THE EFFECTS OF WEARABLE FITNESS DEVICES ON A FEMALE COLLEGIATE ATHLETE'S PSYCHOLOGICAL REST

by

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A Thesis for the Degree
Master of Science

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Chapter I: Introduction

As technology continues to develop, it is becoming common for people to wear fitness devices such as smart watches, wristbands or bracelets that monitor their daily life activities and overall health. Wearable fitness devices (WFD) are multi-technology gadgets with two or more sensor applications in the same device (Bloss, 2017). This type of technology is a popular, recent trend, that gives in-depth health and physiological data provided right at the touch of a button (Huang et al., 2018). These convenient fitness devices address multi-technology needs in a "smarter manner" (Bloss, 2017). Bloss (2017) conducted a review on multi-technology sensors like the Apple Watch and Fitbit through health and various applications. The main features of WFD include time, blood pressure, pulse rate, distance traveled, calories used, an individual's movement and heart rate (HR). Not only are these WFD intelligent systems, but they may have potential use in the future with stress monitoring (Hernando et al., 2018), blood sugar assessment (Bloss, 2017), and mental fatigue (Huang et al., 2018). Future applications of WFDs continue to rise along with the different perceptions of this advanced technology.

Since there are questions of reliability and validity, some studies investigated the health and fitness data generated from fitness trackers (Hernando et al., 2018, Bloss, 2017). For instance, Hernando et al. (2018) examined the measurements of HR variability (HRV) using the Apple Watch to determine its validity and reliability with monitoring the changes of relaxation and mental stress in healthy individuals. The Apple Watch results provided possible misinterpretations of the HRV's measurement data. Bloss et al. (2017) had similar findings with miscalculations and false signals when using accelerometers in these devices. Concerns about these technological errors could lead to misinformation, especially if more personal health and medical applications are added on to these sensory devices.

WFDs are common among athletes, which may manipulate their perception of their health status as well as their psychological understanding of rest. In fact, Eccles and Kazmier (2019) used an initial descriptive model with interviews of collegiate athletes and their experiences generalizing the significance of psychological rest and its implication of future research. The results of the model consisted of the five resting processes, the state of being well rested and wakeful rest. The five resting processes are always thinking of sport, being externally controlled, tedium, performance demands, and non-sport opportunity costs. Always thinking about one's sport involves an athlete constantly thinking or engagement sport and their performance throughout the day. Being externally controlled is when the athlete has no autonomy in their sport due to coach or sport program being in control of their schedules and daily activities. Tedium is experiencing a repetitive routine or schedule with sport, and it rarely changes. Performance demands involve an athlete training and competing with full attention toward sport with high emotion and cognitive demands. Non-sport opportunity costs is when an athlete has no time to do activities or have relationships outside of sport due to full time commitment with the sport.

The second result is the state of being well rested. Athlete engagement is the psychological state associated with the concept of being well-rested. The common themes of being well rested involve enjoyment of sport, valuing, motivating, and feeling fresh or refreshed. In other words, if the athlete is well-rested psychologically, then the athlete will feel more motivated to get involved with their sport.

The last result from the psychology of rest model is wakeful rest. Wakeful rest is a recovery experience of participating in non-sport related activities (Eccles and Kazmier, 2019). These activities can be personal hobbies or social activities as long as it does not relate to sport.

Overall, Eccles and Kazmier's model suggested that the psychology of rest can be perceived in a variety of ways depending on the individual. The two key practices or experiences of psychology of rest are psychological detachment and wakeful rest.

Rest is a key component of recovery which is heavily influenced and concerned with the physical aspect then the mental aspect. The physical aspect of rest is sleeping and or taking naps. Plenty of research exists on sleep being useful for the body to recover from physical exhaustion (Kellmann et al., 2018). Psychological rest, however, can be mistaken for sleep in general but there is a difference between physical and psychological rest. The Kaplan Attention Restoration theory argues that sleep may not be fully impactful, psychologically (Kaplan, 1995). The Kaplan Attention Restoration Theory declared sleep to be insufficient for reducing attentional fatigue following a demanding task, which depends on the individual's mental health. The mental aspect of rest is psychological inactivity such as psychological detachment (Eccles and Kazmier, 2019). "Psychological detachment is conceptualized as a key recovery experience involving a reduction of thoughts about stressful aspects of work when away from work" (Eccles & Kazmier, 2019, p. 96). The concept of psychological detachment involving "switching off" or "not thinking about one's work" comes from the stressor-detachment model, which is when work-induced strain is low, as well as key recovery experiences following work or, in this case, specific to sport (Eccles & Kazmier, 2019). The model displayed an association between job stressors and strains while it contains two influences of psychological detachment functioning as a mediator and moderator in the stress-strain process. Empirical studies have consistently shown the lack of psychological detachment is related to poor psychological well-being, which means negative affectivity (i.e., low emotional stability) (Sonnentag, 2011). When a person does not practice mental recovery techniques like psychological detachment, their performance will be negatively impacted. When

it comes to technology, individuals who constantly used technology displayed low levels of psychological detachment according to Sandoval-Reyes et al. (2019). In other words, it would be difficult for the person to practice psychological detachment if they are constantly using technology which can cause a mental overload. With the high demands and stressors of sport, psychological detachment may be a potential solution to the risks and concerns surrounding the individual's health and well-being due to the high levels of stress.

Another key experience of psychology of rest is wakeful rest. Wakeful rest is a psychological relaxation technique (Kellmann et al., 2018) aligned with the psychological detachment concept of not thinking about one's sport. For athletes, the key to this experience is participating in activities and being in environments that do not pertain to the sport (Eccles & Kazmier, 2019). Kellmann et al. (2018) asserted the importance of the relationship between recovery and performance, and how both physiological and psychological recovery strategies are essential for athletes. There are psychological problems related to under-recovery. Under-recovery is the integration of efficient recovery into athletes' training and competition routines as well as a buffer against psychological problems such as burnout and depression (Kellmann et al., 2018). This claim further propels the need for athletes to practice wakeful rest in order to be successful with their sport performance. The other benefits of wakeful rest involve a boost of long-term memories, and memory consolidation of recall and recognition (Dewar et al., 2014). Based upon the psychology of rest model, psychological detachment and wakeful resting are key recovery experiences for psychological rest. However, further research is needed to understand the model.

If an individual does not practice psychological rest, mental fatigue may appear. Mental fatigue has become a common psychological symptom with athletes. Mental fatigue is defined as

“a subjective feeling of mental tiredness” and “a transient decrease in maximal cognitive performance resulting from prolonged periods of cognitive activity" (Huang et al., 2018, p. 39). Mental fatigue can be caused by an athlete who is constantly thinking ahead before they can physically perform the skill. If the athlete’s mind is cognitively overloaded, then their performance will not be successful. Boksem and Tops (2008) evaluated mental fatigue and how it affects behavior and performance. More specifically, mental fatigue associated with continued performance of energy costs and expected awards resulted in decrease of motivation and effort invested (Boksem & Tops, 2008). Based on the researchers’ findings, the researchers claimed mental fatigue possibly occurring when the person is no longer motivated to engage in performance due spending an tremendous amount energy to reach their goal or award. It is noted from Boksem and Tops about the behavior depends on the individual, however it should be taken into consideration the prolonged task performance presents large amount of energy from the individual as well as an occurrence of mental fatigue. Another article similar to the relationship of high cognitive demands and mental fatigue is by Smith et al. (2018) who examined mental fatigue and soccer performance. The findings indicated mental fatigue caused negative effects on soccer-specific physical, technical, and perceptual-cognitive performances. These impairments are crucial in the athlete’s technical and decision-making performance. If the individual is completely overloaded with mental fatigue, then the individual has reached their maximum endpoint, known as burnout.

Burnout is one of the worst experiences for an athlete to go through with their sport. Cresswell and Eklund (2007) described burnout as “an experiential syndrome characterized by emotional and physical exhaustion, reduced accomplishment, and sport devaluation” (p. 1). The theoretical implications of burnout are psychosocial models of stress, commitment-based

explanations, and self-determined theory (SDT) based explanations. Cresswell and Eklund (2007) presented with interpretation of the participants' experience with burnout, but many of their participants experience negative connotations. These negative connotations are perceived media related demands, cumulative effects of training beyond their control, chronic frustration of basic needs, reduced accomplishment, and devaluation. This not only showed a high elevation of stress levels with the rugby players, but it is an interesting finding because it demonstrates the idea of athletes wanting to be in control of their training and performance. Burnout can be caused by many different factors mentioned in Cresswell and Eklund's (2017) study, but mental fatigue is the primary source. In order to reduce the potential of burnout, athletes should practice psychological rest to reduce mental fatigue.

Based upon the previous studies, having access to this convenient, physiological data leads to more questions on the psychological perspective in terms of mental fatigue and psychological detachment. Athletes and coaches are becoming more dependent on these WFD to track the health status for training programs in order to gain a competitive advantage (Ng & Ryba, 2018; Pustisek et al., 2019). The problem lies within the WFD's data with its overall impact of possibly affecting the athlete's perception of their overall health status and understanding of psychological rest. There is minimal research on this topic theoretically and practically in the field of sport psychology (Eccles & Kazmier, 2019). Therefore, the purpose of the study was to examine the influence of WFD and its impact on an individual's psychological rest in National Collegiate Athletic Association (NCAA) Division I female athletes.

Research Questions

1. Is there a difference in the participant's mental rest while wearing the fitness tracker compared to no WFD?

2. Is there a difference in the participant's wakeful rest while wearing the fitness tracker compared to no WFD?

Hypotheses

1. Participants will report high levels of being poorly mentally rested while wearing the fitness trackers versus not wearing it.
2. Participants will report low levels of wakeful rest while wearing the fitness trackers versus not wearing it.

Definitions of Terms

In this present study, wearable fitness device (WFD) are multi-technology gadgets that have two or more sensor appliances in the same device (Bloss, 2017). This study utilizes the Fitbit Inspire 2 for the WFD.

Psychology of rest, also known as "mental rest" involves recovery from the mental and stress demands of the activity to achieve effective rest (Eccles & Kazmier, 2019). The practice of mental rest is crucial to strengthen optimal performance (Eccles et al., 2020). The concept of psychological rest is a relatively new topic in the sport psychology field.

Psychological detachment is conceptualized as a key recovery experience that involves a reduction or cessation of thoughts about stressful aspects of work when away from work; thoughts that would otherwise lead to strain, which comprises deleterious physiological and psychological symptoms (Eccles & Kazmier, 2019, p. 96).

The Division I college athlete is enrolled as a full-time student that is eligible for scholarship while participating in sport for the school or university they attend (About NCAA Division I, n.d.). While this student-athlete is committed to the sport they participate in, they

must maintain a high academic standard to compete with other NCAA Division I schools or universities.

Assumptions

It was assumed that the participants would answer honestly on the questionnaires and during the interview. Additionally, it was assumed that the participants would wear the Fitbit according to the researchers' directions and not modify any settings.

Limitations and Delimitations

With the collection of questionnaire data from the Qualtrics, one limitation was the participants may not answer truthfully. Keeping in mind that the specific population is Division I athletes, these participants may not be honest with their answers due to the pressures they are under and the fear of others knowing their answers or responses. This was the same with one-on-one interviews. Another limitation is the possibility of some of the participants owning a WFD prior to the study. The participant owning a WFD may displayed different results from the other participants who never own one. A delimitation was the population group chosen which are the Division I elite group from one north Texas university. Even though this study could potentially include a general population of NCAA Division I athletes, it was designed best to start with college athletes at one school for one weekly visit in a timely manner.

Variables

The independent variable was either wearing or not wearing the Fitbit Inspire 2. The dependent variables were the Current Mental Rest and the subscales of the Wakeful Resting Experiences Questionnaire (i.e., always thinking about sport, being externally controlled, tedium, performance demands, and non-sport opportunity costs).

Chapter II: Review of Literature

As the demand and popularity of WFD rise so do the questions of influence on the devices' data. In 2017, the vendors of a worldwide wearable device tracker shipped a total of 125.5 million wearable devices, marking a 20.4% increase from the 104.3 million units shipped in 2016 (Jia et al., 2018). Thompson (2021) mentioned wearable technology, a $100 billion dollar industry, being number two on the list of the top 20 world fitness trends for 2021. These facts suggested that the WFD market continues to grow even today. Previous research indicated the variety of benefits and consequences of the WFD. The question remains if wearable technology alters an individual's perception of their psychological rest. The impact of an athlete's psychological rest is crucial for the athlete to perform successfully. This literature review offers the following: background information about the different types of popular WFD, discusses the positive and negative effects of wearable technology, psychological detachment, psychology of rest, and athlete burnout.

Popular Types of WFD

The term WFD refers to the "smart wristbands" or "smart watches" that individuals wear on their arms throughout the day or during their workouts. The wearable technology has various features like a pedometer, a HR monitor, or a sleep tracker which collects an individual's health and fitness status (Coorevits & Coenen, 2016). Not only do the fitness trackers monitor the activity and physiological vitals of an individual, but they have the potential to offer many features, including healthcare applications (Jia et al., 2018). Some of the most common WFD are the Apple Watch, Fitbit, Misfit Shine and WHOOP strap.

Apple Watch

The Apple Watch is the best-known wearable multi-technology sensing device (Bloss, 2017). The popularity of these watches continues to grow as do the number of features. The

features include a variety of elements, yet the present study's focus is on the health and fitness applications. The Apple Watch not only displays time, but also detects the wearer's blood pressure, sleep habits, electrocardiogram (EKG), and activity movement (Bloss, 2017). As the Apple Watches series continues to evolve into more advanced technology, additional features are being added to the health and fitness tracker. In a recent article on the upcoming Apple Watch Series 7, some of the features included sensor activity of fall detection, new mindfulness and workout apps including Tai Chi and Pilates, tracking respiratory rate during sleep and possible blood glucose monitoring (Rogerson, 2021).

