body of literature reviews a series of studies observing the relationship between perceptive preparedness/readiness and performance. The following review has been conducted as a means for investigating the need for a preparedness scale for high school physical education students.

Physical Education in Adolescents

SHAPE America (2013) has provided physical education teachers with the following standards to align lessons with:

- The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.
- The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.
- The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.
- The physically literate individual exhibits responsible personal and social behavior that respects self and others.

- The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

The national standards cover everything from demonstration of motor skills, to achieving physical fitness, and then understanding and applying psychological and sociological concepts in physical education at all grade levels. These standards are provided as a broad model and applied uniquely at different grade levels. For example, all standards are similar in the K-8th Physical education model content standards for California and then the standards are condensed to three for the 9–12th grade physical education courses.

Physical education model content standards for California (n.d.) were published in the state of California for Kindergarten through 12th grade students in an effort to establish what students should know and be able to perform in physical education before they leave public school to transition to adulthood. The state provides this standards-based education approach as a means for respecting local control for schools. This was created not only to facilitate quality physical education but also to support teachers in the instruction and development of a sound program. The standards are linked to the other major subject areas in education and help students develop knowledge, skills, attitudes, and confidence required to lead a successful healthy lifestyle after k-12 instruction. The high school (grades 9-12) standards include three main areas:

- Students demonstrate knowledge of and competency in motor skills, movement patterns, and strategies needed to perform a variety of physical activities,
- students achieve a level of physical fitness for health and performance while demonstrating knowledge of fitness concepts, principles, and strategies, and

- students demonstrate knowledge of psychological and sociological concepts, principles, and strategies that apply to the learning and performance of physical activity.

The Physical Education model content standards for California are designed to be illustrious of the prior 8 years of physical education and encourage students to continue with physical activity for life. The lessons students learn from high school physical education are created to assist kids in managing family obligation, occupational assignments, and individual choices all while they continue to manage physical activity and healthy lifestyle during and after their high school career.

Bailey (2006) illustrated the benefits and outcomes of physical education and sports in school programs. The intention was to explore the scientific evidence of physical education and sports toward the academic experience in adolescents. Various articles lead them to outline five different domains affected by PE and sport: physical, lifestyle, affective, social, and cognitive. The physical domain is associated with longevity, reduced disease risk, psychological/emotional benefits, and activity later in adulthood. The lifestyle domain is associated with self-determination, competence, enjoyment, positive experience, and continued physical activity later in life. The affective domain is associated with a positive effect on psychological well-being, improvements in self-esteem, reduced stress, anxiety, and depression and a more attractive school experience. The social domain contributes by bringing individuals from different backgrounds together in a shared interest, offering a sense of belonging to groups or teams, helping develop social networks, community cohesion, and civic pride. The cognitive domain improves blood flow to the brain, enhances mood, increases alertness and self-esteem, establishes a positive relationship between intellectual functioning and physical activity in adults

and adolescents, and provides evidence that PE and sport does not interfere with other subjects. In the review, the authors referred to 4 studies in which classroom instructional time was decreased by at least 26% for physical education and games. The result was similar: increased academic performance, decreased absenteeism, increased attention, and decreased behavioral problems. The author finishes by concluding that the fundamental principles leading to all of the positive outcomes possible from a quality PE and sport program include a positive environment, enjoyment, diversity, engagement and not just participation, trained teachers and coaches, and informed parents.

Kretschmann (2014) evaluated the purposes and implications of physical education through a short narrative article. The author introduces the idea that the universal PE curriculum includes various units addressing implementing healthy lifestyle behaviors as well as psycho-social, moral attitudes in children and adolescents. Furthermore, it is discussed that multiple domains are expressed through physical education and sport, including physical, lifestyle, affective, social, and cognitive. Specifically, it provides physical activity level prescriptions for positive health effects and disease prevention, it reflects students valuing physical activity for health, enjoyment, challenge, self-expression, and social interaction, it influences active lifestyle through adulthood, and it promotes community engagement while enhancing cognitive performance and academic achievement. The article reflects by stating that PE should not be confined to a singular purpose, is crucial in educating the youth, and should be organized into a thorough and varied curriculum.

Adolescents and Perceived Wellness

Fairclough (2003) observed English secondary children's physical activity levels, perceived competence, and enjoyment. Seventy-three students were assessed for physical

activity using heart rate monitors during their physical education classes, and then, they answered competence and enjoyment questionnaires post-lesson. Physical activity, enjoyment, and competence were illustrated as means and standard deviations, high and low physical activity groups were formed, and Pearson product-moment correlation coefficients established relationships between the variables. The researchers used analysis of variance and covariance to convey differences between groups. Competence and enjoyment were correlated for both boys and girls; enjoyment was negatively associated with moderate to vigorous activity for girls, boys enjoyed team games, and girls enjoyed individual activities. The authors reported that higher enjoyment was recorded in the low physical activity group compared to the high physical activity group. Physical activity, enjoyment, and competence were illustrated as means and standard deviations, high and low physical activity groups were formed, and Pearson product-moment correlation coefficients established relationships between the variables. The authors concluded that more research is warranted to understand the most effective teaching methods for student engagement.

Spurr et al. (2012) investigated a framework for adolescent wellness by employing a 63-question survey in a Canadian high school to understand four major domains as they associate with wellness, including physical, psychological, social, and spiritual. The manuscript served the purpose of providing nurses with the best way to approach adolescent wellness holistically. The authors established the greatest relationships in the physical, psychological, and social domains with minimal relationships in spirituality. Higher levels of wellness correlated with specific areas such as increased perception of nutrition and physical activity, belief in a higher power and perceived importance of spirituality, perceived self-concept, loving caregivers and caring friends, increased perceived self-esteem and perceived worthiness and perceived caring

people in school and peer connectedness in school. Furthermore, physical activity and nutrition statements significantly correlated with physical development, and all connectedness statements significantly correlated with social development. Self-esteem, self-concept, and acceptance from family and friends correlated with psychological development. Finally, having values aligned with spirituality, feeling connected to a higher power, and qualifying spirituality as important correlated with spiritual development. The researchers concluded that nurses should prepare to practice and understand the philosophy of wellness, to assign physical and nutritional intervention, to gain insight in social relationships, and to provide space for adolescents to utilize spiritual practices if considered.

Ashley et al. (2012) explored connectedness in schools and adolescent perceptions of wellness. Over 100 students participated in the adolescent wellness inventory and connectedness survey, with a 73% response rate. The authors analyzed the results using Pearson correlations to determine relationships. The study revealed a statistically significant positive relationship between connectedness and wellness. Wellness was defined as spiritual, mental, physical, and emotional balance and students reflected positive scores for these domains when schools provided opportunity for parent involvement, stability, caring adults, structured activities, nutrition, and extracurriculars.

Rachele et al. (2013) evaluated the definition of wellness and various scales associated with psychometric wellness measurements to determine if the two could be correlated. The authors discussed various definitions, including the WHO, which stated a relationship between optimal achievement in multiple domains and optimal contribution in multiple life settings to convene at the optimal level of health and wellness. Moreover, multiple scales were identified with their individual definitions of wellness, including wellness evaluation of lifestyle, five-

factor wellness inventory, perceived wellness survey, life assessment questionnaire, Testwell, optimal living profile, wellness inventory, holistic wellness assessment, adolescent wellness appraisal, juvenile health and wellness survey, perceived wellness profile, and wellness factor of Laffrey health conception scale. The authors discussed the major shortcomings of wellness scales including scarcity of validity and reliability of scales in adolescents, construct validity of scales based on foundational definitions, minimal to no psychometric testing in adolescents, and a need for a gold standard in the definition of wellness including physical, psychological, and social well being with/without the absence of illness for which to compare the scales' validity. It is concluded that there are several needs that are not limited to a gold standard definition for wellness, more validity and reliability studies in various groups for wellness scales, and further research performed in adolescent populations to validate wellness scales.

Ahononu et al. (2016) evaluated adolescent qualitative perceptions of specific wellness terms such as healthy living, lack of sickness/illness, physical care of oneself, mind and spiritual well-being, and healthy personality in South African high school students. They established small focus groups and discussed the terms with students, collecting qualitative data to determine how students would interpret these wellness concepts. Some of the common statements included a balanced life, healthy nutrition, exercising, avoiding stress, avoiding drugs and alcohol, absence of disease, ability to fight disease, look good, feel good, good personal hygiene, good physical appearance, resilience, and optimism, positive and prayerful, physical/emotional/spiritual balance, acceptance/understanding/respect of oneself, and relating to others well. The authors concluded that adolescents were well informed about wellness concepts, and professionals need to assist them in integrating best practices to begin healthy living and prepare them for a future of wellbeing. This could have implications for adulthood

and therefore, perceived wellness should be considered in the preparation, design, integration, and evaluation of adolescent wellness programs.

Objective Wellness and Performance

Maulder et al. (2005) assessed vertical and horizontal jumps for predictive ability, discriminative ability, symmetry, and validity. Eighteen trained individuals performed various jumping tests including horizontal squat jump, horizontal countermovement jump, horizontal repetitive jump, vertical squat jump, vertical countermovement jump, and vertical repetitive jump tests. Individual and group means were collected, data was expressed as means and standard deviations, coefficients of variation were used to assess the stability of each test, and intraclass correlations were used to assess reliability. Scores were correlated with sprint times using Pearson product-moment correlations. The horizontal squat jump test was the most reliable based on coefficient of variation and intraclass correlation scores. Vertical tests were the best predictors of stretch-shortening ability and horizontal tests were the predictors of sprint ability. The authors concluded that horizontal jump tests adequately predicted leg power in sport performance.

Lockie et al. (2016) investigated the relationships between jump tests and soccer-specific field tests in Division-I NCAA soccer players. Nineteen players completed vertical jump, standing broad jump, triple hop, a series of different distance sprints, change of direction, Yo-yo intermittent sprint test, and the repeated sprint sprint ability test. The authors used Pearson moment correlations to determine relationships between jump tests and field tests. Stepwise regressions were used to obtain jump predictions for the soccer-specific tests. All of the jump tests correlated with all of the sprint tests intervals and the total time of the repeated sprint ability test. The triple hop was predictive of the sprint interval times, the vertical jump was predictive

of the sprint interval times and the total time of the repeated sprint ability test, and the triple hop predicted performance decrements in the change of direction and repeated sprint ability tests. The authors concluded that improvements in jumping ability could result in improvements in field tests and potentially soccer ability.

