

**Factors That Effect Sports Performance: Sleep, Mood, Having a Pre-Match Routine
and Romantic Relationships**

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Abstract

Research around what makes an athlete perform optimally has shown there are various factors to take into consideration. From past research, it was evident sleep, mood, having a pre-match routine and being in a romantic relationship were all factors which effect sports performance. The researcher hypothesised that there is a difference between people who are performing well, performing moderately and are not performing well in sports on outcomes of mood and sleep. That there is a relationship between sleep and mood when predicting self-rated performance and that having a pre-match routine and being in a romantic relationship will help to predict sports performances. Participants were recruited through social media using the convenience sampling and snowball sampling techniques (N = 123) and completed an online survey containing demographic questions, a self-rated sports performance scale, the DASS-21 scale and the PSQI scale. Results from the Spearman's rank order correlation coefficient found a significant negative correlation between sleep disturbances and sports performance. Results from the multiple regression showed that sleep disturbances and having a pre-match routine significantly predict sports performance. The current study will discuss why these factors had a significant effect on sports performances and why the other factors did not. More research is needed around the effect pre-match routines and how being in a relationship effect sports performance.

Table of Contents

Introduction.....	1-11
Method.....	11-15
Results.....	15-20
Discussion.....	21-29
References.....	30-41
Appendices.....	42-52

Introduction

Sports psychology is a growing field in the world of psychology (Lavallee et al., 2004). Many individuals in the sport industry are now realising that there is much more that can be done to improve sports performance than eating right and training hard. Those in the sports industry have begun to focus more heavily on other factors that can help individuals to perform at the best of their ability. Sport psychologists in particular aim to understand the psychological theories and methods to allow one to perform best in relation to their sport. The psychology of sport stretches back to the writing of ancient Greeks, where even then, Greek literature delineates the importance of sports psychology and how beneficial it can be (Gardiner, 1930; Sweet 1978).

At that time there was also a gold standard athletic training called tetrad, which was a 4-day system guided by psychological principles. This system involved a day of preparation, a day of concentration, a day of moderation and a day of relaxation, all one after the other. This shows how early aspects like pre match routines and being well rested has been around sport. Theories and models such as Hull's 'Drive theory of Motivation' and Yerkes and Dodson's law became big in understanding anxiety and motivation in sleep in the 1960s and 1970s (Lavallee et al., 2004). Essentially, sports psychologists want to facilitate their clients to reach their peak sports performance (Anderson et al., 2014). There are several factors that affect sports performance such as sleep, mood (anxiety, depression, stress) and other demographics such as having a pre-match routine and romantic relationships. This review will aim to look at how sleep, mood (anxiety, depression, stress), pre-match routines and being in a relationship impacts sports performance. It will address how each factor contributes to sports performance and what needs to be further researched.

Sleep

Sleep is considered critical to reaching peak performance in sport (Rae et al., 2017). Although, studies have varied in results. Two early studies showed no impact of sleep loss/disturbance on physical performance outcomes (Mougin et al., 1991; Reilly & Deykin, 1983). Similarly, it has been shown that sleep disturbances which would be more common with athletes are shown to have minimal effect on sports performance (Fullagar et al., 2015). In contrast to this, maximal work rate when cycling to exhaustion has been found to decrease from a result of sleep disturbances (Morgan et al., 1987). Likewise, Krueger (1989) examined the effects sleep deprivation have on performance and found that lack of sleep led to decreased reaction times, less vigilance and an increase in cognitive distortions. In support of this, mean and peak power have been shown to decrease in footballers and judo competitors when they experience sleep loss/sleep disturbance (Abdelmalek et al., 2013; Souissi, et al., 2013). A systematic review done on elite sport athletes showed that sleep disturbances can affect training and competition through fatigue and sleep-related performance anxieties (Gupta et al., 2017).