One of the Apple Watch features contained the HR measurement. Khushhal et al. (2017) examined the validity and reliability of the Apple Watch's HR sensor during in healthy male participants' exercise sessions (whether walking, jogging, or running) and recovery phase in healthy male participants. The results indicated that the Apple Watch has good validity of the HR during the walk and recovery from walk, but the validity decreases during intense exercise (Khushal et al. 2017). In other words, the Apple Watch's sensor may not accurately track participants' HR during jogging and running, which may invalidate its data.

Furthermore, Hernando et al. (2018) tested the validity of the Apple Watch for HR variability measurements in healthy participants during the relax and mental stress stages. This study used the Polar H7 band as validation in both relax and mental stress stages. The relax stage consisted of watching a relaxing video with calming music and pleasant images while the stress stage was taking the online Stroop test. The study found acceptable reliability in the Apple Watch measurements, showing no significant difference with the Polar H7 band despite gaps due to missing R wave to R wave (RR) interval values (Hernando et al., 2018). The R wave is the beginning of the heartbeat shown on the electrocardiogram. The RR interval is between the

successive heartbeats or represents one whole heartbeat on the EKG (Hernando et al., 2018). The researchers concluded the Apple Watch has the potential to monitor stress.

As Apple continues to develop its health and fitness trackers, more research is needed on its sensing technology. For example, Apple could explore technology that would allow its devices to monitor blood sugar molecules within an individual's blood stream (Bloss, 2017). The Apple company is working toward application of the blood sugar monitor in the Apple Watch to control diabetes which would be a milestone for wearable multi-sensor technology.

Fitbit

Another popular WFD is the Fitbit. Introduced in 2013, the Fitbit was the first wrist-worn activity monitor (Jung et al., 2020). The Fitbit has different wearable styles including a wristwatch, clipped on a belt or clothing, and a pocket version (Kaewkannate & Kim, 2016). The different features include fitness tracking of activity movement, number of steps walked, the quality of sleep, and helps stimulate wearers' motivation for exercise (Kaewkannate & Kim, 2016). Like the Apple Watch, the Fitbit advanced the evolution of fitness applications through evolving technology by updating features of health and fitness applications. The updated features of health and fitness applications consisted of an estimate of the wearer's HR, calories burned, and distance traveled (Jung et al., 2020).

The features the Fitbit continues to add raise questions of validity and reliability. Under laboratory and free-living conditions, Jung et al. (2020) researched the accuracy of the Fitbit's measurements of HR, step counts, and calories against criterion measures. The results of this study showed no significant difference in accuracy of Fitbit HR and calorie measurements between laboratory and free-living conditions, but a significant difference occurred in step counts with failed accuracy against criterion measurements (Jung et al., 2020). The research

indicated that the Fitbit HR is moderately reliable when measuring the HR of individuals engaged in light intensity activities. The Fitbit made more errors when measuring the HR of individuals engaged in moderate to vigorous activities. The limitation with use of the fitness tracker is on certain intensity activity, but some cautions are addressed when it comes to fully relying on this device.

Fitbit is the leading manufacturer of accelerometer-based physical activity monitors in the consumer market (Redenius et al., 2019). An examination of the Fitbit Flex physical activity monitored by Redenious and colleagues (2019) offered insight about the accuracy of the fitness device's measurements of the wearer's sedentary and physical activity against the ActiGraph GT3X, a validated accelerometer. These findings demonstrated that the devices are statistically equivalent when measuring sedentary behavior, but not when measuring moderate to vigorous physical activity. The study's finding indicated that the Fitbit Flex accurately measured light physical activities more than moderate and vigorous physical activities. The accurate measurements of Fitbit Flex benefitted people who exercise lightly versus those who exercise or train at normal to high levels. In other words, the Fitbit data may not produce accurate data for high level athletes.

Misfit Shine

Misfit Shine, another popular wearable device, had the same features as Fitbit and Apple Watch. It tracked daily activity levels, including step counting, distance traveled, and calories burned, as well as monitoring waking and sleeping hours (Kaewkannate & Kim, 2016). The Misfit Shine worked with the iPhone and Android app to track and motivate individuals to achieve their fitness goals (Kaewkannate & Kim, 2016). However, the Misfit Shine does not have is the HR monitor (Breteler et al., 2019).

One of the problems is the requirement of a smartphone to check for the tracking status, which the wearer cannot find on the Misfit Shine wristband. The data from the Misfit Shine may sometimes be inaccurate due to the loss of its Bluetooth connection with the smartphone (Kaewkannate & Kim, 2016). Another inaccuracy of the device is the overestimation of steps. Breteler et al. (2019) tested the usability and validity of commercially available activity monitors like the Misfit Shine to measure free-living activity. The researchers found the Misfit Shine unreliable for counting steps due to low frequency of data transmission from the device to the phone (Breteler et al., 2019).

WHOOP

The WHOOP strap is a different type of WFD compared to the other fitness devices due to not having a screen on the band. It is a wearable sensor strap that collects physiological data and syncs the feedback via Bluetooth on a smartphone (Harms, 2018). The physiological data includes HR, resting HR, HRV, electro-dermal activity, sleep, ambient temperature, and 3D acceleration that informs the athlete's recovery status (Breslow, 2016; Harms, 2018). Not only the physiological data is collected 24/7, but the continuous feedback will give the individual recommendations to make smarter, behavioral decisions with their performance, training, and sleep. The WHOOP is a well-known monitoring technology for its accurate and consistent physiological data, especially with sleep.

The WHOOP company had eight NCAA Division I teams from various sports use the technology and had found results of the athletes increasing their sleep over time (Breslow, 2016). Due to sleep analysis being one of the main features of WHOOP, it created more sleep awareness, and the athletes felt encouraged to make improvements with their sleep patterns. With the WHOOP technology, the athletes who usually average fewer than 7.9 hours to sleep per

night, had an increase of 52 minutes (Breslow, 2016). Overall, the 129 days analyzed on the average time dedicated to sleep per night increased 41 minutes with all the teams. Not only did the majority of the athletes improve their sleep time, but many reported that they never realized how little sleep they were getting and noticed the negative impact on their pre-sleep behaviors. This important result indicated that if athletes improve their sleep by using the WHOOP technology, it may positively influence their sport performance. As WHOOP continues to attract the elite sport organizations like the NCAA, the growth will match the dependency on these devices for the athletes to perform successfully at practice and in a game or competition.

Another experimental study examined the WHOOP technology and its impact on sleep, recovery, and performance in NAIA baseball players. Harms (2018) observed ten baseball student athletes split into experimental and control groups over four weeks. The results found a change of sleep habits which increased recovery which influenced the athlete's performance. The increase of sleep had a positive effect on the athletes and allowed their recovery levels to increase. Though an interesting finding on the experimental group, batting performance decreased over time compared to the control group. The experimental group expressed the WHOOP technology was helpful with their sleep and recovery. As WHOOP technology continues to evolve and athletes make what WHOOP calls an "investment in the body," there are inherent difficulties in deciding how best to utilize the device and measure its effectiveness (Harms, 2018, p. 49). Harms (2018) stated the use and effectiveness of the WHOOP device through this type of technology and information is beneficial for our athletes but will be challenging to properly utilize and maximize its potential.

Positive and Negative Influence of WFD

Being familiar with the different types of WFD provided better understanding of the overall impact it has on the general and athletic population. Previous research expressed mixed perspectives on the positive and negative influence of the fitness trackers (Coorevits & Coenen, 2016; Jia et al., 2018). Coorevits and Coenen (2016) identified the participants' positive and negative experiences with the wearable activity trackers commercially consumed every day. The authors claimed the visual appeal, smooth integration with body and smartphone, feedback loops, easy customization, and relatively simple setup contributed to the devices' having become part of people's daily routine. However, some negative aspects included the inaccuracy, inconsistency, and low quality (Coorevits & Coenen, 2016). The list of negative aspects explained the attrition of the WFD when the consumer uses it. Too little research addressed the overall evaluation of consumer experience, specifically for wearable fitness trackers. This study provided different insights into the attrition of the wearable fitness devices from the feedback given in the data. The researchers urge to focus not solely on the technology use and performance, but also on the users perceived feedback and experience on these wearable fitness trackers.

Another study assessed user preferences and the usability of various fitness trackers for health monitoring (Jia et al., 2018). The participants gave feedback on a questionnaire about the top feature preferences of seven mainstream fitness trackers, which included the Fitbit and Apple Watch. To determine pros and cons of each fitness tracker, Jia et al. (2018) asked participants about five WFD dimensions: product design, durability, ease of use, added features, and user-rated accuracy. The first part of the results displayed the top three preferences of the fitness devices: daily activity tracking, heart health monitoring and professional fitness tracking. The

second part of the results showed the top three health-related feature preferences: HR monitoring, daily pedometer, and professional fitness tracking (Jia et al., 2018). The overall results indicated the participants valued and approved of the health and fitness applications in the wearable technology. The devices only provided health data specific to fitness but not the corresponding medical meanings or suggestions related to the participant's health risks (Jia et al., 2018). This perspective reflects people's dependency on fitness devices for their overall health which can cause problems for those with medical issues and unexpected health risks.

Data Privacy

The WFD collects physiological data of the individual's fitness health. These devices popularity has grown not only with the general population, but among the well-known sport organizations such as the National Football League (NFL), National Basketball Association (NBA) and Major League Baseball (MLB). According to Socolow & Jolly (2017), the U.S. national sport organizations are partnering with fitness device companies to collect athlete's detailed performance data before, during, and after the games. The intention is to interpret the athlete's data and utilize the information to improve the athlete's training, competition, and injury prevention. The problem at hand is the advancement of this technology with no current law protecting the athlete's biometric data.

The U.S. Privacy Act of 1974, American Disabilities Act, Genetic Information Nondiscrimination Act of 2008, and the Health Insurance Portability and Accountability Act (HIPAA) applied protection of information whether it is medical, health or genetic related but not to biometric data (Socolow & Jolly, 2017). The problematic issues related to the legal and ethical standards of the fitness devices are the privacy, ownership, and security. The athlete's data will be under the sport organizations but will create more questions on who will see it and

potential risk of hacking. Whoever has access to the athlete's health and performance information can use it to their advantage and possibly threaten the athlete's career. The pros and cons of WFD will develop over time with the athlete and their performance, yet the ethical decisions made must be held to a higher standard and the awareness of the amount of biometric data that is private or public.

Unlike the average person who utilizes the fitness trackers to track their health information, athletes may adopt these devices to improve their performance and gain a competitive advantage. In competitive sports, athletes use wearable fitness technology to enhance training and performance (Ng & Ryba, 2018). With the use of fitness trackers, athletes can become self-aware of their sport performance. Ng and Ryba (2018) explored the relationship of wearable technology to athlete identity in high school athletes. The purpose of the research offered insight into whether wearable technology enhances the athlete's identity or not. Based on data from 437 student athletes, the results found a positive correlation between wearable technology and athlete identity. More specifically, Ng and Ryba (2018) noted the fitness trackers created a higher level of athlete identity and professional sport aspiration. The ownership of wearable fitness devices may boost athlete's confidence, give them a sense of autonomy, and give them knowledge of their fitness data to personalize their training.

Psychological Detachment

Psychological detachment is the concept of "switching off" mentally and refraining from thinking about a certain activity (Sonnentag, 2011). The term associated with work-related tasks and was first introduced by Sonnentag and Bayer (2005). Psychological detachment from work played a core role in the stressor-strain process, particularly in job situations characterized by

psychological stressors (Sonnentag, 2011). The notion of the psychological detachment's role in the stress-strain process is explained by the stressor-detachment model.

Stressor-Detachment Model of Recovery

Psychological detachment is a concept traditionally associated with the Stressor-Detachment Model of recovery from work in organizational psychology (Eccles et al. 2020). The stress-detachment model proposed by Sonnentag and Fritz (2015) combined the cognitive activation theory and allostatic load model to emphasize the importance of psychological detachment within the stressor-strain process. In the model, psychological detachment mediates and moderates among job stressors, levels of strain, and levels of impaired well-being. Psychological detachment as a moderator influences job stressor as well as strain and impaired well-being while as a mediator, job stressors hinder psychological detachment then hinder strain and impaired well-being (Sonnentag & Fritz, 2015). Sonnentag and Fritz (2015) claimed different types of stressors to predict poor psychological detachment while poor psychological detachment predicted strain and impaired well-being. If triggered at high levels, an athlete's sport stressors will prevent the athlete from performing psychological detachment, which in turn disrupts the athlete's well-being. This model embodied the role and significance of psychological detachment as part of the athlete's recovery.

The model displayed an association between job stressors and strains while it contains two influences of psychological detachment functioning as a mediator and moderator in the stress-strain process. Sonnentag (2011) stated that, "some empirical studies have consistently shown that lack of psychological detachment is related to poor psychological well-being" (p. 259). The idea explained negative affectivity (i.e., low emotional stability) being related to low psychological detachment. When a person does not practice mental recovery techniques like

psychological detachment, their performance will be affected negatively. Psychological detachment may be the solution to the risks and concerns surrounding the individual's health and well-being due to the tremendous amount of stress. With the recent high demands and stressors of sports in college, in some ways being a collegiate athlete is becoming more as a job which is explained in the next model.

Demand-Induced Strain Compensation Model

Another model resembling the psychological detachment concept is the demand-induced strain compensation model. This model combines the demands and resources with psychological outcomes as the Demand-Induced Strain Compensation (DISC) model. "The DISC Model proposes two different work-related antecedents and distinct processes to explain employee outcomes" (De Jonge et al., 2012, p. 323). The demands and resources impact the individual's cognitive, emotional, and physical outcomes. De Jonge et al. (2012) affirmed that if the job demands disrupt any of these outcomes, they will affect the person's health and well-being. The job resources helped to balance the functionality of a person's health and well-being. The researchers provided examples of such job resources as social support and constructive feedback from colleagues. These examples influence a person's motivation and work engagement. If these matching job resources are not available, the individual will search for other job resources until they correspond with the job demand (De Jonge et al., 2012). Supportive, empirical evidence indicated the accuracy of the model according to De Jonge et al. (2012).