Sawczuk (2018) investigated the relationship between sleep, recovery, training, and countermovement jumps in adolescent athletes. They sought to understand if there was a relationship between an objective measure like the countermovement jump and perceptual measures like perceived recovery, sleep, perceived training load, and perceived well-being. The authors collected data from 52 youth athletes by employing surveys and countermovement jumps before the first training session four days per week for a seven-week block. Findings included no relationship between countermovement jump and training load or sleep, the wellness questionnaire correlated with sleep but not training, the perceived recovery scale correlated with training but not sleep, the wellness questionnaire was sensitive to low sleep, and perceived recovery was sensitive to high and low training. The researchers concluded that the countermovement jump was not an effective test for this population with respect to monitoring sleep and training when compared to employing perceived wellness and perceived recovery questionnaires.

Travis et al. (2018) evaluated objective monitoring tools to measure preparedness for competition in adolescent weightlifting populations. The purpose was to compare various tests including the squat jump, countermovement jump, and the isometric mid-thigh pull to weightlifting performance as well as determine if one was better for monitoring performance than the other. The study was performed within 18 days from a maximal performance and utilized 52 female and male weightlifters with experience levels ranging from beginner to master

of sport. Pearson correlations established that the squat jump was the most associated variable with performance compared to countermovement jumps and isometric mid-thigh pulls. Moreover, the authors concluded that the squat jump may be the most reliable test for monitoring weightlifters across all levels of ability.

Franceschi et al (2018) studied three youth national-level long jumpers over the course of an indoor season for neuromuscular changes from the preparatory phase through the competition phase. The authors were interested in understanding the relationship between countermovement jumps and readiness for competition as it related to the different phases throughout a season. This case study followed three youth national long jumpers who trained 2-4 days per week, and tested for countermovement jump at the beginning of each week in the indoor season. When comparing the preparation phase to the competition phase jumps, one athlete showed no changes, one athlete showed moderate changes, and one athlete showed large changes in the countermovement jump numbers. The researchers concluded that the countermovement jump may be an appropriate tool for assessing readiness for competition and that it also illustrates individualized results.

In a recent study, Callaghan et al. (2021) illustrated the relationship between countermovement jump profiles and back squat mean velocity profiles in Rugby players. The objective was to find if the variables were equally affected by post match fatigue at intervals of immediately after, 24 hours after, and 48 hours after the competition and understand if back squat mean velocity could assess the competition effects on the neuromuscular system. The investigation found significant decreases in back squat mean velocity up to 48 post match, a significant reduction in CMJ up to 24 hours post-match that returned to baseline at 48 hours, and significant correlations between CMJ and back squat mean velocity at 30 minutes and 48 hours

post-match. The authors concluded that back squat mean velocity could be a more suitable alternative or addition to countermovement jump for assessing neuromuscular system fatigue because back squat was a more common fundamental pattern and training tool used with Rugby athletes.

Ab Rahman et al. (2021) analyzed the validity and reliability of the standing broad jump test to assess leg power and establish normative data for this test. 417 college students and athletes performed two trials of the broad jump for analysis. Six researchers took part in administering the broad jump test. The authors employed independent test for validity, Pearson moment product correlations, and intraclass correlations for reliability, and reported means and standard deviations for normative values. The study revealed a high reliability between test administrators. There were significant differences between scores for athletes and students, validity and reliability were excellent, and data revealed that the standing broad jump has construct validity in this population. The researchers concluded that the study provides evidence that the standing broad jump is a valid and reliable test in their college population and encouraged further studies validating broad jump in different populations.

Dietze-Hermosa et al. (2021) investigated the relationship between broad jump, countermovement jump, loaded countermovement jump, and athlete sprint performances. Twenty-five athletes performed the three jump assessments and two different 30-meter sprint tests. Data was presented as means, standard deviation, and range. Pearson r correlations were used to compare the jumps with the sprint assessments and the sprint profile components, including speed, velocity, force, and power. The researchers used stepwise regressions to explain the variance from each jumping exercise pertaining to the sprint profile components. The variables for the jumps entered into the regression included distance, velocity, and force for

each of the jumping assessments. Moderate to large associations were found for all three jumps and the sprint assessment times. Also, correlations were found between the three different jump assessments and all components of the sprint profile. Finally, the authors discovered that the broad jump was the best predictor of the sprint profile components during both sprinting tasks compared to the other two jumping tests. The authors concluded that this probably occurred due to the rapid generation of force and the similarities of the direction of force between the two tasks.

Wellness Perception and Performance

Kellman (2010) provided a narrative review of the relationship with stress, recovery and how this relationship could end in under-recovery or overtraining. Through this process, various theories and monitoring tools were provided, including the Profile of Mood States (POMS), The Borg's Rating of Perceived Exertion (RPE), the Total Quality Recovery, and the Recovery-Stress Questionnaire for Athletes (REST-Q). A thorough analysis of the REST-Q revealed its application in junior through elite athletic populations in various nations with different varieties of events such as triathlon, swimming, soccer, rugby, and rowing. The author deems it suitable for tracking an athletes progression throughout a season and identifying markers of overtraining. The implication of this research is that applying psychological scales in conjunction with physiological monitoring can provide interdisciplinary athletic staff with tools to prevent overtraining or under-recovery.

McLean et al. (2010) investigated a group of professional rugby players' neuromuscular, hormonal, and perceptual profiles during three differences between match microcycles of a season. The authors recorded measures like countermovement jump, a subjective feelings of fatigue questionnaire, and salivary testosterone/cortisol immediately after 3 different matches

with different recovery lengths of 5, 7, and 9 days. Significantly higher training loads were accrued in the 7 and 9 days compared to the 5-day microcycles. Countermovement jumps tended to improve throughout each microcycle between games, perceived fatigue and soreness returned to baseline after 4 days, and cortisol concentrations returned to normal after 4 days in each microcycle. The authors illustrated the effectiveness of countermovement jump and psychological questionnaires for monitoring of fatigue in professional Rugby. The implications of this study indicate the effects of inappropriate loads on match-play, the cost-effective use of psychological surveys, and the benefits of weekly fatigue of analysis.

Gastin et al. (2013) attempted to validate perceived wellness as a meaningful measurement of adaptations in Australian football players over the course of a season. The study was designed to assess a professional practice, perceived wellness surveys, that already existed with respect to monitoring athletes and challenged the validity of such a monitoring measurement. The authors were interested in understanding if perceptions of wellness change weekly, reflect fatigue and soreness, are affected by age or performance measures, and affect playing performance. The study observed 27 senior-level players over 25 total games gathering daily wellness ratings for fatigue, muscle pain, hamstring/quadricep strain, pain/stiffness, power, sleep, stress, and well-being using Likert scale of 1-5. A pre-season assessment included the 3k time trial and the 40-meter sprint. The researchers sought to draw correlations to wellness scores and some secondary elements, including time, age, height, weight, speed, running endurance, and experience. After a season of wellness scores the investigation reported findings such as experienced players handle the AFL season well, pain/stiffness and sleep quality had the highest average scores and, quad strain, stress, and wellness had the lowest average scores, wellness improved as gameday approached, and faster players have higher ratings for strain and power

after a game. It was also revealed that fatigue, strain, and well being improved over the course of a season, fatigue, pain, power, and sleep significantly improved following a week with no game, and older player sleep quality was affected greater after games. Last, more experienced players had improved strain and power and deteriorated wellness throughout the season, fatigue ratings improved more for faster players throughout the season, variability declined for all items over the season except for pain/stiffness and positive correlations were established between performance, stress, and strain. The researchers concluded wellness questionnaires were an effective tool for understanding athlete's adaptations throughout the course of a season and could be used daily or periodically. The authors discussed that the wellness survey effectively monitored AFL athlete responses to training and competition, adaptations, and individual circumstances during the season.

Hoover et al. (2017) investigated mood and performance anxiety in high school basketball players during a season. Twelve varsity basketball players participated in the Profile of Mood States (POMS) and the Sports Anxiety Scale 2 (SAS-2) at the beginning of the season, before a non-conference game, before a conference game, and before the state tournament. The POMS uses 65-items to assess 6 mood states, including tension, depression, anger, vigor, and confusion on a 5-point scale from 0 (not at all) to 4 (extremely). The SAS-2 uses 15 questions to assess performance anxiety with the same scoring system as the POMS and addresses somatic anxiety, worry, and concentration disruption. Google Sheets was used for data collection, Cronbach's alpha was used for consistency assessment, Repeated measures ANOVA was used to assess differences, and main effects were further assessed with a post hoc test using a pairwise comparison and a Bonferroni correction. Significant correlations were found on the POMS and SAS-2 for all four conditions; both scales were considered reliable across conditions, and

significant differences were found among the four conditions for the subscale of worry from SAS-2 and the subscale of confusion for the POMS. The researchers suggest that the competitive conditions impacted the subjects mood and performance anxiety.

McGahan et al. (2019) illustrated the relationship of training loads and readiness to train during a pre-competition training camp in Gaelic football players. 30 players were evaluated for total distance and high-speed running through GPS, countermovement jump, and readiness to train through a psychometric questionnaire during practices leading up to a match. No significant differences were measured. However, a trend was identified illustrating lower readiness to train scores in individuals registering more high-speed running compared to individuals registering less high-speed running. This study established a relationship between total mileage and high-speed running and rate of perceived exertion and readiness to train in Gaelic football players. The authors conveyed the usefulness of the countermovement jump, readiness to train survey, rate of perceived exertion, and GPS monitoring athletes during pre-competition training camps.

Conclusion

The following section covered multiple bodies of literature for the rationale of establishing a scale directed towards measuring wellness/preparedness in high school physical education students. The initial section illustrated a physical education program's expectations, benefits, and outcomes. The next section conveyed information from several studies associating adolescent wellness and other factors. The third section was a detailed outline of studies associating objective wellness measures and performance in sport. Finally, the chapter concluded with a supportive fourth section describing the relationship between perceived

wellness and sport performance. This rationale should provide information and guidance to organize and craft an effective methods section to test the projected thesis.