Many previous reviews showed a correlation with getting deeper sleep and more optimal sport performances (Davenne, 2009; Halson, 2008; Halson, 2014; Samuels, 2008). Although there was some good content backing the importance of sleep for athletes, Gupta et al. (2017) commented that the quality of studies done is still quite low and more research is needed on the effects of sleep disturbances and sports performance. From the above, we can see that sleep and sports performances do have a relationship. The research shows sports performance has shown to differ on the outcomes of sleep. From the backing of past studies, this study will examine the relationship between sleep and sports performance. A meta-analysis done by Pilcher and Huffcutt (1996) with a sample size of 1,932 showed that sleep deprivation strongly impairs human

functioning and performance, primarily mood (negatively). It was found that mood is more affected by sleep deprivation than cognitive distortion or motor functioning. The limitations for this review were, unlike cognitive and motor task performance, mood measures were not broken down by additional characteristics, as a result some characteristics were not meaningful with mood. The researcher will address this in the current study. Evidence here shows that mood and sleep are related. From this, research has been found on the relationship between mood and sports performance.

Mood

When an athlete is unable to get in the correct mood, they often under-perform (Terry et al., 1999). One study examined the relationship between the changes in professional cricketers' sports performances ($n=33$) and the changes in their mood. Most players performed better when they felt less tense, but some players performed better when they felt more tense. The findings were reinforced by players' perceived moods in good performances and bad performances. The results concluded mood significantly influenced the athletes sports performances, showing that a player's mood will affect how they perform on the pitch (Totterdell, 1999). More recently, similar findings have concluded the same result (Andrade et al., 2016; Brandt et al., 2017). Likewise, past studies have shown that being in the correct mood was felt to be the single most statistically significant link to Olympic glory. Findings from this study came from measuring the Olympians stress, anxiety and depression (Bali, 2015). In the current study, the participants stress, anxiety and depression will be assessed to form a total mood score. This will be tested to see to what extent sports performance and mood are associated.

Stress

Every athlete is said to have a certain stress stage which allows them to reach their peak performance, this can vary on person to person (Bali, 2015). Too little stress has shown to be linked to boredom and not being pushed. Competitive stress is often shown to enhance sport performance (Ghosh et al., 2018). Although doing physical activities has proved to be beneficial to an individual's mental health, it can also be seen as a stress factor (Morgan et al., 1987). There are two different types of stress as a result, acute or chronic stress (Mastorakos et al. 2005). Chronic stress has been shown to inhibit the recovery stage as it drains the adrenal glands leading to lower cortisol, which will affect performance and recovery (Perna & McDowell, 1995). This shows athletes with high constant stress could suffer in terms of their performance on the pitch. Before big games stress has been shown to rise, which in turn lowers cortisol and increases the risk of injuries and increases chances of a drop in performance (Lautenbach et al., 2014; Moreira et al., 2013). Similarly, using methods to reduce an athlete's stress has been shown to improve sports performance (D'Angelo & Tarfuri, 2020). Prior research clearly indicates a relationship between stress and sports performance. This study will further investigate this relationship. When talking about stress, anxiety will almost always come into the conversation. Stress and anxiety have 'intertwined behavioural and neural underpinnings' (Daviu et al., 2019). Stress has been shown to cause performance anxieties (Kanters, 2000). Like stress, anxiety also increases cortisol (Strahler et al., 2010).

Anxiety

Anxiety is another factor we must take into consideration when examining factors that affect sports performance. Anxiety and what it contributes to affecting an athlete's sports performance is one of the main research areas in sports psychology today (Bali, 2015; Hanin, 2000; Parnabas et al., 2015; Woodman & Hardy, 2001), as athletes often need to perform in high

pressure situations. Some psychologists view that anxiety is multidimensional of which there are two main elements. The first one is cognitive anxiety, which leads individuals to have worrying thoughts about their performance and the second one is somatic anxiety, how nervous they may get for a match (Martens, Vealey, & Burton, 1990). Cognitive anxiety can affect sports performance in numerous ways. It can affect the joy of participating in sports (Smith & Smoll, 1991) and somatic can result in weakened sport performance (Hanin, 2000; Woodman & Hardy, 2001). Most researchers mainly found negative effects to do with anxiety and sports performance (Kleine, 1990; Woodman & Hardy, 2003). If somatic anxiety is too high, it can cause the athlete to lose complete concentration. Somatic anxiety has been shown to be harmful, cause a person to lose concentration and even drop out of a game (Hanin, 2000). The athlete has then shown to under-perform. Theories such as the e drive theory in 1943, and the inverted U-hypothesis or optimal arousal level in 1962 backed up the strong relationship anxiety has with sports performance (Bali, 2015). Similarly, a study done on anxiety and sports performance showed that participants with depleted self-control strength performed worse in the specific tasks as their anxiety went up. The study also found that improved self-control strength may improve a person's anxiety levels (Englert & Betrams, 2012). The above research shows a relationship between anxiety and sports performance. The strength of this relationship will be examined in following study. Much like anxiety and stress, depression can also affect sports performance and playing sports can also be a factor of a person's depression (Mummery, 2005). A conceptual examination of mood in sport was done and they found depression to be the biggest factor in affecting mood, the intensity of mood responses and performance relationships between anger and tension. As a result of this, depression has been heavily examined in sport psychology (Budgett, 1990; Hollander et al., 1995; Lane & Terry, 1999).