To further advance the field's understanding of the interplay between sport demands and sport resources, Balk et al. (2018) created the Demand-Induced Strain Compensation Questionnaire for Sport (DISC-SPORT), which drew upon elements of the DISC model and questionnaire. The DISC questionnaire created by De Jonge and his colleagues, explored

different dimensions such as: physical, cognitive, and emotional job demands and resources. The DISC-SPORT uses the same structure as the DISC, but it replaces the word job with sport. Balk et al. (2018) examined the validity and reliability of the DISC-SPORT, and the results supported the questionnaire and its invariance across all types of sport, competitive level, and language. The DISC-SPORT is a measurement with some resemblance to the general psychology of rest aspect based upon the dimensions of physical, cognitive, and emotional sport demands and resources.

Research on Psychological Detachment

Since stress continues to grow in work related activities, Sonnentag and Bayer (2005) investigated the predictions and consequences of psychological detachment from work during off job time. The prediction made by the researchers on psychological detachment is high chronic and day-specific workload that will display negative effects. The researcher's hypothesis led to a notion that if the individual does not psychologically detach themselves from work, the individual's mood and well-being will be negatively affected. The researchers focused on the evenings of normal work weeks which are the short-term psychological detachment from work. By measuring over a period of three days, the main significant results displayed a correlation of psychological detachment from work with positive mood and low fatigue as well as high workload is detrimental for psychological detachment (Sonnentag & Bayer, 2005). Due to these findings, it supported the researchers' notion of the importance of psychological detachment and the positive effects it has on the individual. The overall study emphasized the importance of balance in the work life and taking a break from work by not thinking about it.

Another study examined the relationship of self-regulation perspective and psychological detachment effect on employees with their work (Smit, 2015). To fully understand the concept of

psychological detachment and the employees, the researchers provided self-regulation research which proposed that the employees' minds are constantly thinking about goal related content even when their time at work is finished. The longitudinal study included over 100 employees pursuing over 1000 goals. The results supported the researcher's hypothesis of the employees having difficulty detaching themselves from incomplete work versus completed work (Smit, 2015). Another significant finding from their work is the workers resolved incomplete goals by practicing planning intervention and increased the psychological detachment levels. An example of planning intervention from the article is scheduling small breaks throughout the day within one's schedule to detach themselves from work. Planning intervention is an effective strategy to implement the practice of psychological detachment, particularly with completing goals in general. The study on work-related environment may parallel the same with the sport environment.

Like the employees from Smit's (2015) research, athletes are constantly participating in their sport physically, emotionally, and mentally. All employees have certain requirements or goals to match with their boss' expectations; it is the same with athletes and their coaches. Athletes are constantly being instructed on what to do and what not to do which further concludes that most of the time athletes have minimum to no control to the decisions being made for them. Based upon the findings of Smit's research through the self-regulatory perspective, it may be difficult for athletes to psychologically detach themselves from their sport. The self-regulatory perspective is when the individual makes intentional decisions of when, where, and how to evaluate a situation at hand with no guidance (Smit, 2015). The examination on the working relationship between an employee and the boss may have some similarities with the athlete and coach relationship. The reason athletes may struggle to practice psychological

detachment points is because they do not have the opportunity to practice the concept. For example, a coach, particularly at the elite level, creates a training plan for the athlete to implement as part of their daily routine. Usually, coaches facilitate the decisions made for the athlete within the sport.

When it comes to psychological detachment and technology, there is a recent study that investigated the effects of the relationship looking at over 300 health professionals. Sandoval-Reyes et al. (2019) found in their results that there is a negative effect of technology use on psychological detachment from work as well as a positive correlation between work overload and technology. The significant finding the researchers mentioned are the workers connected with technology through their jobs are less likely to practice psychological detachment. Based on the discussion of the results, technology acted as the central axis of connectivity in the work world and the extension on the demands of a workplace (Sandoval-Reyes et al., 2019). Technology is linked to high workload levels which decreases psychological detachment. With Sandoval-Reyes et al. (2019) research, further indicated the wearable fitness technology being used in this present study may have similar results with participant displaying low levels of psychological rest while wearing the devices.

With the literature found on psychological detachment, there seems to be an influential approach depending on the individual being in control of their daily routine whether at work or in sport. The participants in the present study will be self-regulated wearing the fitness devices and not wearing the fitness devices. Based on the literature found, there is an expectation that the participants will have difficulties practicing psychological detachment with their sport while wearing the fitness device and the wearable technology negatively influencing the individual's

psychological rest. The practice of psychological detachment can be beneficial to one's mental health by reducing stress if the individual mental detaches themselves from the activity itself.

Psychology of Rest

Based on psychological detachment, physical rest like sleep is crucial for athlete performance and emphasized by many researchers yet few studies have examined the concept of psychological rest (Eccles et al. 2020). Though often mistaken for physical rest, the psychology of rest relates to recovery from psychological fatigue and exhaustion (Eccles & Kazmier, 2019). Psychological rest allows athletes to psychologically detach from an activity by reducing their thoughts about the stress and demands of the activity when not engaging in it. For athletes to be psychologically detached from their sport means to occupy their minds with unrelated activities such as watching a show, reading a book, or hanging out with a friend. More information is further detailed below regarding the psychology of rest models and recent studies on the concept.

Eccles and Kazmier's Psychology of Rest Model

In the past, the sport psychology literature had established no specific models to explain the psychology of rest (Eccles et al. 2020). However, Eccles and Kazmier (2019) created the psychology of rest model recently that presents the athletes' experience and perspective on this concept. Eccles and Kazmier (2019) developed a study to better understand the psychology of rest by creating an initial descriptive model through qualitative data from interviews of athletes and researchers' proposals on psychology of rest. The researchers believe their generated model of the psychology of rest in athletes may offer analytical generalizability across different sport contexts and populations concerned with different sport contexts and populations concerned with recovery, skill learning, and expertise development (Eccles & Kazmier, 2019). The results of

various concepts within the psychology of rest model included the resting process, the state of being well rested, and wakeful rest.

The resting process outlines conditions of behavioral, social, and environmental factors that reduce the resting experience and increase the opposite of the resting experience. In Eccles and Kazmier's (2019) research, the athletes' common resting processes are the following: always thinking about one's sport, being externally controlled, tedium, performance demands and non-sport opportunity costs. Always thinking about one's sport involves constant thinking or engagement within the sport. Since athletes are heavily invested in their sport through constant practice and engagement in sport-related activities throughout the day, their mindset will continue to be on the sport and their performance. According to Eccles and Kazmier (2019), a constant engagement or thinking about the sport can result in mental fatigue and possibly a decrease in motivation. Being externally controlled highlights that athletes feel their lives are being controlled by the sport program and the fixed schedule in how they should eat, sleep, and socialize. Without autonomy of the athlete and their time, the athlete's motivation to continue in the sport will plummet. Tedium from an athlete perspective is an experience of the same routines regarding the practice schedule times, gyms or venues and social environment rather than changing the routines occasionally. Performance demands are the athlete's experience of training and competition on a high level in the sport that are cognitively as well as emotionally demanding. The exhaustion occurs due to the athlete giving their full concentration on their sport performance. The non-sport opportunity costs are when an athlete cannot attend to relationships or hobbies outside of sport due to their sport commitment. Stress and frustration stems from this experience which means the athlete is unable to feel well rested mentally (Eccles & Kazmier,

2019). Based on all the resting process factors, the athlete may not be able to receive the appropriate mental rest needed.

The athletes described their conceptualizations of the state of being well rested. The description of 'being well rested' is the mental state of 'feeling fresh, valued, and motivated to enjoy the sport (Eccles & Kazmier, 2019). The phrase, 'being well rested,' positively associates rest with athlete engagement. When an athlete is mentally rested, high motivation is expressed. Feeling poorly rested is explained as the opposite of being well rested. It correlates to athletes' disengagement from the sport with athlete disengagement. An athlete who is poorly mentally rested has difficulty continuing in their sport based on low motivation and not in the best health condition physically and mentally. These common themes of athletes' perception of psychological rest are based on the athlete's experience in their sport performance.

For psychological recovery, athletes viewed sleep and wakeful resting as the best practices of being well rested according to Eccles and Kazmier (2019). Wakeful rest is "a recovery experience that does not involve 'thinking of one's sport' and participating in non-related sport activities such as reading, seeing a friend, or going on vacation" (Eccles & Kazmier, 2019, p. 97). The athletes in the research viewed wakeful resting in reducing thoughts or taking a break from mental experiences associated with sport to feel well rested. When it comes to wakeful rest experiences, there is a difference for the athlete during the in- and off-season. To practice wakeful rest during the season is limited due to the number of practices throughout the week and having one or two rest days given each week. Eccles and Kazmier (2019) explained that the rest days for the athletes are "catching up" on other activities involving work, school or personal. Rest days are small breaks for the athlete and gives them a sense of control outside their sport. However, it is difficult for an elite level athlete to practice wakeful rest as the season

progresses. While it is unavoidable to get a good mental rest during the season, there are better opportunities during the off season. The off-season involves the athlete having time off from the practice gym or venue, little training, no competition, a variety in food diet and more social time with family and friends. The off-season is a time of recovery physically and mentally which the athlete can be in control by increasing wakeful rest activities with their daily routine during this period. The importance of wakeful rest is significant for the athletes to implement in their sport and benefit success performances in practice and competition.

Lastly, the model indicates the importance of both deliberate practice and rest, which are motor skill learning processes affected by the psychology of rest. Deliberate practice occurs when an athlete is constantly practicing physically and mentally to maximize their performance to the best of their ability (Eccles and Kazmier, 2019; Ericsson et al., 1993). The process parallels the development in expertise of sport within amateur and professional athletes. For elite athletes in general, the challenge will be to implement these recovery strategies after practice and competition during their sport season. The article is the beginning of studying the psychology of rest concept and its overall goal is to encourage more future research on this topic within the sport psychology field.

Research on Psychology of Rest

In further research on the psychology of rest, Eccles et al. (2020) developed a review of the theoretical aspects of recovery, skill learning, and expertise development. Within the sport psychology literature, Eccles et al. (2020) found an uncommon topic of interest and uncovered no existing research on the topic itself. The relationship between rest and recovery deserves more research to why this relationship is fundamental to prevent disturbance of athletic performance to

prevent fatigue and burnout (Eccles et al., 2020). Part of the recovery of rest is psychological detachment which involves both the cognitive and emotional components.

When athletes use psychological detachment during the season, their motor skills will improve and allow for memory consolidation. An athlete can use the benefits of memory consolidation when learning a new skill through a rest period in between repetitions. Eccles et al. (2020) explained the process of separating two practice sessions with a rest period. The athlete consolidates memories of the first session before undertaking the second session, which allows memories created in the first session to be partly consolidated before the second session undertaken.

Other relative motor-learning processes that contribute to rest are sleep and wakeful rest. As athletes continue to reach the highest level of performance, their practices and seasons get longer, which means they need more rest to recover. When athletes constantly train in their sport to reach optimal performance, they are engaged in deliberate practice (Eccles et al., 2020). Deliberate practice is common with athletes from specialized to expert level, which can disrupt complete recovery. Eccles et al. (2020) emphasized the importance of psychological rest and why more research is needed to increase awareness and overall understanding of rest in general. The three main areas surrounding the concept of psychological rest are great practice for directing attention toward advancement of research in the sport psychology field.

Athlete Burnout

When an athlete does not get the proper mental rest to recover, then potentially burnout will occur. The definition of athlete burnout is “a multidimensional cognitive-affective syndrome characterized by symptoms of emotional and physical exhaustion, reduced sense of accomplishment, and sport devaluation” (Eklund & DeFreese, 2015 p. 64). Burnout is an

experiential syndrome that is often misunderstood and more common with the athlete population recently. The cognitive-affective experience of burnout is associated to many different psychological factors like elevated stress perceptions, mood disturbances, anxiety, lack of autonomy, lack of social support, and amotivation or the opposite of motivation (Goodger et al., 2007; Li et al., 2013; Eklund & DeFreese, 2015). With athlete burnout, the main occurrence is chronic perceived stress and motivation which leads the athlete to be unmotivated. The notion of athlete burnout is difficult to measure due to the variety of factors associated with the athlete's experience. Most studies on athlete burnout are both quantitative and qualitative due to complexity and continuous development of the concept.

One study examined the possible early signs of the athlete burnout syndrome from professional rugby union players through a quantitative measurement, the Athlete Burnout Questionnaire (Cresswell & Eklund, 2004). The Athlete Burnout Questionnaire is a 21-item inventory consisting of three 5-item subscales measuring reduced sense of accomplishment, devaluation, and emotional/physical exhaustion. The results had significant associations of proposed early signs of the rugby players associated with athlete burnout. The proposed early signs of burnout are competence related perceptions, perceptions of rugby-related hassles, perceptions of control over rugby career, satisfaction with social support and concerns about money-related hassles. These are stressors associated with psychosocial theories which propose burnout is one of the potential outcomes of the stress response (Cresswell & Eklund, 2004). The researchers made it clear about the stressors not being a prediction or causation of burnout. Although the study provided insight to the proposed early signs of burnout, there is more need of future research on the subject as well as investigating the long-term effect of it.

Cresswell and Eklund (2007) presented with the interpretation of the participants' experience with burnout through a longitudinal, qualitative study. The purpose of the study was to examine rugby players with their experiences involving central factors, processes, and changes of burnout (Cresswell & Eklund, 2007). Most of their experiences are negative connotations of perceived media related demands, cumulative effects of training beyond their control, chronic frustration of basic needs, reduced accomplishment, and devaluation. This not only showed a high elevation of stress levels with the rugby players, but it is an interesting finding because it demonstrated the idea of athletes wanting to be in control of their training and performance. The notion of athletes being in control of the decisions being made within their sport supported the Self Determination Theory. To satisfy the need of autonomy for athletes, they must be able to give their input into the decision-making process which would increase the athlete's motivation and eventually prevent burnout (Cresswell & Eklund, 2007). The researchers observed the participants for a year which gave a broad perspective on burnout and how it is dependent on the individual's experience.