Chapter 3: Methodology

Introduction

The following sections detail the methodology that delivered the experiment to determine if high school physical education students could perceive preparedness for a task through investigating the relationship between preparedness survey results and performance. For practitioners, this scale was aligned specifically with the third content standard of high school physical education, which states that students will demonstrate knowledge of sociological/psychological concepts and apply them in a performance/physical activity setting. Considering all parts of the project, this methodology also aligned with portions of the first and second content standards, particularly in demonstrating motor skill competency and achieving physical fitness standards. This project attempted to assess the relationship between a preparedness scale with a broad jump and aerobic capacity tests.

Participants

Surveys were sent out to every student who agreed to participate in the physical education department at one public high school in the Southern California area, which totaled approximately 700 participants. Recruiting was administered through an email to the students and parents of students enrolled in physical education at the school and by word of mouth from the researcher presenting a brief synopsis of the project in all physical education classes. Participants were in grades 9-12 and enrolled full-time as students at the high school. Participants were a part of one of three distinct classes in the physical education department including physical education year one, physical education year two, or weight training. In some special circumstances, students may have had multiple physical education classes.

Instruments

Demographic Questionnaire. A questionnaire was used to collect participant information regarding the population: age, grade level (9-12), course (PE1, PE2, or PE3), race/ethnicity, sex, physical activity level, and grade point average on a 4-point scale (See Figure 1 in Appendix B)..

Psychometric Scale. This instrument utilized a 5-point Likert scale to assess the topics of sleep, diet, stress, mood, muscle soreness, and energy with rankings from 'very bad (1)' to 'very good (5)'. The adapted scale was formulated referencing a project by McGahan et al. (2019) and McLean et al. (2010) and then modified to meet the needs of adolescent subjects. This scale was the main factor for correlation as an internal metric or psychosocial metric of preparedness/readiness (See Figure 2 in Appendix B).

Broad Jump Test. The next instrument implemented was a broad jump test. This test gave researchers a measurement of full-body power and also served as a preparedness metric before workouts and competitions (Ab Rahman, 2021; Maulder, 2005). Subjects were instructed to line up on a line indicated by white tape at a starting point of zero inches measured by a measuring tape. The individual was asked, volunteering maximal effort, to perform a countermovement using the arms and legs swinging synchronously with the semi-squat and then jump horizontally as far as they could. The individuals were informed to land with both feet flat, stabilize their position, and then stand and hold the position. The best of three jumps was measured from the starting position to the heel of the closest foot in the landing position. The best jump distance was recorded. The broad jump was used as an external metric to correlate the preparedness scale.

Aerobic Capacity Test. Another instrument implemented was the aerobic capacity test, which gave the subjects a physical performance to determine if there was a relationship with

preparedness. This test is termed the 20-meter beep test or the 20-meter PACER (McVeigh et al., 1995; Liu et al., 1992; van Mechelen et al., 1986; Leger et al., 1988). Students lined up at designated starting cones, ran to the next cone following a beep, and played using a cell phone connected to a wireless speaker. The cadence starts at 8.0 km/hr, increases 1.0 km/hr to level 2, and increases by 0.5 km/hr after every level until the conclusion. Therefore the first level is 9 seconds between laps, the second level is 8 seconds between laps, the third level is 7.6 seconds between laps, the fourth level is 7.2 seconds between laps, etc. Performance of the test was complete once the student failed to make it to the cone 2 consecutive times before the subsequent beep. Scores were reported for total number of laps, total distance, and total time. The scale was tested for its associative ability with the aerobic capacity outcome and the broad jump.

Procedures

Recruiting and Consent.Before recruitment, permission was sought and acquired from the administrative team at the high school. Subjects were recruited from the physical education department at a public high school in Southern California. Recruiting was marketed through a mass email to all students and parents in the physical education department. The researcher also visited each physical education class to briefly explain the project and ask for volunteers. Subjects were notified about this volunteer research project and parents of the students under 18 years of age were asked for assent to participate.

Introduction, Familiarization, Testing. Subjects participated in this study during the scheduled physical education classes. Before familiarization began, students filled out a participation questionnaire (See Figures 3-4 in Appendix B) to determine if they were cleared to participate in the study. Anthropometric data in the form of height, weight, and BMI was recorded along with other demographic data. Upon completion of initial data collection, subjects

were introduced to the warm-up which consisted of 5-minutes of walking/jogging, 10 lunges, 10 alternating quad pulls, 10 alternating figure four hip lifts, 10 alternating knee to chest hip flexions, 10 lateral lunges, 10 forward and backward skips, 10 shuffles left and right, 10 Carioca shuffles left and right, a 10-meter backpedal, and a 10- meter sprint. Subjects were given direct instruction with definitions of sleep, nutrition, stress, mood, energy level, and soreness. Subjects were also given examples of perception and its relationship with quality sleep, quality nutrition, stress, mood, energy level, and muscle soreness. Subjects were exposed to the scale and its structure was outlined. Then students filled out the survey for the first time. Students were also given a walkthrough of the physical tests including the broad jump and the aerobic capacity test. Following the overview, subjects assumed a standing position and began the warm-up as instructed by the researcher. Following the warm-up, each subject was individually assessed for broad jump distance measured to the closest centimeter. Subjects were instructed to give maximum effort and a baseline for the aerobic capacity test was collected as a final component of the familiarization. Following the visits, data was compiled and analyzed.

Design and Data Analysis

This project was designed to analyze a correlation between the preparedness scale, a broad jump, and an aerobic capacity test in high school adolescent physical education students. All data was recorded and stored in a Microsoft Excel spreadsheet. Descriptive statistics were compiled to capture critical participant characteristics. Pearson product-moment correlation analyses were conducted to identify the participant psychometric correlates (sleep, diet, mood, stress, energy level, soreness) related to the broad jump and the aerobic capacity test outcomes. All statistical analyses were completed using SPSS (version 25.0; IBM, inc., Chicago, IL, USA) with an alpha of $p \leq 0.05$. Values were expressed as mean ± standard error.

Ethical Considerations

To best meet the subjects' needs, ethical considerations were implemented to protect them. The Institutional Review Board approved the project, Human Subjects Review Committee through Concordia University St Paul. Preparticipation forms and informed consent and assent forms (see Appendix A) were filed to ensure subjects were healthy and volunteered to participate in this project. These forms were collected electronically, filed, and stored in a locked folder only accessible by the researcher. There was no monetary or grade-point-related reward used to encourage participation. Once participation occurred, all data was collected, stored, and de-identified to protect each individual subject.

Conclusion

This section detailed the methods related to an experiment of validity and reliability for a preparedness scale in high school adolescent populations. The researchers covered the subject population, instrumentation, procedures, data analysis, and ethical considerations. Results and discussion will follow this section.

Chapter 4: Results

Introduction

Chapter 4 presents the comprehensive results obtained from the study, analyzing the correlation between preparedness, as measured by a psychometric scale, and performance on physical tests, specifically the broad jump and aerobic capacity tests, among high school physical education students. The chapter begins by providing general demographic descriptives of the study participants, followed by detailed statistical analyses, including descriptive statistics, and correlation analyses, to examine the relationships between the preparedness scale components and the performance outcomes. These analyses aim to determine whether self-reported preparedness indicators can reliably predict physical performance in high school adolescents.

Demographic Profile of Participants

The Demographic descriptives were as follows (see Table 1 and Figures 5-12). A total of 41 participants volunteered and completed the study. Frequency tables and histograms were produced to explain the demographic makeup of the participants. More male participants (n=31) than female (n=10) participants volunteered for the study. Most participants were either age 17 (n=12) or 15 (n=12), followed by age 14 (n=7), then age 16 (n=5) and 18 (n=5). The majority of the participants were in 9th grade (n=19), followed by 12th grade (n=13), and then 11th grade (n=9). There were no 10th-grade participants. A large portion of the participants were enrolled in first-year physical education (n=20), followed by individuals enrolled in weight training (n=17), and then second-year physical education students (n=4). The majority of participants were of Hispanic or Latino descent (n=19), followed by African American (n=8), European American (n=7), Asian American (n=4), and then Native American (n=3). Activity hours presented physical activity levels in three categories: strenuous, moderate, and mild. For

strenuous activity, most participants indicated 30 minutes to 2 hours per week (n=15), followed by participants who indicated 2 hours and 30 minutes to 4 hours (n=9), and a similar number of participants indicated 4 hours and 30 minutes to 6 hours (n=9), then 30 minutes or less (n=5), and last the participants who indicated they completed 6 or more hours of strenuous activity (n=3). For moderate activity, most participants indicated 30 minutes to 2 hours per week (n=15), followed by 30 minutes or less (n=10), then 2 hours and 30 minutes to 4 hours (n=8), then 4 hours and 30 minutes to 6 hours (n=5), and last the participants who indicated they completed 6 or more hours of moderate activity (n=3). Most participants indicated they completed 30 minutes or less of mild activity (n=18), followed by 30 minutes to 2 hours per week (n=12), then 2 hours and 30 minutes to 4 hours (n=7), then 6 or more hours (n=3), and last 4 hours and 30 minutes to 6 hours of mild exercise per week (n=1).

Other demographic information, including academic performance and anthropometrics, were analyzed and presented as means and standard deviation. The average for age calculated was 15.90 (M=15.90, SD=1.34). The average grade point average on a 4-point scale was 3.20 (M=3.20, SD=0.69). The average height in inches for the sample was 66.76 (M=66.76, SD=4.07), the average weight in pounds was 151.78 (M=151.78, SD=39.78), and the average body mass index in BMI units was 23.83 (M=23.83, SD=4.96).

Preparedness Survey Analysis

The descriptive data for the preparedness survey was analyzed using frequency charts to compile data for all 41 participants. The data was presented as means and standard deviations. The mean score for perception of mood averaged 3.80 (M=3.80, SD=0.75), perception of sleep quality averaged 3.63 (M=3.63, SD=1.11), perception of energy level averaged 3.80 (M=3.80, SD=0.78), perception of diet quality averaged 3.34 (M=3.34, SD=0.91), perception of stress

averaged 2.90 (M=2.90, SD=1.48), and the perception of muscle soreness averaged 2.95 (M=2.95, SD=1.66) (see Table 2 and Figures 13-18 in Appendix B).**Aerobic Capacity and Jump Performance Metrics**

The descriptive data for the performance variables was analyzed using frequency tables (Table 3). Data was presented as means and standard deviations. The average level achieved on the PACER was 3.71 (M=3.71, SD=1.19), the average lap total for the PACER was 25.76 (M=25.76, SD=11.02), the average distance in meters achieved on the PACER was 515.12 (M=515.12, SD=220.31), and the average VO2max in ml/kg/min was 35.17 (M=35.17, SD=7.74). The average distance in inches for the broad jump assessment was 70.98 (M=70.98, SD=12.66).

Pearson Correlation Results Between Preparedness and Performance Variables

Pearson product-moment correlations were analyzed for the following variables: mood, sleep, energy, diet, stress, soreness, PACER level, PACER laps, PACER distance, VO2max, and broad jump. Scores will be reported as weak, moderate, and strong correlations with the r-score and p-value for each relationship (see Table 4).

The broad jump had significant moderate correlations with PACER level (r=.407, p=.008), PACER laps (r=.410, p=.008), PACER Distance (r=.410, p=.008), and VO2max (r=.415, p=.008). The broad jump had insignificant weak correlation with mood (r=.202, p=.204), sleep (r=.001, p=.994), energy (r=.275, p=.082), diet (r=-.064, p=.690), stress (r=.039, p=.811), and soreness (r=-.041, p=.801) (see Table 4).

The VO2max had significant strong correlations with PACER level (r=.991, p=.000), PACER laps (r=.993, p=.000), and PACER distance (r=.993, p=.000) as displayed in Table 4. The VO2max had significant moderate correlations with broad jump (r=.415, p=.007), soreness

(r=.372, p=.017), stress (r=.320, p=.041), and energy (r=.349, p=.025). The VO2max had insignificant weak correlations with diet (r=-.027, p=869), sleep (r=.205, p=.199), and mood (r=.236, p=.138).

The PACER distance had significant strong correlations to PACER level (r=.970, p=.000), PACER laps (r=1, p=.000), and VO2max (r=.993, p=.000). The PACER distance had a significant moderate correlation with broad jump (r=.410, p=.008), soreness (r=.416, p=.007), and energy (r=.375, p=.016). The PACER distance had an insignificant weak correlation with stress (r=.307, p=.051), energy (r=.001, p=.995), sleep (r=.215, p=.177), and mood (r=.252, p=.112).

The PACER laps had significant strong correlations with PACER level (r=.970, p=.000), PACER distance (r=1, p=.000), and VO2max (r=.993, p=.000). The PACER laps had significant moderate correlations with broad jump (r=.410, p=.008), soreness (r=.416, p=.007), and energy (r=.375, p=.016). The PACER laps had an insignificant weak relationship with stress (r=.307, p=.051), diet (r=.001, p=.995), sleep (r=.215, p=.177), and mood (r=.252, p=.112).

The PACER level had significant strong correlations with PACER laps (r=.970, p=.000), PACER distance (r=.970, p=.000), and VO2max (r=.991, p=.000). The PACER level had significant moderate correlations with broad jump (r=.407, p=.008), soreness (r=.323, p=.040), stress (r=.339, p=.030), and energy (r=.314, p=.046). The PACER level had insignificant weak correlations with diet (r=-.067, p=.677), sleep (r=.182, p=.256), and mood (r=.215, p=.177).

Conclusion

Chapter 4 presented the study's results, detailing the participants' demographic characteristics and the statistical analyses conducted. The demographic analysis showed a diverse participant pool in terms of age, grade, and ethnicity. Statistical analyses, including

descriptive statistics and Pearson correlation, were used to investigate the relationships between self-reported preparedness measures and physical performance outcomes. The findings indicated significant correlations between certain components of the preparedness scale, such as stress, muscle soreness, and energy level, and performance on the broad jump and aerobic capacity tests. These results provide insights into how self-perceived readiness can impact physical performance in high school students, offering implications for enhancing physical education programs and tailoring interventions to improve student preparedness and performance. The discussion connects these findings with existing literature, suggesting potential applications and areas for further research.

Chapter 5: Discussion

Introduction

The following details the discussion about the experiment performed. The original research question aimed to examine the association between a psychological preparedness scale and physical performance tests in high school students. The study successfully demonstrated significant correlations between components of the preparedness scale—such as stress, muscle soreness, and energy level—and performance outcomes on the aerobic capacity and broad jump tests. These findings indicate that self-reported preparedness measures can reliably predict physical performance in high school students. The reliability and validity of these measures are supported by the consistent significant relationships observed, which align with previous literature that links perceived wellness and objective performance metrics. This suggests that the preparedness scale used in this study is a valid tool for assessing readiness in adolescent physical education settings, providing a reliable method for educators to gauge and enhance student performance through tailored intervention.

Summary

The data suggests that participants were between age 14-18, predominantly male and Hispanic, majority 9th or 12th-grade students, enrolled in 1st year physical education or weight training, and displayed moderate levels of physical activity weekly. Moreover, analysis of the preparedness scale indicated mean scores for mood 3.80, sleep quality 3.63, energy level 3.80, diet quality 3.34, stress 2.90, and muscle soreness 2.95. Results for the PACER confirmed an average level 3.71, an average lap total 25.76, an average distance 515.12 meters, and an average VO2max 35.17 ml/kg/min. In addition, the average broad jump was 70.98 inches.

The results indicated the broad jump had significant moderate correlations with PACER level (r=.407, p=.008), PACER laps (r=.410, p=.008), PACER Distance (r=.410, p=.008), and VO2max (r=.415, p=.008). In addition, the VO2max had significant strong correlations with PACER level (r=.991, p=.000), PACER laps (r=.993, p=.000), and PACER distance (r=.993, p=.000). The results also confirmed the VO2max had significant moderate correlations with broad jump (r=.415, p=.007), soreness (r=.372, p=.017), stress (r=.320, p=.041), and energy (r=.349, p=.025). The PACER level had significant moderate correlations with broad jump (r=.407, p=.008), soreness (r=.323, p=.040), stress (r=.339, p=.030), and energy (r=.314, p=.046). The PACER distance and laps had a significant moderate correlation with broad jump (r=.410, p=.008), soreness (r=.416, p=.007), and energy (r=.375, p=.016). The data analyzed in this research proves the relationship between perceptive variables on a preparedness survey and aerobic capacity.

Interpretations of the Data

The strong relationship observed in this study between broad jump and aerobic performance was similar to the correlation seen by Maulder et al. (2005), which indicated a strong association between broad jump and horizontal jump performances in high school track and field athletes. Moreover, Lockie et al. (2016) illustrated a similar relationship between running tests and jumping testing in soccer players which was also one of the main findings in the current study. These moderate to strong relationships are likely due to training and tests' specificity. The ability to produce force and power horizontally will translate from one task to the next. In addition to task specificity, lower leg power seems to be a necessary motor ability to be successful in jumping and running tasks. Travis et al. (2018) found correlations between vertical jumps and sport performance, which can be interpreted as similar to what was conveyed

in the present study between the horizontal jump and aerobic performance. Although this is different based on the test selection it still gives strength to the concept that jumping tasks correlate with other physical performance tests. Dissimilar to what was observed in Sawczuk (2018), which was little to no relationship between perceptive scales and jump measures, the current study did see moderate to strong relationships between an aerobic performance test, jump test, and 3 of the variables on the perceived preparedness scale. This could have been due to a number of factors, such as the participants, the preparedness scale, or the tests selected, which produced different results. Franceschi et al. (2018) used countermovement jumps as preparedness measures for youth athletes. In contrast, the current study extended this study by using objective jump metrics correlated with a psychometric scale to illustrate psychological preparedness. Although not the purpose of this study, it supports the possibility of using physical and psychological measurements to exhibit an individual's preparedness. Dietze-Hermosa et al. (2021) also found large associations between jumping and running performances with the strongest relationship indicated between the broad jump and sprinting. Similar to this study, the current study also found a correlation between broad jump and running; however, the running distance in the current study was longer.

McLean et al. (2010) found associations between perceived fatigue and soreness, jumping ability, and matchy play in Rugby players. Although different populations and scenarios, there was a connection between perceived fatigue and the energy level metric as well as the perceived soreness and the soreness metric in the current study. Both studies found a relationship between these metrics and the performance metric. Gastin et al. (2013) had similar findings in Australian football players observing metrics such as perceived soreness, sleep, and fatigue in relation with preparedness for performance. Again, this mimics the findings in the

current study with the only difference being a large relationship between perceived sleep and performance which was not a finding in this study. Hoover et al. (2017) found significant relationships between preparedness for basketball games, perceived mood, and perceived anxiety. In contrast, the current study found small to no correlation between performance metrics, mood, and stress level. The differences may be due to the difference in scales used to define anxiety/stress and mood. There may have been a difference because of the difference in measured performance metrics. McGahan et al. (2019) found no significance in their study but a trend between mileage, high-speed running, rate of perceived exertion, and a readiness to train survey. This was the most similar study to the current study with a lot of similarities relating to the scale used. However, the performance metrics, the subjects and the findings differed. The current study found moderate to strong relationships between performance metrics, stress levels, energy levels, and soreness. This was possibly due to the slight variation in the scales, the different performance tests used, and the different subjects participating in the study.

Implications

This study illustrates the usefulness of preparedness surveys in giving data to create a holistic picture around physical performances. Specifically, a preparedness survey outlining sleep quality, diet quality, mood, energy level, muscle soreness, and stress may in fact give good insight into an individual's performances at the 20-m PACER test and the broad jump test. Furthermore, these preparedness scales may present physical education teachers and students the opportunity to cover the physical education standards related to social and emotional learning during physical activity.

Practical Applications

The primary practical applications would be using this preparedness scale in a high school physical education setting to determine an individual's readiness for the training, game/sport, or lesson. It expands data collection for particular metrics that may be useful in a high school and high-performance setting by informing practitioners about the next periodized training plan, the most appropriate games, sports, and drills, and finally, determining appropriate lessons to improve upon the students' habits related to the scale's topics . Implementing a preparedness scale allows students to explore social and emotional relationships with exercise and take a personal stake. To apply these scales, they may be utilized in a physical education or training journal as part of a before class mindfulness exercise. This type of intervention will allow students to master state and national standards related to psychological perspectives of health and exercise.