Based on the literature on athlete burnout, there are many factors influencing the individual to reach this detrimental phase. Athlete burnout may be the result when an athlete is not getting the proper recovery both physically and mentally. Although the present study is looking at WFDs whether it benefits or disrupts the individual's psychological rest, it is important to consider the effects of wearable technology and the possibility of the athlete being mentally drained from constantly thinking of their sport which increases the chances of developing burnout.

Conclusion

Overall, WFD such as the Apple Watch, Fitbit Misfit Shine, WHOOP are common, and many people utilize the fitness trackers as part of their daily routine. As mentioned previously, WFDs, in general, have many problems pertaining to their non-usability, inaccuracy, and inconsistency, according to the research regarding its perceived evaluation and feedback (Jia et al., 2018). Before the idea of the psychology of rest, older research was on psychological detachment, which is when the person taking the initiative or control to mentally detach themselves completely from the sport to recover mentally. Recently, Eccles et al. (2020) reviewed the psychology of rest as an experience and recovery process of easing the mental demands placed by the activity itself. Based on the psychology of rest, the model represented the notion of the resting process, the state of being well rested and wakeful rest. The development of the model is the overall structure of psychology of rest definition and meaning. Collegiate athletes maintain busy schedules between school and the demands of their sport. These athletes are in dire need to rest not only physically but mentally to perform successfully and prevent athlete burnout from occurring.

Therefore, the purpose of this study was to observe the WFD impact on the collegiate athlete's psychological rest. In this present study, the athletes were examined through the current mental rest level measure, wakeful resting experience questionnaire, and an interview in measuring the differences with the wearable fitness devices physiological data disrupting the athlete's psychological rest while wearing the device versus not wearing it. Although the fitness trackers enhance wearers' awareness of their health and fitness data, this may not benefit an elite athlete in training who is trying to create a mental balance with their sport and rest.

Chapter III: Methods

Participants

The participants of the study consisted of a total of 20 female NCAA Division I athletes. The participants' average age was 20.14 ±1.64 years. In order to be eligible to participate in the study, participants must currently be on the Varsity Team roster. Out of the 20 participants, 17 were Caucasian/White, one Asian, one African American/Black, and one Other. With ethnicity, 17 were non-Hispanic/Latinx while three were Hispanic/Latinx. The total sample consisted of freshmen (*n*=4), sophomores (*n*=6), juniors (*n*=2), seniors (*n*=5) and graduate students(*n*=3). The sports included beach volleyball *(n*=11), indoor volleyball (*n*=2), track & field (*n*=3), tennis (*n*=1), soccer (*n*=2), rifle (*n*=1). Important note is that three participants competed in two sports. There were a total of 12 participants who owned a WFD.

Instrumentation

Consent Form

The participant filled out the consent form as the first step of the research's procedure. The consent form consisted of review of the study's procedure, expectations, confidentiality, and possible risks that may occur. The participant read to understand all that was applicable to the present study prior to beginning the process (See Appendix A)

Demographic Questionnaire

The demographic questionnaire was completed first at the beginning of the present study. The questionnaire included questions regarding gender, age, race, ethnicity, sport background, athletic scholarship aid background and past experiences using wearable fitness devices and phone apps such as Calm and Headspace (See Appendix B).

Fitbit Inspire 2

The Fitbit Inspire 2 was the WFD used in this study. The wrist worn device has a screen and an adjustable snap. The features include 24/7 HR, resting HR, HRV, all day activity, cardio fitness level, HR zones, real time pace and distance, all day calorie burn, reminders to move, notifications and a Fitbit App (Fitbit.com). The features on the Fitbit Inspire 2 gave the participants the actual experience of using the device throughout the day as part of their daily routine. While the participants wore the devices, the researchers set up the device by turning on the notifications, reminders, and alerts the whole time. The notifications, reminders and alerts included phone calls and text messages as well as movement and activity reminders. This information appeared on the Fitbit screen along with a short "buzz" sound. The Fitbit Inspire 2 was chosen for this present study due to all information mentioned above and provided a true experience of wearing a fitness tracker utilizing all its features.

Wakeful Resting Experiences Questionnaire

The second measurement is a questionnaire related to wakeful resting experiences. This is a six-item survey that primarily measured wakeful rest through the five psychological resting processes (Eccles et al., 2021). The five common resting processes are listed as "always thinking about sport", "being externally controlled", "tedium", "performance demands" and "non-sport opportunity costs". In the breakdown for each question matching with the five resting processes; question one and two is "always thinking about sport", question three is "being externally controlled", question four is "tedium", question five is "performance demands", and question six is "non-sport opportunity costs". Each question described the nature of the resting process related to the free time outside the sport of training and competition such as work, relationships, hobbies, friends, family, and other commitments. The score of these items is a five-point,

frequency-based Likert-type scale that ranges from (1) “Never” to (5) “Almost”. The athletes rated the best or similar to their recent engagement in the wakeful resting experience (See Appendix C).

Current Mental Rest Measure

The first measurement examined the perceived current level of mental rest the individual had over a specific time (Eccles et al., 2021). In the present study, the time frame was a one week or seven-day span. This one-item questionnaire asked the participants how much they received mental rest in over one week. There were examples provided for the participant to have a better understanding of mental rest. Some descriptions of poor mentally rest are described as “feeling tired”, “not really valuing or appreciating my sport”, “lacking the motivation to engage in my sport”, “not applying much effort to my sport” and “not enjoying my sport very much”. In contrast, descriptions of well mentally rest are “feeling fresh”, “valuing and appreciating my sport”, “highly motivated to engage in my sport” “applying a lot of effort to my sport” and “enjoying my sport a lot”.

From the original study with Eccles et al. (2021), the participants answered from 0 to 4 with (0) being “poorly mentally rested” and (4) being “well mentally rested”. In this present study, the researchers replaced (0) and (4) to (0) and (100). The reason for changing the number was to give the athletes a more relatable approach when giving the best possible percentage of their mental rest (See Appendix D).

Interview

The semi-structured interview consisted of open-ended questions. The questions are from from Eccles and Kazmier’s 2019 article. In addition to the questions, the researchers added more questions centered around the participants overall experience with the Fitbit Inspire 2. The

participants answered the questions with no limit on what they wanted to share. The main idea of collecting the verbal feedback is to get as much detailed information from the participant's experience. The interview collected central themes from the participants' answers to find connections between each theme. To measure the interviews, the researchers used content analysis to identify concepts within the data in the interview transcripts (Weber, 1985). The researchers reviewed the selected answer quotes from the interview transcripts to modify and categorize the concepts in relation to psychological rest experience and other themes (See Appendix E).

Procedure

Prior to any data collection, IRB approval was granted. The study span was six weeks with four weeks of data collection and a washout period using a counterbalanced design. The participants were randomly split into two groups, A and B. During the first two weeks, group A wore the Fitbit Inspire 2 while group B without it. After the first two weeks, both groups switched with group B wearing the Fitbit Inspire 2 while group A without it for another two weeks. Throughout the study for each week, there was one visit per week.

Baseline Visit

Before participation, the individual was informed to undergo a COVID-19 symptom screening as well as wear their masks or face covering in the lab during all the visits. During the initial visit, the participants digitally signed the informed consent and completed the demographic questionnaire Next, the researchers explained the Current Mental Rest Level Measure and Wakeful Rest Experience questionnaires to the participants before completing both. Group A participants were assigned the Fitbit Inspire 2 and given instructions on how to use the device. The researchers assisted the participant to set up the device. From there, the participants

were instructed to keep the notifications on regarding calls, text, and reminders. After the setup of the Fitbit Inspire 2, expectations were communicated to the participants. The participants were instructed to wear the device throughout the day except when showering, swimming, and charging the device. The researchers did give the participant a choice to take off the Fitbit if it interfered with their athletic performance and sleep. Finally, the researchers scheduled a consistent, one weekly follow-up visit for all four weeks.

Visit 1

Five to seven days later after the Baseline Visit, both groups of participants completed the questionnaires. Participants in group A participants had the Fitbit Inspire 2 synced.

Visit 2

Five to seven days later after Visit 1, Group A participants synced and returned the Fitbit Inspire 2. Both groups completed the questionnaires. The researcher informed the participants about the washout period.

Washout Period

This period will be between 10-14 days. The overall purpose was to reduce the crossover effects.

2nd Baseline Visit

After the washout period, Group B was assigned the Fitbit Inspire 2 along with the same procedure and instructions from the baseline visit. Both groups completed the questionnaires.

Visit 3

Five to seven days later after the 2nd Visit Baseline, both groups completed the questionnaires. Group B participants had the Fitbit Inspire 2 synced.

Visit 4

Five to seven days later from Visit 3, both groups completed the questionnaires. Participants in Group B had the Fitbit Inspire 2 synced and returned the device. The researchers used a stratified random sampling for the interview. A total of 12 participants were randomly selected for an interview. These participants consented to being audio recorded. Upon completion of the interview, the participant was debriefed and thanked for their participation with the study. The participants who were not assigned an interview were debriefed and thanked for their participation.

After Visit 4 Interview

The interview transcription was checked for consistency and the researchers emailed their interview transcript. In the email, the researchers asked the participant to review their interview answers to ensure the information provided is correct and if they would like to add or change any of their answers. The researchers gave a one week deadline to respond back with their confirmation of their interview answers.

Data Analysis

The statistical data analysis was conducted with SPSS version 26. The demographic information in the present study was calculated by means and standard deviation. A Repeated Measure Analysis of Variance (RM ANOVA) was used for the Current Mental Rest Level measure. A repeated measures Multivariate Analysis of Variance (RM MANOVA) evaluated the Wakeful Resting Experience Questionnaire.

For the interview, a content analysis of the transcribed data was undertaken. The interview was transcribed verbatim using Zoom and its transcription. Then researchers went through each interview to verify transcriptions and made corrections accordingly. The objective of content analysis is to identify concepts within textual data. Within content analysis, concepts

are identified within raw textual data and categorized according to shared characteristics, which can result in concept hierarchies. Following Eccles and Kazmier's (2019) research, the researchers individually reviewed each interview and inspected all quotes. The researchers wrote or electronically took notes on the different themes found from the participants' quotes. The themes paralleled Eccles and Kazmier's psychology of rest models. Then the researchers collaborated as a group, compared notes, and decoded the quotes to match each theme. After the decoding process, the researchers reviewed their findings for similarities.

Chapter IV: Results

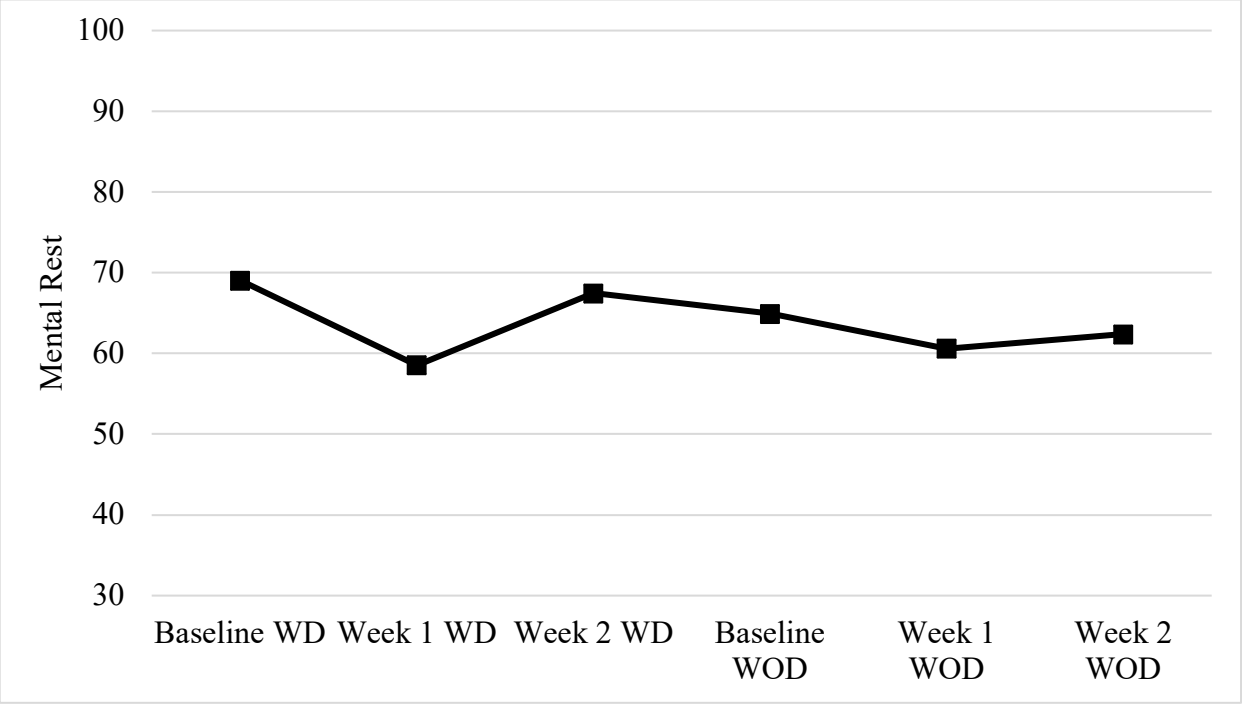
Psychology of Rest Questionnaires

Current Mental Rest Level Measure

A RM ANOVA was conducted to examine the current mental rest level measure condition differences over the span of four-weeks. A non-significant result was found for condition, Sphericity Assumed with means square of .672, F (5,1) = 1.32, $p < .264$, $\eta\rho^2 = .062$. Figure 1 displays the means of the following six different time visits using descriptive statistics.