Contribution to Knowledge and Profession

This study contributes to the efficacy of the usefulness of preparedness surveys in the physical education setting. It highlights high school physical education students' ability to relate the concepts of stress, energy level, and muscle soreness to power output and aerobic capacity performance tests similar to higher-level athletes. It also highlights that there might be some barriers in their ability to relate sleep, mood, and diet to jumping and running performance tests, which was in contrast to the literature as it related to higher-level athletes. Moreover, it strengthens evidence for correlations between broad jump and running performance. A unique contribution is the utility of the broad jump as a possible preparedness assessment tool for performance compared with most studies that use the vertical jump as a preparedness tool.

Action Plan

An action plan will be provided in this section to implement the current study into the everyday classroom. The main practitioners of this plan will include the school physical education staff and the school administrator who oversees the department. Based on the current data set, the ideal setting would be in a high school in southern California at any school district. Last, based on the size of the student population during the school year, it could range from a few dozen to a couple thousand participants.

The focus of this plan is to assist practitioners and participants in understanding the link between perception and performance. This plan aims to expose students to the perception of preparedness on a weekly basis and before assessments to assist them in aligning the social-emotional domain with the physical domain of exercise and health. The specific goal is to have students fill out a preparedness survey at the beginning of each week and prior to performance testing or assessments and follow up the process with critical reflection. With reflection, the plan is to see improvements in performance testing and weekly ratings of perceived preparedness. The team goal is to have 80% of students participating in the plan and showing physical and perceptual improvements. A step-by-step guide will be provided as follows:

1. Promote the use of preparedness surveys through special signage in the locker rooms, weight room, gym, and other athletic facilities used by the physical education students
2. After students are introduced to warm-up, cool-down, and basic training structures, give a lecture on journaling for physical education including setting goals, training logs, and most importantly the weekly preparedness survey. Be sure to inform participants that this will be filled out weekly and before any performance testing or assessments.

3. Set up a Google Classroom where information can be disseminated to students and shared with parents.
4. Set up the surveys to be administered on a quick efficient application that can be exported to a spreadsheet. One of the easiest would be Google Forms.
5. Post the Google Form to your Google Classroom and set them to open when the class begins. Set them to close when the class ends.
6. On the first day of the survey administration, be sure signs are readily available to reference and give students roughly 1-2 minutes to perform the surveys. Ideally this can be done after getting dressed but before leaving the locker room.
7. As students are preparing for class in the warm-up, the facilitators can be sifting through the group data in Google Forms to get an understanding of how the class is prepared from a perceptive factor. The information is conveniently provided in visual aids quickly after the surveys are finished.
8. This data can be used to curtail weekly training for the participants and either accelerate learning or regress learning based on the perceived preparedness at the beginning of each week.
9. Steps 4-8 should be repeated weekly.
10. Prior to assessments, steps 4-7 should be repeated. Then the assessments should be administered.
11. After assessments, data should be downloaded to a spreadsheet and any statistical analysis can be performed through a traditional spreadsheet software.

12. Following assessments, facilitators and participants should gather in a classroom space to individually address the physical performance metrics compared with the preparedness data.
13. Following individual class assessments, facilitators should debrief and share de-identified group data to understand trends in the relationships or lack of relationships with the individual topics of the perception survey and physical performance assessments.
14. Once trends are identified, as educators do, educational modules can be further implemented to overcome barriers, bridge gaps for students, and improve results on the physical and perceptual assessments.

Assessments for this action project will be formative and summative. The formative assessments will happen every week, with students filling out their preparedness surveys on the first day of each week. Teachers will use this as a gauge for the weekly activities. Summative assessments will be at least every 6 weeks using the tests provided in the study, the broad jump and the 20-meter PACER. At the end of each quarter, practitioners should also be administering the state testing to prepare students, and this should also be used in the assessment protocol as correlates with the survey. At the end of each quarter, students should write a summary explaining the connection between their preparedness and fitness scores.

The overall cost for a high school in this region should be nothing. Most schools in this region are considered 1:1 technology with students and teachers, making it easy to administer an assignment like this. However, if technology is not available, paper methods are also possible, just more tedious in terms of data analysis. Either way, the time for analysis is going to be the only costly variable and it is quite an efficient method of gauging preparedness compared to current technologically savvy interventions.

Limitations

The most prominent limitation of this study is that it is a correlation study that does not indicate any causation from the intervention. The variables of performance and perception are merely associated. Further limitations can be realized from the descriptive data and include: a mostly male sample size, a predominantly Hispanic sample, and a high school sample lacking subjects in 10th and 11th grade. Another limitation was VO2 max was measured indirectly through a field test rather than in a laboratory setting. These limitations could lead to the generalizability of these findings in multiple ways, including inferring the findings of this information toward the curriculum in a primary setting, assuming this data would have the same impact on high school athletic teams, expecting these results to be replicated with lab based tests, expecting similar preparedness scales to illustrate similar relationships, or possibly assuming that this same outcome would be expected in a similar setting but in a different geographical setting.

Recommendations for Further Study

This project should be continued by longitudinal studies, which could provide more insight into the causal relationships between preparedness and physical performance. Using the information from this study, a project could be implemented by visiting pre, mid, and post-semester points to understand changes throughout an academic cycle. Moreover, different performance tests should be assessed in conjunction with different psychometric scales to develop a larger body of research about perceived preparedness and physical performance. Experimental studies could explore the effects of specific interventions to improve preparedness and performance. Another way to extend this study and further provide descriptive information detailing the relationship between physical and psychological would be to perform biological assessments such as blood draws or saliva swabs to collect data on Cortisol and other hormone

levels. Additional variables such as nutrition, hydration, and psychological stressors should be considered to provide a more comprehensive understanding of factors influencing physical performance. Future research should include a larger and more diverse sample to improve the generalizability of the findings. This study could be replicated in different geographic locations with varying levels of k-12 students and perhaps extend to collegiate students and athletes. This would provide more evidence and perhaps efficacy towards the implementation of these scales in physical education programs to fill the need of a curriculum matching the standards for social and emotional learning.

Conclusion

The results were summarized, including the demographic and correlation values with indicated significance. The original question analyzed a relationship between an aerobic capacity test, a broad jump test, and the individual metrics of a preparedness survey, including sleep, diet, mood, stress, energy level, and muscle soreness. The takeaway from the current study was the significant relationship between the aerobic capacity test, the broad jump test, and the preparedness survey variables of stress, energy level, and muscle soreness. Interpretations of the data were discussed in light of the other studies mentioned in the literature review. Comparisons and contrasts were made specifically with reference to most of the cited works. Implications for this data reinforces the significance of addressing participant perception before testing. Consistently focusing on the social-emotional piece for learners could potentially lead to more engagement and better performance when individuals understand the connection between perception and performance. Furthermore, the understanding of individual perceptions between participant and instructor could strengthen relationships and create a more cohesive training and

educational environment. The final sections covered the limitations and recommendations for further study, which progressed the discussion to its final phase.

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Appendix A

Informed Consent and Assent Forms

Title: Correlation of Preparedness with Performance Tests in High School Education

Invitation: You have been invited to participate in a project to observe if perceptions of sleep, nutrition, stress, mood, energy, and soreness affect broad jump and aerobic capacity performance ability. You have been selected because you are an adolescent individual between the ages of 13-19 and you are enrolled in at least one physical education course. We ask that you read this form and ask any questions you may have before agreeing to participate in this study.

This study is being conducted by Nicholas Cullen-Carroll at Banning High School which is part of the Banning Unified School District.

Background: At the center of this project is determining the accuracy and precision of preparedness scales in the high school physical education population as a correlated factor with physical performance. The purpose will be an analysis of this scale's association with performance in the broad jump and aerobic capacity test.

Procedures: You will participate in a single visit which will take place during your physical education period and not require any other outside time or efforts. Please bring your chromebook if you choose to participate in this study. The following events will take place if you choose to participate. First, you will fill out a demographic questionnaire including the following topics: age, grade level (9-12), course (PE1, PE2, or PE3), race/ethnicity, sex, physical activity level, and grade point average on a 4-point scale. Next, you will complete a ParQ to assess your medical readiness for exercise. Following these forms, you will be given instruction and clarification on preparedness surveys including explanations for sleep, nutrition, stress, mood, energy, and soreness and detailing the likert scale associated with each variable. After this, you will complete the scale based on your perceptions. Following this, you will participate in a dynamic warm-up including the following exercises: 5-minutes of walking/jogging, 10 lunges, 10 alternating quad pulls, 10 alternating figure four hip lifts, 10 alternating knee to chest hip flexions, 10 lateral lunges, 10 forward and backward skips, 10 shuffles left and right, 10 Carioca shuffles left and right, a 10-meter backpedal, and a 10- meter sprint. Last you will be assessed for your performances in the broad jump for distance and the aerobic capacity PACER test for maximum laps.

Risks and Benefits: This study contains a minimum amount of risk. You may be exposed to acute cardiovascular, respiratory, and/or musculoskeletal stress during the exercise testing intervention. However, we will attempt to prevent complications through administration of a preparticipation survey (ParQ) to screen for any pre-existing or possible illness. You might also experience fatigue or soreness after the exercise testing. You have the right to discontinue participation at any moment during the session.

There are no guaranteed benefits for you in this study. However, you may acutely improve aerobic fitness and maximum power. You might benefit from learning the concepts and skills to gauge perceptions of sleep, nutrition, stress, energy, soreness, and mood. You will also fulfill the California state model content and SHAPE America standards as they pertain to sociology and psychology of exercise for high school physical education.

Compensation: We thank you for your participation in this study. You will not receive compensation for your participation in this study. Any equipment needed will be provided by the researcher.

Confidentiality: The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify you. Research records will be stored securely and only the researcher in this study will have access to the records.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Banning High School or

the principal researcher on this study. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions: The researcher conducting this study is: Nicholas Cullen-Carroll. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at cullencn@csp.edu or 951-265-2188. You may also contact his faculty advisor, Dr. Matthew Buns, at buns@csp.edu or 651-641-8472.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact Steve Ross, chair, Human Subjects Review Committee, at irb@csp.edu or 651-641-8723.

Statement of Consent: I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Subject Signature:_____Date: _____

Parent/Guardian Signature:_____ Date:_____

Signature of Investigator:_____Date: _____

Letter of Permission and Confirmation

To whom this may concern:

My name is Nicholas Cullen-Carroll and I am a doctoral student at Concordia University St. Paul. I am also The Chair of the PE department, The head coach for track and field, and the certified strength and conditioning specialist on campus at Banning High School.

I am writing to you today to ask permission from the site administration to perform a dissertation study with the high school PE students at this location. Below is an overview of the consent form which I will use to inform students and ask for permission from parents and students.

Title: Correlation of Preparedness with Performance Tests in High School Education

Invitation: You have been invited to participate in a project to observe if perceptions of sleep, nutrition, stress, mood, energy, and soreness affect broad jump and aerobic capacity performance ability. You have been selected because you are an adolescent individual between the ages of 13-19 and you are enrolled in at least one physical education course. We ask that you read this form and ask any questions you may have before agreeing to participate in this study.

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Risks and Benefits: This study contains a minimum amount of risk. You may be exposed to acute cardiovascular, respiratory, and/or musculoskeletal stress during the exercise testing intervention. However, we will attempt to prevent complications through administration of a preparticipation survey (ParQ) to screen for any pre-existing or possible illness. You might also experience fatigue or soreness after the exercise testing. You have the right to discontinue participation at any moment during the session.

There are no guaranteed benefits for you in this study. However, you may acutely improve aerobic fitness and maximum power. You might benefit from learning the concepts and skills to gauge perceptions of sleep, nutrition, stress, energy, soreness, and mood. You will also fulfill the California state model content and SHAPE America standards as they pertain to sociology and psychology of exercise for high school physical education.

Compensation: We thank you for your participation in this study. You will not receive compensation for your participation in this study. Any equipment needed will be provided by the researcher.

Confidentiality: The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify you. Research records will be stored securely and only the researcher in this study will have access to the records.

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Statement of Consent: I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

If you are interested in this study taking place on Banning High School's campus, we look forward to hearing back from you. If not, thank you for your time and consideration.

Best Regards,

Nicholas Cullen-Carroll

Appendix B

Tables and Figures

Table 1. Demographic Characteristics of Participants

Factors	Categories	Frequency
Sex	Male	31
	Female	10
Age	14 yrs	7
	15 yrs	12
	16 yrs	5
	17 yrs	12
	18 yrs	5
Grade	9th	19
	10th	0
	11th	9
	12th	13
Class	PE1	20
	PE2	4
	Weight Training	17
Race/Ethnicity	Hispanic/Latino	19
	African American	8
	Europe American	7
	Asian American	4
	Native American	3
Strenuous Physical Activity	30 min or less	5
	30 min to 2 hrs	15
	2.5 hrs to 4 hrs	9
	4.5 hrs to 6 hrs	9
	More than 6 hrs	3
Moderate Physical Activity	30 min or less	10
	30 min to 2 hrs	15
	2.5 hrs to 4 hrs	8
	4.5 hrs to 6 hrs	5
	More than 6 hrs	3

Mild Physical Activity	30 min or less	18
	30 min to 2 hrs	12
	2.5 hrs to 4 hrs	7
	4.5 hrs to 6 hrs	1
	More than 6 hrs	6

Table 2. Summary Statistics of Preparedness Survey Metrics

	M	SE
Mood	3.80	0.75
Sleep Quality	3.63	1.11
Energy Level	3.80	0.78
Diet Quality	3.34	0.91
Stress	2.90	1.48
Muscle Soreness	2.95	1.66

Table 3. Performance Metrics for Aerobic Capacity and Broad Jump Tests

Metric	M	SE
PACER Level	3.71	1.19
PACER Laps	25.76	11.02
PACER Distance*	515.12	220.31
VO2max^	35.17	7.74
Broad Jump	70.98	12.66

*distance expressed in meters
^VO2max expressed in ml/kg/min

Table 4. Correlations Among Participant Preparedness and Performance Data

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Broad Jump	–										
2. VO2	.415*	–									
3. Pacer Distance	.410*	.993*	–								
4. Pacer Laps	.410*	.993*	1.00*	–							
5. Pacer Level	.407*	.991*	.970*	.970*	–						
6. Soreness	-.041	.372*	.416*	.416*	.323*	–					
7. Stress	.039	.320*	.307	.307	.339*	.467*	–				
8. Diet	-.064	-.027	.001	.001	-.067	.111	-.037	–			
9. Energy	.275	.349*	.375*	.375*	.314*	.282	.242	.201	–		
10. Sleep	.001	.205	.215	.215	.182	.193	.114	.373*	.433*	–	
11. Mood	.202	.236	.252	.252	.215	.093	.050	.247	.488*	.332*	–

*. Correlation is significant at the .05 level (2-tailed)

Figure 1. Demographic Questionnaire

Question	Answers
What is your age?	A. 13 B. 14 C. 15 D. 16 E. 17 F. 18 G. 19
What is your grade level?	A. 9 B. 10 C. 11 D. 12
In which Physical Education course are you enrolled?	A. PE1 B. PE2 C. PE3
What is your race?	A. European American/White B. Hispanic/Latino C. African American/Black D. Asian American E. Native American
What is your sex?	A. Male B. Female
What is your grade point average(GPA)?	Numerical free response
How many hours per week do you engage in strenuous exercise (heart beats rapidly) (hockey, running, jogging, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance biking)?	A. 30 minutes or less per week B. 30 minutes to 2 hours per week C. 2 hours and 30 minutes to 4 hours per week D. 4 hours and 30 minutes to 6 hours per week E. Greater than 6 hours per week
How many hours per week do you engage	A. 30 minutes or less per week

in moderate exercise (not exhausting) (fast walking, baseball, easy bicycling, tennis, volleyball, badminton, easy swimming, alpine skiing, folk and pop dancing)?	B. 30 minutes to 2 hours per week C. 2 hours and 30 minutes to 4 hours per week D. 4 hours and 30 minutes to 6 hours per week E. Greater than 6 hours per week
How many hours per week do you engage in mild exercise (minimal effort) (yoga, fishing, bowling, horseshoes, archery, golf, snow mobile, easy walking)	A. 30 minutes or less per week B. 30 minutes to 2 hours per week C. 2 hours and 30 minutes to 4 hours per week D. 4 hours and 30 minutes to 6 hours per week E. Greater than 6 hours per week

Figure 2. High School PE Preparedness Scale - Descriptions and Scoring

Domain	1	2	3	4	5
Mood State	Very Bad	Bad	Reasonable	Good	Very Good
Sleep Quality	Very Bad	Bad	Reasonable	Good	Very Good
Energy Level	Very Low	Low	Reasonable	High	Very High
Diet Quality	Very Bad	Bad	Reasonable	Good	Very Good
Stress Level	Very High	High	Reasonable	Low	Very Low
Muscle Soreness	Very High	High	Reasonable	Low	Very Low

Figure 3. Flow Chart for Methodology

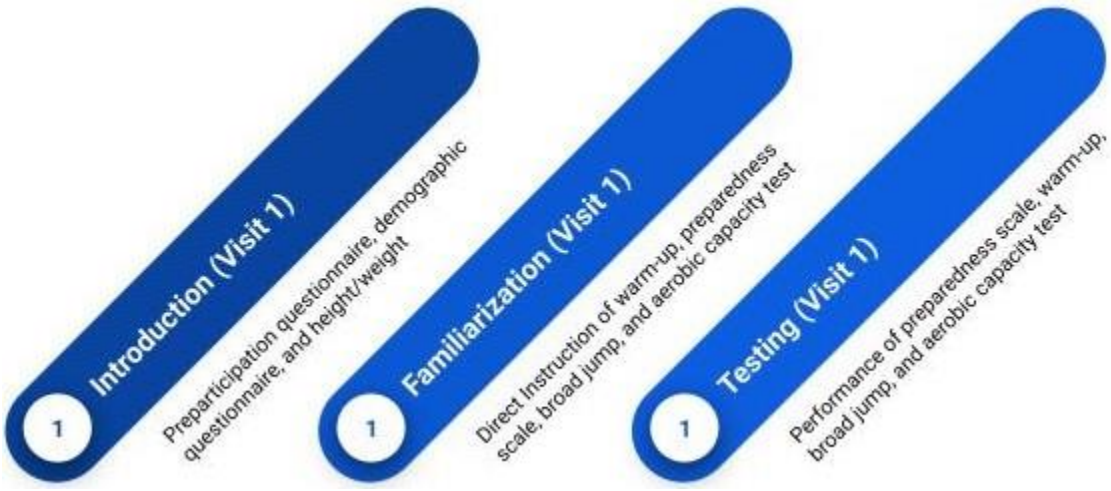

Figure 4. Standard ParQ Preparticipation Questionnaire

Question	Yes	No
Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?		
Do you feel pain in your chest when you do physical activity?		

In the past month, have you had chest pain when you were not doing physical activity?		
Do you lose your balance because of dizziness or do you ever lose consciousness?		
Do you have a bone or joint problem that could be made worse by a change in your physical activity?		
Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?		
Do you know of any other reason why you should not do physical activity?		