Figure 1

Mean mental rest ratings throughout four-weeks



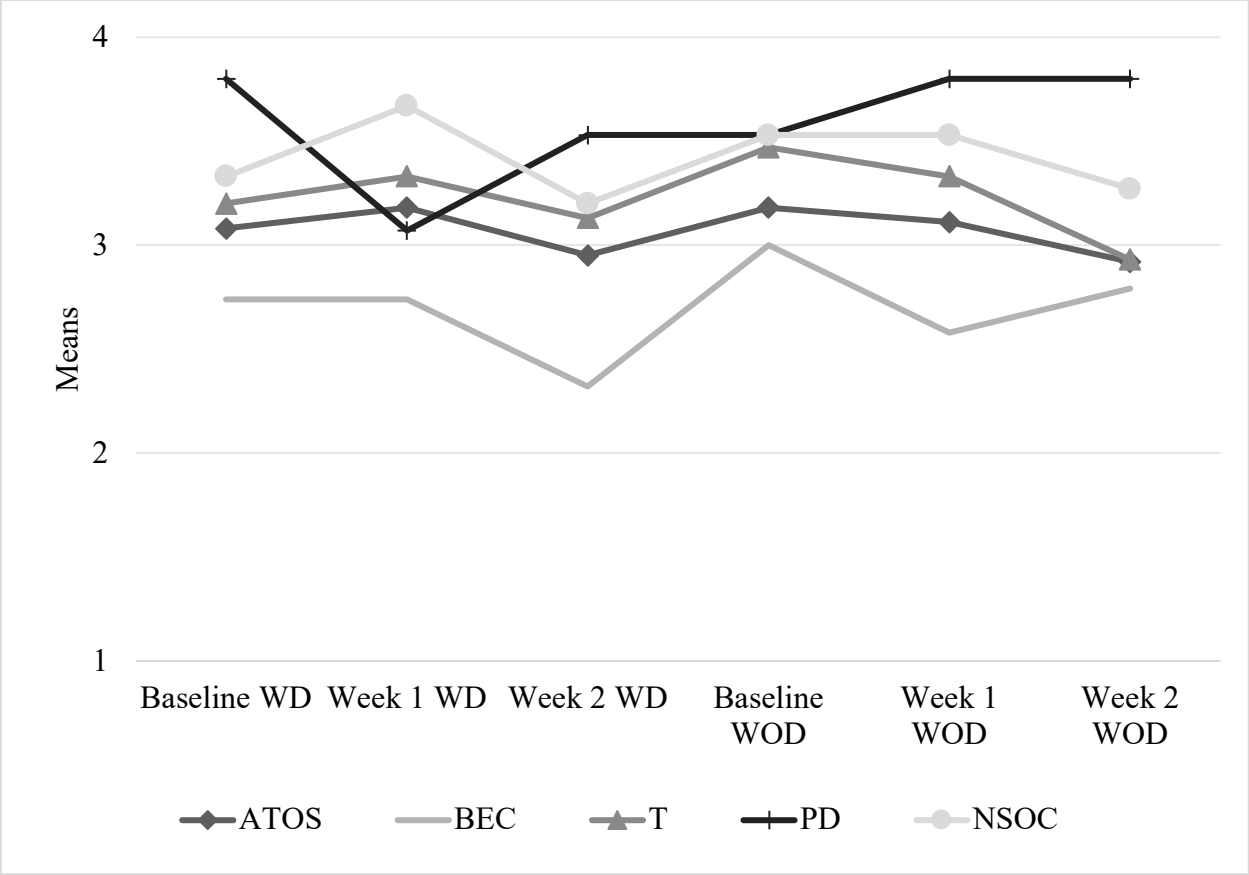
Note. WD=With Device; WOD=Without Device

Wakeful Rest Experience

A RM MANOVA was conducted to examine the wakeful rest experience condition over the span of four-week. A non-significant result was found for condition, Wilks λ= .757, F (25, 320.97) = .998, $p < .469$, $\eta\rho^2 = .054$. Figure 2 displays the means of each resting processes with each time visit using descriptive statistics.

Figure 2

Mean wakeful rest experience ratings throughout four-weeks



Note. WD = With Device; WOD = Without Device; ATOS =Always Thinking of Sport; BEC = Being Externally Controlled; T = Tedium; PD= Performance Demands; NSOC= Non-Sport Opportunity Costs

Interview

The interview consisted of a stratified random sample of 12 participants out of 20. The 12 participants were randomly selected by the researchers from each individual and team sport (i.e., beach volleyball, indoor volleyball, track & field, soccer, tennis, rifle) for representation. The interview provided various concepts of the analysis found. Below are the concepts along with direct quotes and phrases from the participants as an example. The direct quotes and phrases gave insight to the participant's overall experience with the psychology of rest. The average time of the interview was 18 minutes and 41 seconds. For abbreviation purposes in the interview, "PA" is a participant.

The Resting Processes

The resting processes outlined behavioral, social and environment conditions to either enhance or reduce the experience with rest. The themes of each resting process were found in Eccles and Kazmier research (2019). The participants communicated their thoughts and experiences within and outside of their sport.

Always Thinking of Sport. In general, college athletes are constantly thinking about their sport due to engagement and the large amount of time contributed. The engagement with sport related activities included team bonding activities, conversations with teammates, and sport program activities related like weightlift training, recovery, or rehabilitation sessions. One participant shared an example of always thinking about her sport:

PA: "This fall semester, with our team we've been doing activities like pinball, going to dinner, or having lunch in our head coach's house. You are with the same people that you are practicing with but you are doing things completely different from just playing beach volleyball."

Another participant mentioned competing in a tournament on a Saturday and spent time with family the next day:

PA: “I played Saturday and then I was with my family on Sunday. But instead of taking and spending time with them, we talked about the weekend with the team and volleyball. With yesterday, I could not get through a full practice because I was mentally done; I couldn’t do it.”

This constant thinking and engagement of sport is the result of time invested which increased the significance and pressure the sport had on the athlete. With the pressure, there are high expectations of sport performance. The society standards weigh heavily on sport performance, which intensifies pressure on the athlete to continue to think about their sport to perform their best and successfully in their sport. While continuously thinking of their sport, athletes tend to reflect on their practices and overall performances. A variety of thoughts linger in the athlete’s mind if a mistake occurs during their sport performance. These thoughts typically occur either during or after practices and or competitions. Whether the athlete’s thoughts are positive or negative, they are fully engaged and related back to their sport. The following example illustrates a participant going through difficulties with moving on from their previous performance.

PA: “I have to sit back and make myself move on from the last practice from the previous day because it’s definitely something that will stick with you. You are constantly thinking about, ‘What could have gone better? What went wrong? What did go well?’ And college athletics is a

day-to-day thing. Honestly, I don't stop thinking about the last practice until right before the next one."

Always thinking of sport includes a high cognitive demand to the individual's performance. The time, environment and people contribute to this resting process which can affect the person's mental state. Mental fatigue is possible to experience if one does not get proper mental rest.

Being Externally Controlled. In this resting process, there is no autonomy for the athlete during in- and off-season of their sport. The external control stems from a fixed schedule of practices and competitions with time of eating, sleeping, schoolwork and socializing. The participants expressed the external control whether it is from their sport program or their coaches, affecting their daily schedule which influenced the plans they originally had with commitments outside of sport. A participant goes in depth about trying to get rest from the stresses of the sport:

PA: "We have [sport] homework due every week that we have to do, like answering questions, watching films and doing tags. A lot of times, I have trouble adding one more thing to my plate. That can become stressful to have to get that done but also my [school] homework done."

The external control component can be a barrier for athletes receiving the proper, effective rest. Another participant communicated the stress regarding to her coaches adding a random practice:

PA: “My coach decides to throw something random with physical aspects sometimes. My coach likes to put on random practice or like my strength coach puts a random lift.”

Random practice times are an example of maximal external control. There are different types of external control whether big or small. One participant gave another example of not allowing the athletes to wear smartwatches, such as a Fitbit, during practice. She further explained because their coach did not want them to look at the time on the smartwatch. Whether the external control is major or minor, the athlete has little to no authority over certain outside aspects in their sport. Athletes feel they had no choice but to follow the sport’s program and or coaches’ instructions and rules to participate in their sport. Being externally controlled lacks autonomy for the athlete to be able to balance the rest needed. When there is a decrease of autonomy, there is reduction of motivation to continue with the sport.

Tedium. Tedium occurs during the competition season with repetition of routines within the same environment or practice venues, routine training schedules and socializing with teammates. Redundancy and boredom are the participant’s experiences that derive from this resting process. A participant explained their whole schedule for one day out of the week:

PA: “For school, I have classes in the morning, and then practice. The afternoon is when I need to do my homework. If you are on a typical day line Tuesday night, you stay up late and go to bed about 11:30 p.m. or 12:00 p.m. which is normal for college students. I wake up at 6:50 a.m. to leave for class at 9:00 a.m., break at 10:00 a.m., class at 11:00 a.m. to 11:50 a.m. Practice is at 1:00 p.m. to 3:00 p.m. and or 3:00 p.m. to 5:30 p.m. Then eat at 6:00pm. If you take a nap from

6:00 p.m. to 8:00 p.m., then you are not sleeping again until 11:00pm. And then the cycle starts over if that makes sense."

Most college athletes have a scheduled day filled with training, practices, academic classes, studying, and completing assignments/projects. Adding variety to the routine can benefit the athlete's experience without repeating the same cycle of routines

Performance Demands. Performance demands involve cognitive and emotional demands in a high-level sport. This is a requirement of full concentration during one's performance which can cause an increase in mental fatigue. When an individual is mentally fatigued, they are unable to perform at their optimal levels due to exhaustion from the demands of training and competition as shown in the following exchange:

PA: "I would say, there is definitely stress involved with that in terms of just playing time performance. I have to worry about how much sleep I get, how much I'm training, the stresses that's on my body, as well as the mental stress of, again, having to worry about how I'm performing, how I'm playing, and how I'm interacting with my teammates."

When the athlete overwhelmed by stress and mental demands of the performance, a variety of emotions tend to be expressed. One participant provided details on the challenges of being the oldest on the team to managing everyone including herself, which weighs on her emotions:

PA: “Emotionally it can take a toll because you wonder why maybe something isn’t working and then you’re going to get frustrated or someone’s not listening. It’s a lot of up and down emotions and then physically I guess from the workouts and the playing. When you mix all that together you’re tired by the end of the day.”

Not only sport was mentioned in the participant’s responses, but the researchers also recognized school as another common theme within performance demands. Many of the participants referred to school as a stressful, performance demand. Considering the participants are student-athletes, it was an interesting finding. Student-athletes have challenges with the responsibility of maintaining excellent performance in both competition and the classroom.

PA: “I would say having those constant stresses of school and sport can sort of interfere with me resting. When it comes down to going to bed at night, I might lay awake for a while thinking about the exam I have the next day, the practice I have tomorrow, or the game I have the next day.”

As a student athlete, finding the balance to perform your best in sports and school creates a mental toll cognitively and emotionally. Another participant stated that carrying the title of “student-athlete” every day is demanding. To reduce mental fatigue in relation with performance demands is to ease the practices and competitions for the individual’s mind.

Non-Sport Opportunity Costs. Athletes do not have time or are unable to spend time on other activities outside of their sport program due to their sport commitments. Their outside activities can be school related, studying, outside jobs or internships, personal relationships, or

social events. The student-athlete participants, all are young and have lives outside the sport and school commitments. A direct quote from one of the participants revealed her in-depth experience of her busy schedule with sport and school.

PA: “With my major and also being with beach volleyball we have an extremely busy schedule, so we don't really have room for anything else, which I don't mind. I'm fine with it. But definitely don't have room for a lot of other things.”

For the participant above, there were barely any opportunities for her to do activities not related to her sport. Without participation in personal or social activities, there is minimum room to recharge and gain internal control. Participating in these opportunities enhances the athlete’s needs and gives the mind a break from the demands of sport.

Wakeful Rest

Wakeful rest is a recovery experience related to participation in non-sport related activities was shown in the majority of the participant’s interviews. The non-sport related activities can be anything if it does not involve interaction with sport and its environment, teammates and coaches or the sport program itself. Most non-sport related activities take place whenever the athlete is on break or time off from the sport. The questions asked to the participants regarding the wakeful rest experience are what mental rest means to them and the opportunities of rest available in a typical week. With the meaning of mental rest, majority of the participants had a common theme of “not having to do anything”, “not thinking about my sport or with academics”, “doing something I enjoy that does not require a lot of stressing”, “when you

zone out" and "no obligation to anything, having a peace of mind." The participants connected mental rest with wakeful rest in their responses to the meaning of mental rest.

The question about opportunities to rest had a variety of responses to the different activities the athletes participated in. A list of activities was the following: hanging out with family on the weekend, going to their favorite restaurant or coffee shop, performing deep breathing, taking a bike ride, going to the park for a walk, drawing, listening to music, laying in the bed with lights off, turning off phone or any electronics. When it comes to practicing wakeful rest, there is a difference between in-season and off-season athletes. Athletes who are currently in-season will practice wakeful rest activities during the weekend or on the days of no training with their sport. Some participants fit their wakeful rest activities into some breaks with their schedules, but these wakeful rest opportunities are minimal. The athletes are limited to practice wakeful rest during the competition season but have more chances during the off-season. The off-season is when athletes have no training or competitions which allows more freedom to practice their wakeful rest activities more often. Without practicing wakeful rest, frustration and mentally exhaustion may occur causing a decrease of motivation and potentially burnout. Table 1 displays a summary of the resting processes and wakeful rest examples.