Figure 5. Age Distribution of Participants

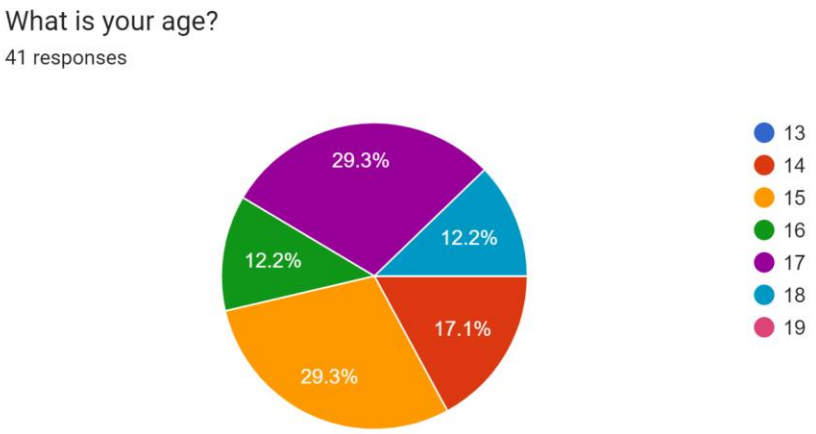

Figure 6. Grade Level Distribution of Participants

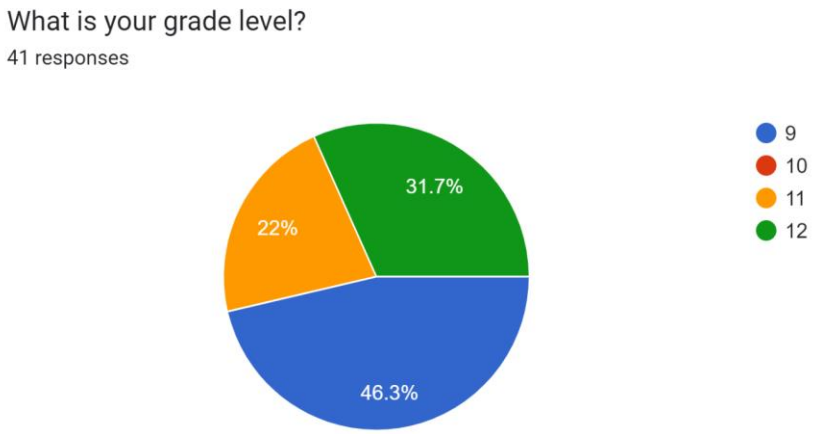

Figure 7. Physical Education Course Distribution of Participants

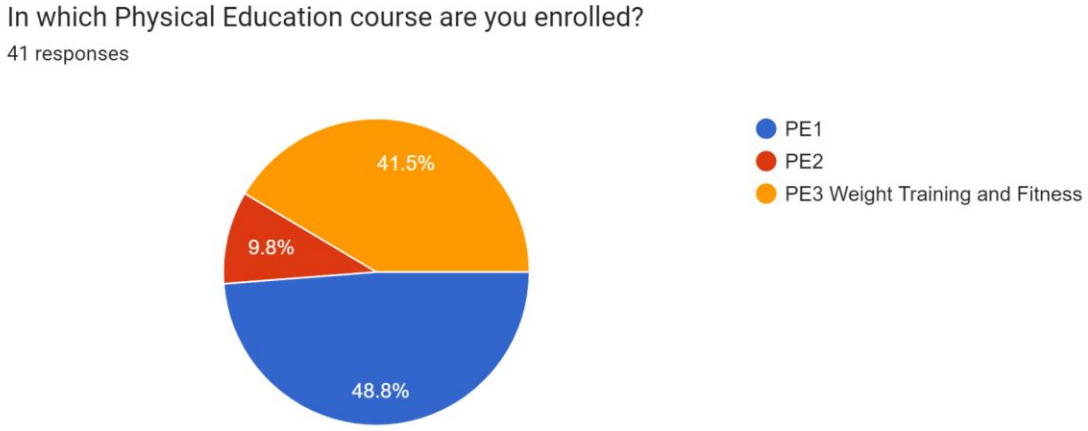

Figure 8. Race Distribution of Participants

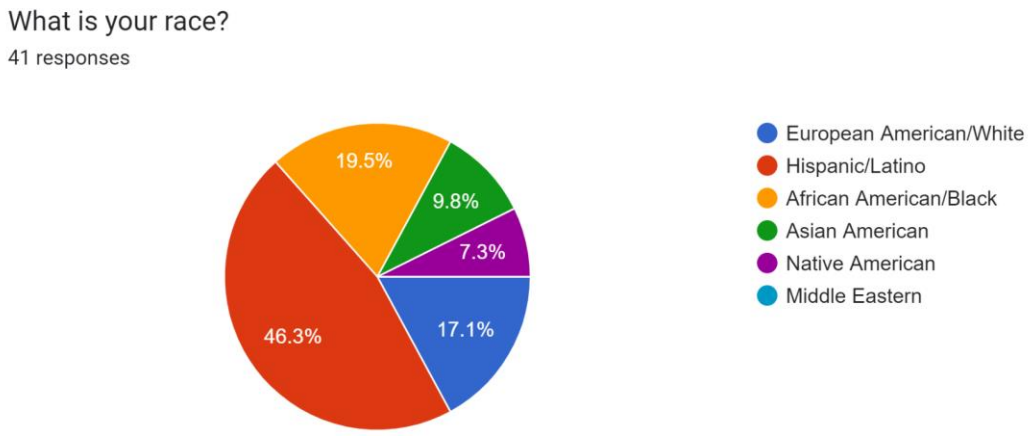

Figure 9. Sex Distribution of Participants

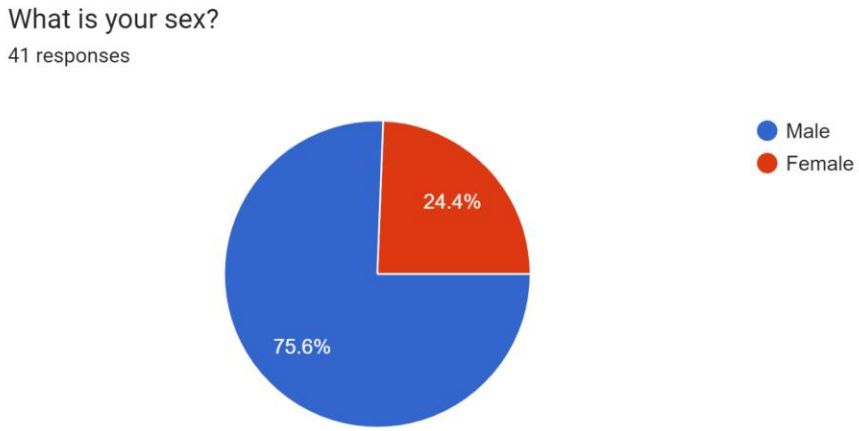

Figure 10. Strenuous Exercise Distribution of Participants

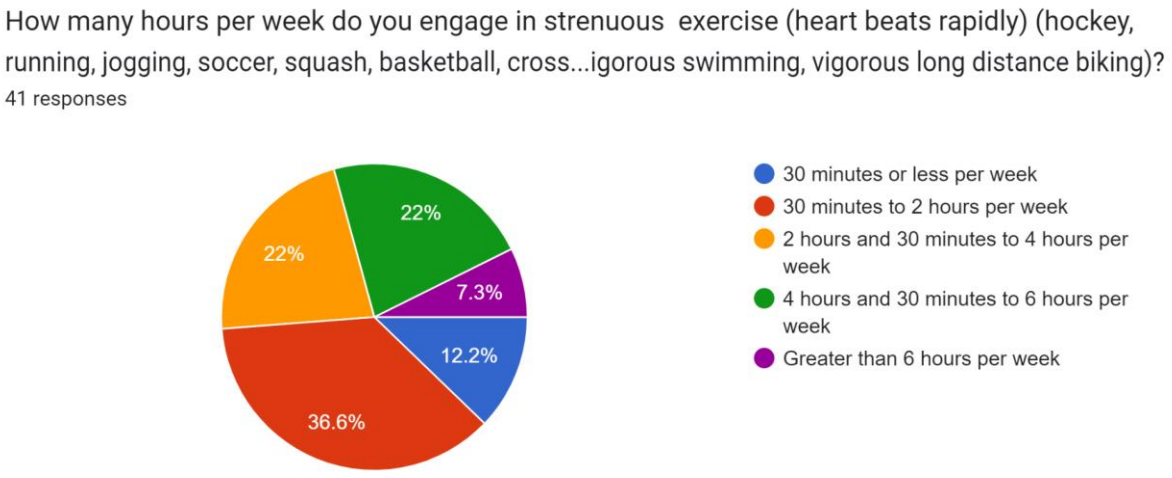

Figure 11. Moderate Exercise Distribution of Participants

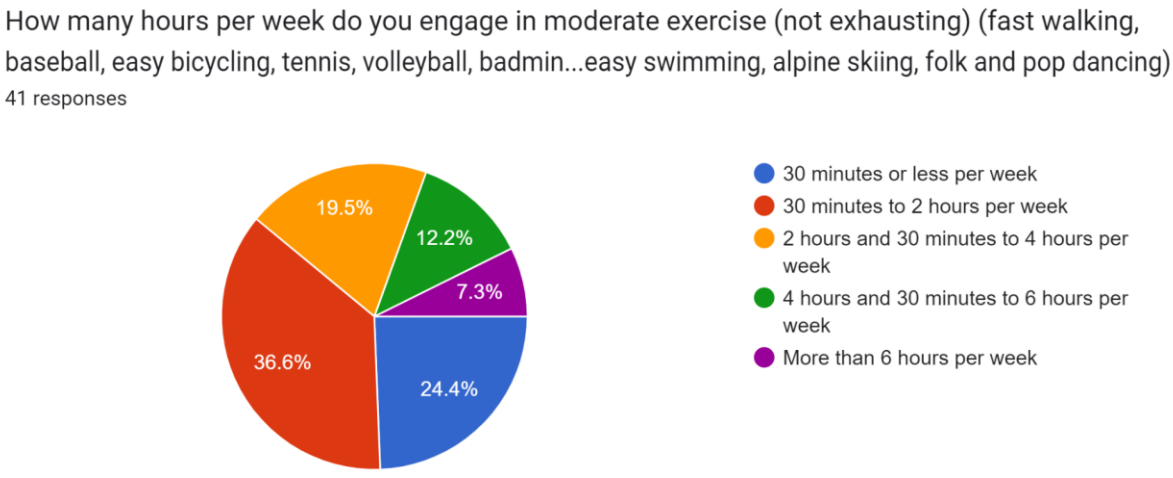