Table 1

Summary of Resting Processes and Wakeful Rest Examples

Resting Processes	Wakeful Rest Examples
Thinking about my sport	Spending time with family or friends *(non-teammates)*
Being externally controlled	Going to a favorite restaurant or coffee shop
Tedium	Schedule breaks in the weekly planner
Performance Demands *(Sport & School)*	Perform deep breaths or take a walk
Non-sport opportunity cost	Going for a bike ride or drawing

Barriers for Obtaining Psychological Rest

One interview question elicited responses about the different barriers to achieving effective rest within a typical week. The theme of "balance" was a common term participants centered their answers around. Balance is a problem for many athletes to maintain. It requires full engagement with all commitments in and outside of sports which includes personal life, social activities, school and or work. Balancing these factors decreases opportunities to rest. Insufficient time is one of the barriers to rest. When a student athlete's schedule is full of other commitments with sport and or school, rest is not an option. Student athletes are required to not only compete and represent the school but submit class work on time like every other student. Time management was one of the challenges for some participants. Without psychological rest, athletes are unable to recover physically and mentally, and they may lack in their overall performance. Another barrier was the stresses from school which includes finding time to study and prepare for written assignments and exams, and the pressure of maintaining

academic success. A participant shared her story regarding maintaining her scholarship which included staying focus, maintaining strong academics and competitive sport performance:

PA: “I know that the reason I’m at school is for volleyball and my major. If I fall behind in any of those, the money for my scholarship goes away. I do not want my parents to have to worry about paying for my school.”

Participants further explained the stress of competing almost every weekend, long hours of practice, performing their best in front of coaches, and continually surrounded by the same teammates. These stressors correlate back to constantly being engaged with their sport through thinking and practicing it every day. In a high-level sport, the performance expectation is even greater. However, small breaks can alleviate the stress levels for the athlete. Technology was another common barrier among the participants. It was mentioned that phones, computers, and social media are distractions from rest or doing activities related to rest. When text messages, calls, emails appeared on the telephone screen, the participant felt the need to attend to the notification immediately. The same is applicable with computers in which the internet, videos, live streaming, and emails. A participant went into detail about the struggles with staying focused on schoolwork while on the computer:

PA: “If you’re doing homework on your computer, it is very easy to open up another tab and pull-out social media on your computer. I’m not big into online shopping, but I know many people are, and advertisements are constantly popping up. And emails even because we get the notification on our phone.”

As the participant described, there's a connection with the phone and the computer including text message notifications and calls. Social media is on another level of distraction for some participants. A participant joked about getting caught up with social media instead of not going to bed. She stated with laughter, "I'm still like not a teen, but still a person. I will be checking stuff and not going straight to sleep." For the younger generation, social media is a part of their life. For some, it is a daily habit of checking on everything happening with their friends, family and around the world. However, being on social media can be distracting if one is on it for a long time. For student athletes, it can be a difficult barrier to get effective rest if they are not able to manage their use.

Strategies for Obtaining Psychological Rest

There was an interview question regarding the strategies the participants would use to get around the different barriers to get rest. A common theme appeared in multiple responses was scheduling and planning rest. Scheduling and planning rest is when the individual carves out time in their daily schedule to get rest whether it is doing personal activities. The personal activities included power naps, listening to music, hanging out with friends, baths, a walk, and watching a show. Religion and faith were a strategy for a couple participants. Going to church on Sunday or praying helped with the mental rest. It provided reflection and being able to let go of the past or worries that bothered that individual. Scheduling and planning rest can increase productivity for the individual. For the participants, the productivity involved homework, study time, or organization to scheduled breaks for the week. Table 2 displays a summary of the barriers and strategies for obtaining psychological rest. The participant below explained in detail regarding scheduling a couple breaks in a day.

PA: “Normally, between my classes and practice, it’s 30 minutes to an hour depending on if it’s Monday or Tuesday of the week. Then for after my practice I give myself an hour window and then I get into my schoolwork.”

Even though it is a small time, it is impactful and beneficial for her to take time for herself and get caught up with anything she needs to do. Some participants shared they adjust their schedule if a time opens for them to rest or be productive. This is to either get ahead of their work or catch up on rest they need to get through the day. Another participant discussed the importance of finding time for rest.

PA: “I would say that’s important for me to find times to rest because a lot of times I think the more you concentrate your life on sports, you are to fall into the habit of thinking your work is in how you perform in your sport, relationships with your teammates or whatever those things are. I feel the more you rest and actually separate the two, the healthier you’ll be.”

In other words, the participants describe the significance of having balance which is crucial for student athletes to practice. For rest to become a priority, the athlete will need to schedule and plan out their time in their schedule to make it happen. Without time for rest, fatigue and burnout can potentially occur.

Table 2

Summary of Barriers and Strategies for Obtaining Psychological Rest

Barriers to Rest	Strategies to Rest
Time Stress from sport *(Practices, competitions, optimal performance, current position/rank)* Stress from school *(Studying, exams, projects, assignment deadlines)* Technology *(Phone, computer, internet, social media)*	Scheduling and Planning Rest: Personal activities *(power naps, music riding a bike, drawing, watch a show, yoga)* Social activities *(going to get coffee with friends, spending time with family and loved ones)* Work productivity *(writing in a weekly planner, chores, getting ahead or catching up on schoolwork)* Religion and spiritual faith *(going to church, praying)*

Fitbit Experience

Part of the interview included a question on the experience with the Fitbit Inspire 2 during a two-week period. The participants had various responses with the device. Seven participants liked the devices while two disliked and three were indifferent. Individual differences were acknowledged throughout this section.

Advantages with Fitbit

The participants who liked the device discussed the positive features of the device. The two most popular features were the tracking of stepa and sleep. Some participants enjoyed the 10,000 steps per day challenge. Even though the participants practiced almost every day for their sport, the idea of completing the 10,000-step challenge promoted a sense of accomplishment. One participant described that she loved when the device congratulated her when she completed 10,000 steps because it made her feel good about herself. Additionally, tracking sleep helped participants be aware of how much sleep they received when they wore the device going to bed.

Some wore the Fitbit at night while others did not. However, the ones who did, felt more knowledgeable about their sleep pattern during the study. Due to this awareness, some were encouraged to go to bed earlier which resulted in additional sleep time.

Other likable features are the activity minutes, sleep reminders, text message reminders, and the physiological data statistics. The activity minutes is how active the person is through constant moving throughout the day. Even though these participants are student athletes, some of them find inspiration to still get up and move on days when they are not training or competing. It gave them a sense of accomplishment. The reminders to go to sleep were useful for some participants, because some tend to stay up late or get distracted. Some participants received the sleep reminder message at 10:00p.m. which they felt was a good time to wind down or get ready for bed. A couple of participants who are in a team sport liked the text message reminders due to missing messages on the phone from their coach and or team chats. They felt this feature was great since the device is on the wrist and they could feel the vibration and viewed the message on the device's screen immediately. With the physiological data regarding HR, a couple participants in the individual sport indicated the value of having the full data report on the wrist. One participant described this feature as "valuable when wearing it" and "it gives you a lot of data that might explain why I'm feeling this way." Majority of the participants found more positives to the device's features; however, some experienced the Fitbit in a completely different perspective.

Disadvantages of Fitbit

The participants who disliked the device, did not care for constant notifications, the loud notification buzz, the activity, and sleep reminders. The notifications include the text messages,

calls and activity minutes which appeared continuously on the screen along with the buzz. A participant shared her experiences in class with the device's notifications and buzz:

PA: "Sometimes it was annoying during class because it would show my text messages. I found myself checking those more often than I would have been."

Along with notifications and buzzing occurring throughout the day, some participants felt annoyed with the activity reminders scrolling across the device screen. The activity reminders would have messages like, "It is time to move" or "You haven't been active in the last hour or so". A participant was annoyed by the device reminding her to move even though she already practiced or did a workout on that day. The notifications may be either annoying or overwhelming which can negatively affect the mental state of the person, preventing them from being able to get the rest. Another interesting dislike of the feature is reminders of going to bed. One participant recounted the feature in as, "I felt like it (Fitbit) kind of knew too much about me." The statement is profound because the participant feels they are being watched which may lead to the notion of the device being controlled. The participant who was indifferent to the Fitbit had the same responses as the liked and disliked group. Table 3 displays the advantages and disadvantages of the Fitbit.

Table 3

Summary of Advantages and Disadvantages of Fitbit

Advantages of Fitbit	Disadvantages of Fitbit
Gain knowledge of physiological data with step count, sleep and heart rate	Distractions of notifications with texts, calls, activity, and sleep reminders
Increased awareness of sleep	Loud buzz vibration
Reminders of active movement and sleep	Increased stress levels

Based on the result of the Fitbit experiences, seven participants highly favored the device. The input from the participants provided in detail the pros and cons of the Fitbit and its features. It is important to note the individual differences concept were clearly shown through the participants preferences on the Fitbit.

Chapter V: Discussion

The purpose of the current study was to examine the effects of WFD on the athlete's psychology of rest. The hypotheses were that the participants would report high levels of being poorly mentally rested and low levels of wakeful rest while wearing the fitness devices which was not supported. There were non-significance differences in both wakeful rest experiences and current mental rest levels indicating the Fitbit did not impact the participants. However, the interview displayed more in-depth information about other aspects of sport and school impacting the participant's mental rest.

Psychology of Rest Questionnaires

In the Wakeful Rest Experience questionnaire, the participants result remained consistently the same throughout time with all six questions. The psychology of rest model described these resting processes as deleterious psychological experiences that outline behavioral, social and environmental conditions to reduce the experience itself and enhance the contrasting resting experience (Eccles & Kazmier, 2019). The contrasting rest experiences are opposite to the resting processes including reduction in thinking about one's sport and effortful thinking generally (always thinking of sport), assuming internal control (being externally controlled), variety (tedium), reduction in stress from performance demands (performance demands) and reduction in stress associated with work-related opportunity costs and frustration associated with personal opportunity costs (non-sport opportunity cost). The literature further implies the participants encounter more resting experiences than the deleterious psychological experiences throughout the study regardless of the WFD.

There was a slight decrease during week one and two during the Fitbit period with resting processes of always thinking of sport, non-sport opportunity cost, being externally controlled,

and tedium. The same outcome transpired during the without Fitbit, but the resting processes were always thinking of sport, non-sport opportunity cost, and tedium. The meaning of the slight decrease in the four out of five resting processes displayed less opportunities in practicing wakeful rest activities due to numerous factors. The factors are not identified in the questionnaire specifically, but the results of the resting processes are related with previous literature. The resting processes of always of thinking of sport and non-sport opportunity cost coincide with the lack of psychological detachment. The role of psychological detachment is mental disengagement from work related task (Sonnentag & Bayer, 2005). Always thinking of sport and non-sport opportunity cost are experiences with constant engagement and commitment with only sport whether thinking or participating in the sport related activities. This relates to lack of practicing psychological detachment from the sport. When there is less practice of psychological detachment, high strain levels and poor well-being is in effect (Sonnetag & Fritz, 2015). The resting process of being externally controlled is opposite to autonomy, one of the satisfying basic psychological needs from the self-determination theory (Ryan & Deci, 2000). If the individual has no autonomy, then motivation decreases. For the individual to acquire motivation, there is a need of internal locus of control to take place. Tedium results in lack of change when it comes to repetitiveness of environment, people, and program. The contradiction of tedium is novelty which provides variety within the experience and was experimented as one of the satisfying basic psychological needs based on the self-determination theory (Gonzalez-Cutre et al., 2016). Novelty can prevent boredom and potential mental fatigue by adding variety of changing the routine.

The Current Mental Rest Level Measure determined between the state of being mentally rested and poorly mentally rested. The participants responses were persistently neither well

mentally rested nor poorly mentally rested throughout the study. The results showed a decrease during baseline and week one with and without the Fitbit. Eccles et al. (2020) discussed the importance of mental recovery along with its positive and negative experiences. The positive experience of mental rest provides the athlete the following: undergo full recovery in preparation for future training and competition, development of new technical and tactical skills, and memory consolidation process (Eccles et al., 2020). When an athlete encounters a negative experience with their mental rest by being fully engaged in their sport, the athlete feels there are little to no opportunities to engage in effective mental rest. Without receiving proper mental rest, mental fatigue and burnout may potentially increase over time (Eccles et al., 2020). Based on literature from Eccles et al. (2020), the result of a decrease mental rest during the with and without Fitbit period further suggest the participants mental rest moderately plummeted due to minor opportunities to engage with their mental rest. Different factors may contribute to the participant's mental rest which is further explained with details in the interviews.

Interview

The interview was constructed based on Eccles and Kazmier's (2019) research evaluation on athlete's perspectives on mental rest as well as opportunities and barriers to rest. Additional questions were added related to the Fitbit experience. Based on the interview results, eight participants expressed about their mental rest not impacted by the Fitbit, but rather various matters concerned with sport and school. Each participant had distinctive experiences from multiple commitments ranging from high to low demands.

Individual Differences

Individual differences were commonly evident during the present study interviews. The interview paralleled with Eccles and Kazmier's (2019) research in reference to the broad,

identified concepts found from the athlete's experiences. The concept of individual differences was derived from the participant's demographics background. The participants compete in several sports either team or individual. Some athletes under scholarship either full, partial, or none. They are not only athletes but full-time college students with different classification status such as undergraduate and graduate level with all types of major. Nationality, race, and ethnicity also fall under the concept as well. Considering all the individual differences mentioned above, the individual's perception, experience, and preference categorize the various themes found throughout the interview using content analysis.

The individual differences were found under the Fitbit experience based on the participant's perception, experience, and preference. The use and influence of wearable technology consisted of likes and dislikes concerning the Fitbit's features from the participants which supports previous literature on wearable fitness devices. Coorevits and Coenen (2016) reported a mixed positive and negative feedback from consumers in regards to WFDs. The researchers highlighted the importance of user perceived feedback and experience on wearable technology over technology use and performance. The emphasis on perceived feedback and experience further reiterated the notion that even though a WFD comprises of high-level technology and performance, the individual may or may not prefer to utilize the device for personal reasons whether its preference, unfamiliarity or perceive it as a distraction. Furthermore, Jia et al. (2018) assessed consumer feedback related to preference and usability of health monitoring on the top seven mainstream fitness devices including the Fitbit. The research findings contained both pros and cons on the wearable fitness device's use and features. The feedback generated more positives toward the health and fitness application. Previous literature

on the preference, experience and perception concerning wearable technology is consistent with the present study's finding on individual differences.