Figure 12. Mild Exercise Distribution of Participants

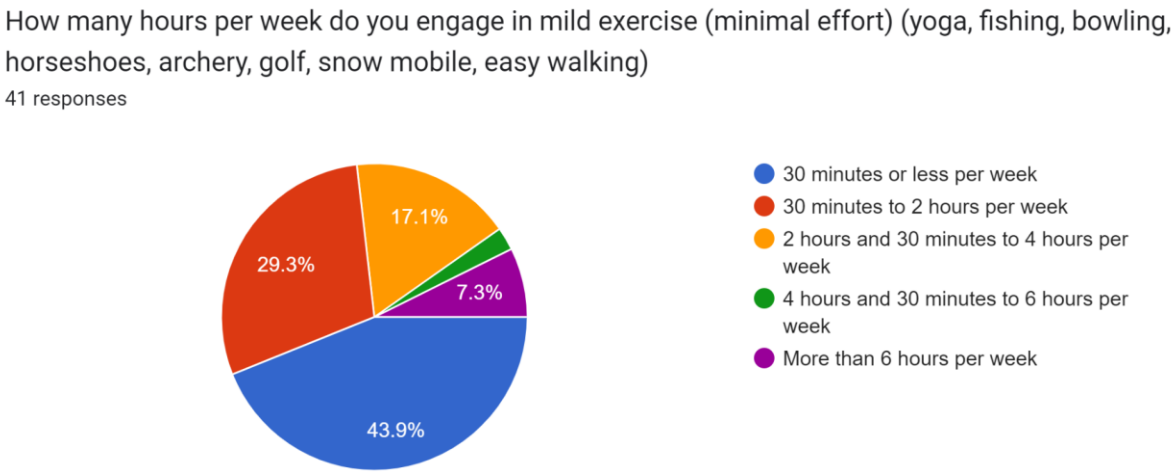

Figure 13. Mood Metric Distribution of Participants

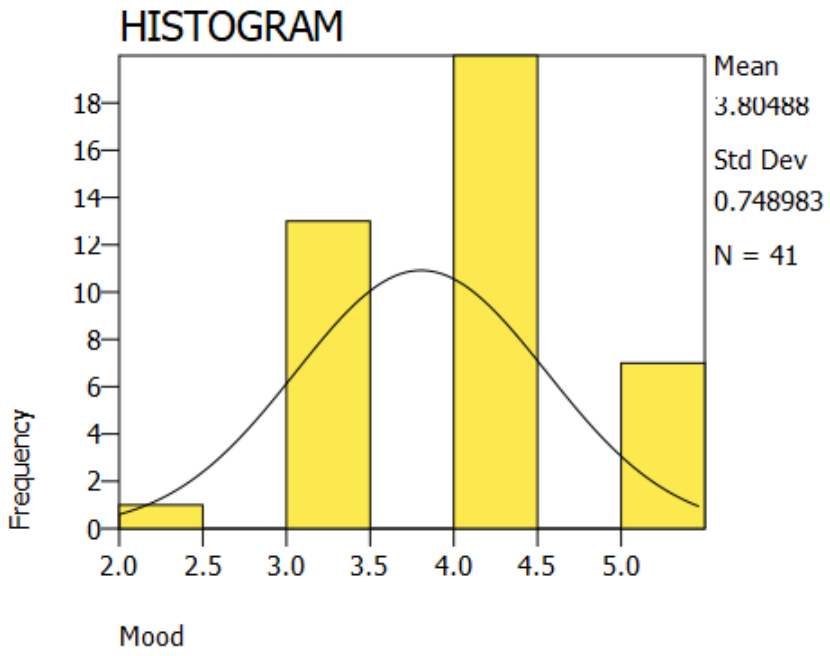

Figure 14. Sleep Quality Metric Distribution of Participants

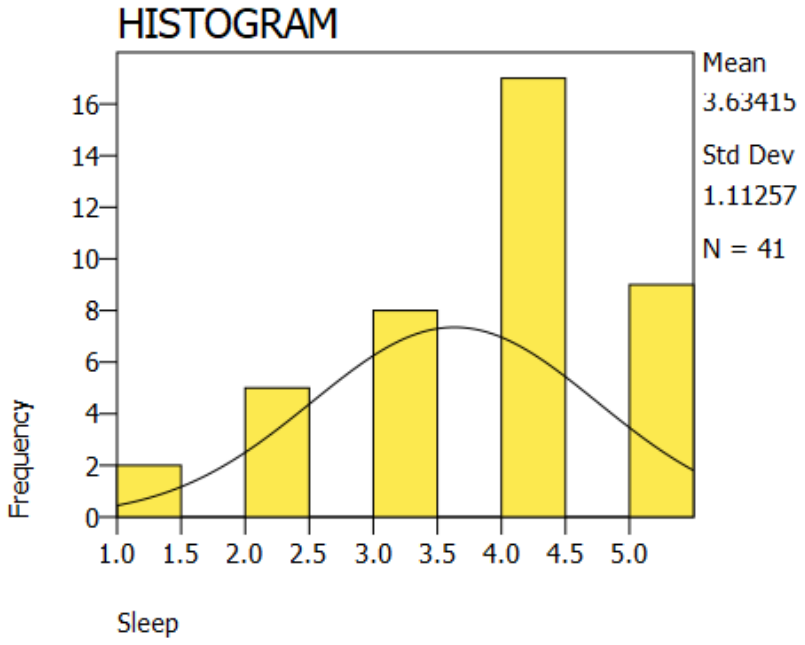

Figure 15. Energy Level Metric Distribution of Participants

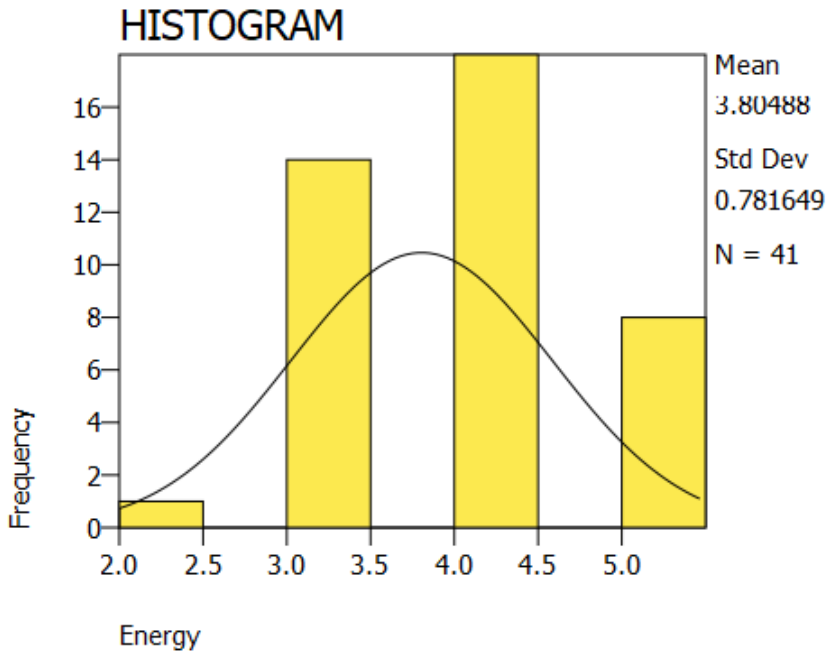

Figure 16. Diet Quality Metric Distribution for Participants

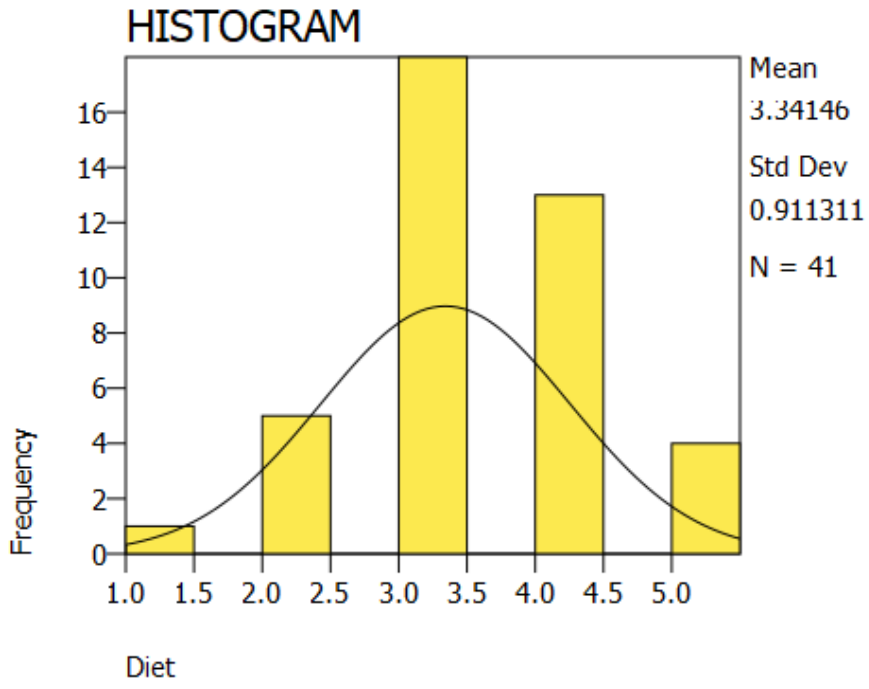

Figure 17. Stress Level Metric Distribution of Participants

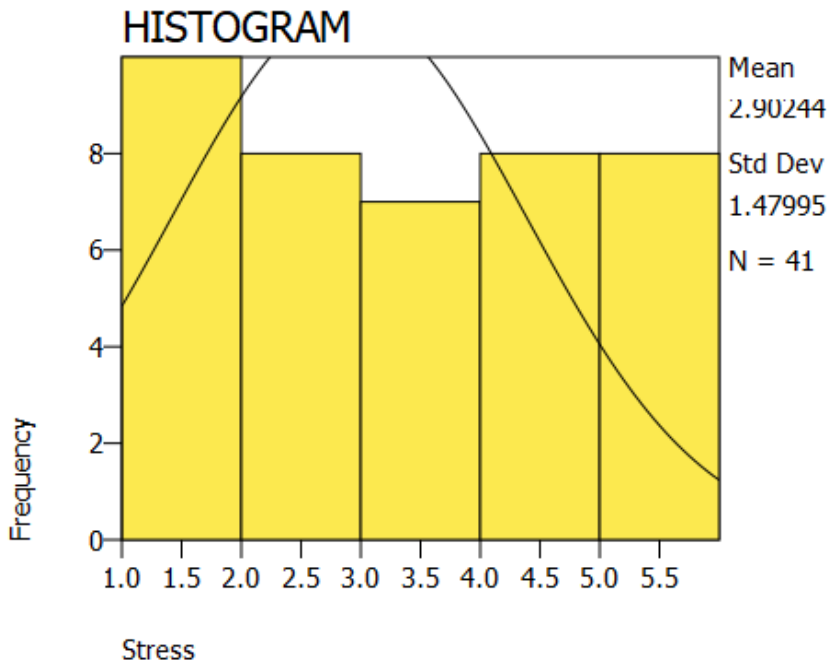

Figure 18. Muscle Soreness Metric Distribution of Participants