Advantages and Disadvantages of Wearable Technology

Based on the interview results, ten participants had a positive responses and experience with the Fitbit. They stated the Fitbit did not disrupt their mental rest but rather created more awareness in thinking about their overall rest, which is an advantage. Some participants felt some of the Fitbit physiological features gave them awareness of their sleep, HR, and daily steps which is similar to the results of Jia and colleagues (2018). According to Jia et al., the participants preferred in order the following: daily activity tracking, heart health monitoring, professional fitness tracking, and sleep monitoring. Consistent with previous literature, the health and fitness related features of wearable devices are favored to know one's overall health status. Additionally, athletes can use the physiological features for knowledge purposes in taking care of their bodies to perform successfully at training and competition (Ng & Ryba, 2018). With examination on the relationship with wearable technology and athlete identity in high school athletes, Ng and Ryba identified a positive correlation and noted the fitness trackers created high levels of athlete identity and professional sport aspiration (2018). As found in the present study, the college athletes expressed a similar desire to be aware of their physiological data to improve their sport performance. Not only the participants were more aware of their physical health, but equivalent with their mental health, especially mental rest. Some participants revealed the Fitbit was a reminder to take breaks or make time for activities associated with rest. One of them claimed that every time she checked the Fitbit, it made her think about the study and the questionnaires directed toward her mental rest. Reasons to why the Fitbit created awareness of the participant's overall rest may be difficult to rationalize yet the researchers believed some type

of intervention could have taken place for some participants. The intervention could be wearing the Fitbit is a constant reminder of participating in the study since the participants answer the questionnaires asking about their mental rest.

Another advantage of wearable technology is the practicality for monitoring physiological data. The researcher recognized practitioners from the sport science field utilize the physiological data from the wearable technology to gain and keep track of the individual's overall health status. Seshadri et al. (2021) referenced wearable devices as applicable technology to not only monitor energy cost and movement patterns to improve performance but minimize injuries. Practitioners having real-time data during a practice or training can provide better prediction of the individual physiological health in preparation to recover and injury prevention. For future reference, the statistics and data report should be considered how these devices impact the person overall from the psychological perspective. Sport science practitioners need to understand and acknowledge the existence of the individual differences component when applying wearable technology.

Disadvantages associated with the Fitbit pertained to continuous notifications of texts, calls and reminders along with the distraction of the loud, buzz sound. The participants expressed their annoyance with the notifications during school with study periods, assignments, and class to remain focused on the task at hand. The loud buzz was another distraction the participants mentioned with not only calls and text messages but the constant reminders with activity minutes. The activity minutes is when the device reminds the person the walk at least 250 steps per hour to help meet the hourly activity goal. If the person did not walk 250 steps, the reminder will appear on the device at ten minutes before the hour. Three participants felt irritated by this feature since some exclaimed, they are athletes who work out with their sport almost every day.

One participant felt the notifications and reminders were stressful to her because she would turn off the notifications on her smartwatch to focus on her school. Not only stress occurred wearing the Fitbit, but one participant was a little paranoid by the Fitbit's sleep reminders. She stated, "the Fitbit kept telling you when you need to go to sleep, and I don't like that. I felt like it kind of knew too much about me." The participant did not care for this feature and believed the sleep and activity reminders heighten her stress levels which affected her mental rest. In congruent with previous literature on psychological detachment, the use of technology lowered psychological detachment levels in the full-time work employee population (Sandoval-Reyes, 2019). Psychological detachment is equivalent to practice of wakeful rest. Whether in work or sport related, technology extends demands and high levels of workload reflecting low levels of psychological detachment according to Sandoval-Reyes (2019). Evidence is shown in the present study regarding the participants not being able to concentrate or increased stress levels due to the technology use of the Fitbit. These disadvantages above can potentially prevent effective one's mental rest if not managed properly.

The researchers noted the importance of individual preference. The person should be able to manage the settings on the device to feel pleasant and comfortable when utilizing it. While some wearable technology has options turn off some of the features through settings, some features remain on as part of the device. Moving forward, it is highly recommended for individuals using the wearable technology to select devices that offer options to turn off the features distracting the person from concentrating on the task at hand.

Scheduling and Planning Wakeful Rest

Wakeful rest is one of the strategies of getting effective rest. Throughout the interviews with the participants, the researchers asked about their perspective and knowledge on the

definition of mental rest. Most participant's answers referred to wakeful rest without saying the actual term itself. Some of the phrases the participants discussed include "not thinking about my sport", "no obligation to anything" and "when I completely have my mind blank" or "when you zone out". The common phrases the participants stated were related to psychological detachment concept. Psychological detachment describes the psychological component of no engagement or detachment from work by not thinking about it or being physically absent from the job (Sonnentag & Bayer, 2005). Another way the Sonnentag and Bayer outlined psychological detachment is "switching off" concept. The role of the psychological detachment is to reduce fatigue levels and provide recovery (Sonnentag, 2011). Previous literature with psychological detachment aligns with the present study results on wakeful rest since both involve no engagement, thinking and being absent from a certain activity related to work or sport. This reinforces the similarities between wakeful rest and psychological detachment as well as indicate the participant's awareness of applying wakeful rest activities in their schedules.

The present study had participants who are either in-season or out of season. The responses collected on wakeful rest activities had similarities with the interview results from the Eccles and Kazmier's (2019) research. In-season athletes practiced their wakeful rest activities on days they were off days from training concerning the on and off season. These wakeful rest activities involved catching up on homework and studying, being alone, going out with friends, and more naps or sleep. Although in the present study, several participants attempted to plan a certain time on the practice day to do these activities but expressed the difficulty of applying it and the limitations with time. Off-season athletes had more free time to implement wakeful rest experiences due to less practices and competitions. Whether off-season is during the school semester or summertime for the college athlete, wakeful rest is commonly practiced in the off-

season due to less time with sport and more time associated with school, work, and personal activities. Through the present study's results, on- and off-season wakeful rest remains unchanged from the Eccles and Kazmier's (2019) study. The importance of wakeful rest is essential for athletes to implement as part of their daily schedule. Since the present study's population is college athletes, it is highly recommended for this group to plan ahead of time specific time periods to practice wakeful rest activities for the day or the week.

Furthermore, organizing a specific time to achieve effective rest is another strategy the participants applied. The participants either wrote down the time for the activity in their planner or put a reminder on their phone. Given the importance of placing a time to do wakeful rest, scheduling and planning rest was recognized by the researchers as potential resting strategy that benefits the individual to achieve effective rest. This strategy matches with planning interventions found in previous literature. Smit (2015) reported that a planning intervention increased psychological detachment levels in a work environment. Planning is an effective strategy when completing goals in general according to Smit (2015). These goals can include wakeful rest activities. The opposite of scheduling and planning rest are unpreparedness and spontaneity with rest which could be a deleterious psychological experience. Scheduling and planning rest is strategy that should be taken into consideration for future studies with psychology rest model and the resting processes.

Limitations and Future Research

The present study had its own limitations that occurred before and during the study. The first is the small sample size. Since the present study occurred during the Covid-19 pandemic, athletes were hesitant to participate. The influence may be from the coaching staff who encouraged their athletes to stay within their team bubble to lower the risk of testing positive for

Covid-19. Another possible reason are coaches and athletes not being familiar with sport psychology in general.

A second limitation is the student-athlete population in the study. The participants were either in- or off-season. Therefore, the demands of their sports could have influenced their psychology of rest. Additionally, we had participants involved in more than one sport. A few participants competed in two sports throughout the year, but the sports were similar such as cross country and track and field. In the middle of the study, one participant switched sports based on the season. Within the experience of multiple sport, different types of demands can occur in practice and competition. In general, each sport has its own structure, rules and demands. Some examples are indoor vs. outdoor, objective rules vs. subjective rules and the utilization of the intensity levels. Due to these different demands with sport, it may alter the participants responses with the questionnaires and interview.

A third limitation is the study's time span. The present study was over six weeks, but the data collected was over four weeks. A recommendation is to extend study to over a semester or a year for the results to indicate the long-term impact and represent true mental rest over time. The fourth are participants ownership of a wearable fitness device prior to the study. There was an expectation with some of the participants having some type of smartwatch since it is common for college students. Additionally, some sports may provide wearable technology to the athletes, like the WHOOP, to gather the athlete's overall physiological data. This limitation may impact the results based on the participants prior experience. Even if the participant is familiar with the technology but does not own one, this can determine the individual's perception and effect the results.

The present study has potential with future research in continuing to expand the topics of psychology of rest and wearable technology. The psychology of rest model is relatively new topic and there is a need for more research. Future research should expand the population and potential comparisons between genders, NCAA Divisions (I, II, and III), and individual and team sport. Different populations to consider are people in the work environment and exercisers. Measuring mental rest in these groups are important to better understand if these populations receive proper rest and practicing activities to benefit their rest. Another recommendation is utilizing other wearable technology such as the WHOOP and the Apple Watch. Both fitness trackers have different design, however, it will be interesting to see if both device's technology has an impact on the person's mental rest.

Future research should also implement the electronic diary as part of study. The electronic diary is for self-reflection purposes in allowing the participants to truly share their thoughts. Whether its writing in the electronic day multiple times a day or once a day, the information will benefit the researchers to explore in-depth the individual's thought process and experience. Also, participants may not remember their mental rest looking back a week or more, but having the electronic diary provides the opportunity to write down their thoughts and perceptions immediately.

Practical Implications

Since psychology of rest is a relatively new topic, sport science and sport psychology professionals can apply the current study's information to understand mental rest. Sport science practitioners can utilize wearable fitness devices to gather physiological data to adjust and improve one's performance. However, it is noted to proceed with caution when using wearable technology and consider individual differences. With sport psychology professionals, this

research can develop strategies for the athlete to obtain mental rest. In the present study, the researchers found scheduling and planning wakeful rest is a strategy to get effective mental rest. Sport psychology consultants can help athletes to schedule and plan wakeful rest activities in their schedules. Another way for sport psychology consultants can help athletes obtain mental rest is to ask about the athlete's mental rest. Applying check-ins or follow-ups with the athlete's mental rest permits benefits the sport psychology professional to be more observant and make necessary changes with the strategies for the athlete to obtain mental rest.

The present study provided a foundation examining the impact of wearable technology on an athlete's psychology of rest. This research benefits sport psychology professionals and coaches to better understand the athlete's mental rest to improve their overall performance. Not only the individuals supporting the athlete can utilize the research to care for the athlete, but the athlete can take action to care for their mental rest by implementing strategies like scheduling and planning wakeful rest. To practice these activities will take time to develop as part of the daily habit, however, the individual will manage their mental rest positively. Based on the positive findings on the WFD, the data can equip the athlete in preparation for optimal sport performance. However, the WFD negative findings revealed individual differences as a possible factor with the athlete's mental rest.

Conclusion

In conclusion, the Fitbit did not impact the athlete's mental rest found in the psychology of rest questionnaires. However, the interview further explained the participant's mental rest was impacted by the stresses of school and sport. The study findings demonstrated that female Division I athlete's mental rest can be influenced by several factors in consideration of the individual differences' perspective. The scheduling and planning wakeful rest found in the

interview results is an effective strategy to obtain mental rest. Overall, these results support the notion of WFD being a positive influence to increase awareness of the physical health status to enhance sport performance. Psychology of rest should be taken into consideration with understanding the concept itself to acknowledge and regulate one's mental rest.

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Informed Consent- Appendix A

Texas Christian University
Informed Consent to Participate in Research

Title of Research: The Effects of Wearable Fitness Device on a Collegiate Athlete's

Psychological Rest

Principal Investigator: Robyn Trocchio, PhD, CMPC

Co-investigators: Jessica Renteria, Elizabeth Warfield, Ryan Graham, Ashley Ray, Jodi Walker, Megan Westbrock, Dr. Debbie Rhea & Dr. Meena Shah

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Overview: You are invited to participate in a research study. To participate, you must be at least 18 years of age, a current NCAA Division I student-athlete who is currently on the TCU varsity team roster. Additionally, you may not have any physical or psychological disabilities that would interfere with the completion of taking an online survey and participating in an interview. You must be able to read and understand English. Finally, you must have a smart cellphone to sync the wearable fitness devices (i.e., Fitbit Inspire 2). Taking part in this research project is voluntary.

Study Details: This study is being conducted on the TCU campus in the Sport & Exercise Psychology Lab located within the Rickel building, room 257. The purpose of this study is to examine the effects of wearable fitness devices concerning a collegiate athlete's psychological rest. This will be done within in a span of six weeks. Four out of the six weeks will consist of data collection of your psychological rest experience when wearing a fitness device for two weeks and not wearing it for two weeks. There will be a break of 10-14 days in between the two weeks wearing the Fitbit device and two weeks not wearing it. The research includes wearing a Fitbit Inspire 2 for two weeks, a demographic questionnaire, two psychology of rest questionnaires and an interview. The total expected active participation time for the entire study is approximately 3 hours.

Participants: You are being asked to take part because you are an athlete competing at the university level of NCAA Division I. We want to understand the experience in the sport with psychology of rest within and outside the sport. We want to see if your psychological rest has an effect from wearing a fitness device, the Fitbit Inspire 2 versus not wearing it. If you decide to be in this study, you will be one of the 30 participants in this research study.

Voluntary Participation: Your participation is voluntary. You do not have to participate and may stop your participation at any time.

Confidentiality: Even if we publish the findings from this study, we will keep your information private and confidential. Anyone with authority to look at your records must keep them confidential. You will be encouraged to not discuss the study as well as not to ask others if they are participating.

What is the purpose of the research?

The purpose of this study is to observe the impact of wearable fitness devices concerning with a collegiate athlete's psychological rest. Based upon the literature review on psychology of rest, the athletes will be examined through the current mental rest level measure, wakeful resting experience questionnaire and an interview in measuring the differences with the wearable fitness device.

What is my involvement for participating in this study?
If you agree to be in the study, we will ask you to do the following things:

All participation will take place individually. The meetings will take place in person in the TCU Sport and Exercise Psychology Lab that is in the Rickel building in room 257. However, there is a backup plan set to have the meetings and interviews on Zoom if necessary. Before you participate, you will be informed to undergo a COVID-19 symptom screening as well as wear your masks in the lab during the visits.

If you agree to participate, you are expected to wear the Fitbit Inspire 2 for two weeks and for another two weeks without it. For the Fitbit Inspire 2, you will be given instructions on how to use the Fitbit Inspire 2 as well as the details of the device. We will setup your login information to start a Fitbit account and sync it to the Fitbit Inspire 2. You will come into the lab for the weekly sessions. During the visits, we will sync the Fitbit Inspire 2 device and then you will complete two questionnaires, the Current Mental Rest Level Measure and Wakeful Resting Experience.

On the last visit, you may be selected to do a complete a semi-structured interview that will be audio recorded. If you are selected to do the interview, your interview will be transcribed, you will be asked to review the information to ensure it is correct and make edits to your answers that you would like to add or change. At the end of the study, you are expected to return the Fitbit Inspire 2 as well as be debriefed and thanked for your participation. We request you to not discuss your experience with anyone during and after the present study which may invalidate the results.

All COVID-19 policies and guidelines set by TCU and the CDC will be followed to create a safe environment.

Total time approximately 3 hours of active participation.

Are there any alternatives and can I withdraw?

There are no alternative procedures for participation in this study other than not taking part in this study. You do not have to participate in this research study. You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. To withdraw, you will either email or verbally tell the researcher that you no longer want to participate. There will be no penalty or loss of benefits to the participants which you are otherwise entitled and it does not impact your student-athlete status. If you decide to withdraw from the study, the data collected will be destroyed and not used for analysis.

What are the risks for participating in this study and how will they be minimized?

There is a slight potential risk of a breach in confidentiality and privacy during the study. In order to prevent and minimize this risk, all identifiable information related to you will be separate from the data and they will be assigned an identification number. Additionally, you are assigned time slots with extra buffer time to minimize any overlap between participants. There is the possibility that others may see the you since the study is taking place in the Sport and Exercise Psychology Lab. However, we will not disclose that you are participating in a research study. Only authorized University personnel will be allowed to view the data to further minimize the risk of breaching confidentiality and all digital data will be password protected.

All COVID-19 policies and guidelines set by TCU and the CDC will be followed to create a safe environment.

- Prior to arriving to the lab, you will be asked to perform a self-assessment for known COVID19 symptoms:
    - Cough
    - Shortness of breath or difficulty breathing o Chills
    - Repeated shaking with chills o Muscle pain o Headache o Sore throat o Loss of taste or smell o Diarrhea
    - Feeling feverish or a measured temperature greater than or equal to 100.0 degree Fahrenheit
    - Known close contact with a person who has been lab confirmed within the past 14 days to have COVID-19
    - Traveled within the last 14 days to a location designated by the CDC to be an at-risk area for COVID-19
- If you have any new or worsening signs and symptoms on list above and/or temperature greater than or equal to 100.0 F:
    - You will not be permitted entry onto the lab.
    - You will be asked to go home and told to contact either a health care professional or Brown-Lupton Health Center.
    - You should contact the researcher to reschedule or cancel.
- Upon arrival to the lab at the scheduled time, you will be screened for the above COVID-19 symptoms and have your temperature checked using a non-contact thermometer. If you have any of the symptoms or a fever greater than or equal to 100.0 F:
    - You will be asked to go home and told to contact either a health care professional or Brown-Lupton Health Center.
- If you have known community exposure to a person who is lab-confirmed to have COVID-19, you are not permitted to return until the end of a 14- day self-quarantine period from the last date of exposure.
- If you have symptoms that could be COVID-19, you are assumed to have COVID-19 and will only be permitted to return to the lab under both of the following circumstances:
    - At least 72 hours have passed since recovery (resolution of fever without the use of fever-reducing medications); and, you have improvement in respiratory symptoms such as cough and shortness of breath; and 10 days have passed since individual's symptoms first appeared. o Individual provides medical professional's note clearing the individual for return to building.

- Prior and upon entry to the labs, faculty, staff, students, and participants will perform hand hygiene, preferably by washing hands with soap and water for a minimum of 20 seconds.
    - If a sink is not available, individuals will perform hand hygiene with hand sanitizer upon entry onto the lab
- You will be required to wear face coverings/masks (over nose and mouth) while in lab
- Follow physical distancing guidelines in accordance with University Policy and CDC guidelines and are expected to maintain at least 3 feet of separation between each other during the meetings in the lab.
- All surfaces and equipment will be cleaned and disinfected prior to and after each session

What are the benefits of participating in this study?
You will learn more about your overall psychology of rest or mental rest and how wearable fitness devices effect your mental rest. If you ask for results of the study, a summary of the information will be emailed once the study has been completed. Also, others might benefit because you will have an opportunity to contribute to the sport psychology research on the psychology of rest.

Will I be compensated for participating in this study?
You will not be compensated for participating in this present study.

What are my costs to participate in the study?
There will be no additional costs to you as a result of being in this study.

How will my confidentiality be protected?
Every effort will be made to limit the use and disclosure of your personal information, including research study records, to people who have a need to review this information. We cannot promise complete secrecy. Electronic data will be stored without any information that can identify you on a password protected computer and in the survey system (Qualtrics). Your records may be reviewed by authorized University personnel or other individuals who will be bound by the same provisions of confidentiality. Your information will be stored in locked cabinets and password protected computers. We may share your research data with other investigators without asking for your consent again, but it will not contain information that could directly identify you. We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

What will happen to the information collected about me after the study is over?
Your name and other information that can directly identify you will be deleted from the research data collected as part of the project. We may share your research data with other investigators without asking for your consent again, but it will not contain information that could directly identify you.

Who should I contact if I have questions regarding the study or concerns regarding my rights as a study participant?
You can contact Jessica Renteria at j.d.renteria@tcu.edu and 210-286-2777 or Dr. Robyn Trocchio at r.trocchio@tcu.edu and 817-257-5623 with any questions that you have about the study.

Dr. Dru Riddle, Chair, TCU Institutional Review Board, (817) 257-6811, d.riddle@tcu.edu; or Dr. Floyd Wormley, Associate Provost of Research, research@tcu.edu

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You may request a copy of this document for your records. A copy also will be kept with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I understand what the study is about and my questions so far have been answered. I agree to take part in this study.

_____

Printed Participant Name

_____

Signature Date

_____

Printed Name of the person obtaining consent

_____

Signature Date

Consent to be audio/video recorder

I agree to be audio/video recorded. Yes _____ No _____

_____

Signature Date

Consent to Use Data for Future Research

I agree that my information may be shared with other researchers for future research studies that may be similar to this study or may be completely different. The information shared with other researchers will not include any information that can directly identify me. Researchers will not contact me for additional permission to use this information. Yes _____ No _____

_____

Signature Date

Consent to be Contacted for Participation in Future Research

I give the researchers permission to keep my contact information and to contact me for future projects. Yes _____ No _____

_____

Signature Date

Demographic Questionnaire – Appendix B

Participant ID (assigned by researchers):

Gender:

- Female
- Male
- Non-Binary
- Prefer not to say

Age:

- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30
- 31

Race:

- American Indian or Alaska Native
- Asian
- Black or African American
- Caucasian/White
- Native Hawaiian or other Pacific Islander
- Multi-racial

- Other

If you chose "other" please provide race down below.

_____

Ethnicity:

- Hispanic or Latinx
- Not Hispanic or Latinx

Year in College (mark one):

- Freshman (0-29 hrs)
- Sophomore (30-59 hrs)
- Junior (60-89 hrs)
- Senior (90 or more hours)
- Graduate Student

Sport:

_____

Athletic Scholarship Aid (mark one):

Are you receiving financial aid of an athletic scholarship?

- Yes
- Full Scholarship
- Partial Scholarship
- No

Current Playing Status (mark one)

1. What is your current playing status on team?

- Starter
- Second String (Gets some playing time but does not start)
- Third String (Receives hardly any playing time or even no playing time at all)
- Injury Reserve
- Red Shirt Freshman

- Other (explain)

2. Number of years participating in your sport collegiately

- 1
- 2
- 3
- 4
- 5
- 6
- 7

3. How many years have you participated in your sport?

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25+

4. Do you currently have an injury?

- Yes, but I am still able to play
- Yes, and I am not able to play

- No

5. Health Issues:

Do you have any health-related issues (e.g., migraines, seizures, etc.)?

- Yes
- No
- Prefer not to answer

If you answered Yes, please explain:

_____

6. Do you currently use a wearable fitness device (e.g., Fitbit, Apple watch, Garmin watch, etc.)

- Yes
- No
- Prefer not to answer

If you answered Yes, what brand/type:

_____

7. Do you currently use any apps, devices, or activities related to relaxation or mindfulness techniques (e.g., Calm, Headspace, etc.)?

- Yes
- No

If you answered Yes, what is the name of the app(s), device, activity?

_____

If you answered Yes, how frequently do you use these techniques (i.e., number of minutes and days per week)

_____

Wakeful Resting Experiences Questionnaire: Appendix C

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Wakeful Resting Experiences Questionnaire

Please think now about your *free time* outside of training, competitions, and your university class schedule (e.g., lectures, labs, etc.) over the last 2 weeks.

In your free time over the last 2 weeks, how frequently have you been able to...		Never	Rarely	Sometimes	Often	Always
1	Spend time thinking about something other than your sport?	**0**	**1**	**2**	**3**	**4**
2	Get a break from doing things that require you to "think hard"?	**0**	**1**	**2**	**3**	**4**
3	Feel free from obligations and commitments (e.g., from your sport, from studying, from a job) so that you could do exactly what you wanted?	**0**	**1**	**2**	**3**	**4**
4	Do something different from your everyday routine (e.g., spend time with different people, eat different foods, go to different places, walk and drive different routes)?	**0**	**1**	**2**	**3**	**4**
5	Undertake required work activities (e.g., class assignments, studying, paid work, chores, etc.)?	**0**	**1**	**2**	**3**	**4**
6	Engage in personal activities and areas of life outside of your sport (e.g., family, friends, relationships & hobbies)?	**0**	**1**	**2**	**3**	**4**

Current Mental Rest Level Measure: Appendix D

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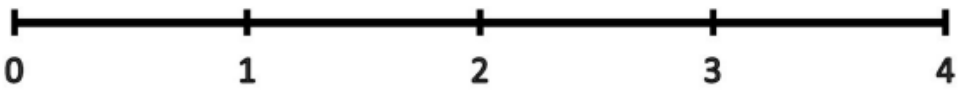
Current Mental Rest Level Measure

How Mentally Rested Have You Felt Over the Last Two Weeks

Lastly, please think about how mentally rested you have felt over the last 2 weeks. We provide examples below of how student-athletes have described being poorly mentally rested and being well mentally rested.

Athletes' Descriptions of Being Poorly Rested	**Athletes' Descriptions of Being Well Rested**
• Feeling "tired"	• Feeling "fresh"
• Not really valuing or appreciating my sport	• Valuing and appreciating my sport
• Lacking the motivation to engage in my sport	• Highly motivated to engage in my sport
• Not applying much effort to my sport	• Applying a lot of effort to my sport
• Not enjoying my sport very much	• Enjoying my sport a lot

Given these descriptions of being poorly and well rested, please indicate below the degree to which you have felt rested over the last 2 weeks:



Poorly mentally rested Well mentally rested

Interview Questions: Appendix E

1. What does rest mean to you?

    a. What about physical rest?

    b. What about mental rest?

2. What opportunities do you have to obtain rest within a typical week?

3. How do these opportunities for rest help you as an athlete?

4. So, when you are getting rest within a typical week, what would you say you are resting from specifically?

5. Within a typical week, what do you specifically do in order to get rest?

6. What are some of the barriers to achieving effective rest within a typical week?

7. What kinds of strategies do you use to get around those barriers and try to get some rest?

8. During a typical week how do you personally know when it is time to get rest?

9. What were your experiences like wearing the Fitbit Inspire 2?

10. Over the past month, how was your rest when wearing the Fitbit Inspire 2 for a couple weeks?

11. Over the past month, how was your rest when not wearing the Fitbit Inspire 2 for a couple weeks?

Probes for elaboration
Can you tell me more about that?
Can you explain what the term X means?
Can you give me any examples of X?
So how is X different from Y?
Can you expand on what you mean by X?

Check for ongoing consent
"I just want to check before we continue that you comfortable with the interview so far and happy to continue".

ABSTRACT

THE EFFECTS OF WEARABLE FITNESS DEVICES ON A FEMALE COLLEGIATE ATHLETE'S PSYCHOLOGICAL REST

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Wearable fitness devices such as a smartwatch are common among athletes, however, these devices may manipulate perceptions of their health status as well as their psychological rest. Psychology of rest or "mental rest" is an essential part of recovery for overall health (Eccles & Kazmier, 2019). The psychology of rest model includes the resting process (i.e., always thinking one's sport, being externally controlled, tedium, performance demands and non-sport opportunity costs), the state of being well rested, and wakeful rest (Eccles & Kazmier, 2019). The purpose of the present study was to examine the impact of wearable fitness devices on collegiate athlete's psychological rest. It is hypothesized that collegiate athletes will report higher levels of being poorly mentally rested as well as lower levels of wakeful rest while wearing the fitness trackers versus not wearing it. Participants included 20 NCAA Division I female athletes. The measurements consist of a mixed quantitative and qualitative analyses based on Eccles and Kazmier's research (2019). The counterbalance, six-week study include participants wearing a fitness device, Fitbit Inspire 2, for two weeks and without it for another

two weeks while responding to two psychology of rest questionnaires each week. On the last week, the researchers will conduct a stratified random sampling for an interview. Results found no significant differences in both questionnaires; however, the interview displayed the impact of the participant's psychological rest related to stress demands from school and sport. This research benefits sport psychology professionals and coaches to better understand the athlete's mental rest to improve their overall performance, and for sport science practitioners to utilize WFDs to enhance athlete sport performance.