Depression

Research found that top athletes are often seen as people who do not have depression as they are seen to be mentally tough to get where they are (Babiss & Gangwisch, 2009).

Interestingly, studies have shown that athletes at the top of their game are more susceptible to depression, particularly when their performances are not going as they would like them to go.

Memories of failed performances have also been shown to put athletes in a state of depression (Davis et al., 2008; Hassmén & Blomstrand, 1995; Jones & Sheffield, 2007). Athletes who must manage academic and sport related anxieties as well as trying to be a top athlete are shown to be more vulnerable in being stressed and depressed (Hammond et al., 2013). Similarly, Mummery (2005) found that athletes are more susceptible to depression as a result of the physical and psychological demands put on them. Depression has also been found to correlate with a drop in confidence and overall performance (Lane et al., 2005). There are plenty of studies that show how sport can cause depression but not enough on how depression can cause poor sports performances. This will be addressed in the current study. As seen in the above paragraphs, factors such as sleep, and mood (depression, anxiety and stress) have been shown to have a significant impact on sports performance. This study will seek to explore these relationships and improve the knowledge around them. There are still other factors to consider when researching sports performance, such as demographic factors (Marinho, 2020). One demographic being romantic relationships. These relationships have been shown to both improve and worsen mood, which as previous research shows, will affect sports performance. (Braithwaite & Holt-Lunstad, 2017; Jowett & Cramer, 2009).

Romantic Relationships

Studies have shown that people with better quality romantic relationships also have better quality friends and better-quality social competence, all factors which can improve depression (La Greca & Harrison, 2005). If mood and overall depression improve, sport performance can possibly improve. Another factor of a person's mental health which effects sports performance is relationships. Sport self-efficacy and relationship self-efficacy have been shown to correlate (Byl & Naydenova, 2016). Sport performers are often surrounded by a group of individuals made up of coaches, family, friends, teammates, or romantic partners. The quality of these relationships in and out of sport are vital as they may positively or negatively influence the performance of the athlete (Jowett & Cramer, 2009).

Partners who have warm and affectionate relationships are more likely to support those doing what they love than those who do not have as strong a relationship (Rogers & May, 2003). Having a perception that your partner is unsupportive is linked with a drop in sports performance (Kelley & Stahelski, 1970; Kenny, 1994; Kiesler, 1996). Likewise, a more recent study done by Jowett and Cramer (2009) found relationship qualities such as interpersonal trust, commitment, communication quantity, and negative transactions to have an association with sports performance. As well as that, they found that talking about each other's thoughts, views and opinions verbally or non-verbally did decrease negativity and barriers between improving sports performance through improving interpersonal relationships. Research suggests that athletes who maintain a healthy relationship by managing stress, communicating effectively and being supportive experience improved well-being, and in some scenarios improved sports performance (Eggleston, 2020). Unexpectedly, commitment was positively linked with a drop off in sports performance (Jowett & Cramer, 2009). Similarly, higher levels of relationship commitment have been shown to lead to an increase in levels of spill over between romantic relationships and sport

performances (Eggleston, 2020; Googins, 1991). Some limitations of Jowett and Cramer's (2009) study is that it was a cross-sectional design. A longitudinal study would be more beneficial. This study was also a self-report study from which poses its own problems. More studies are needed in this area. From the above studies, it appears that romantic relationships effect an individual's sports performance. The current study will aim to further clarify this relationship. The other demographic which will be explored in this study is pre-match routines. Like relationships, a routine has also shown to impact sports performance (Czech et al., 2004).

Pre-match Routine

A sports routine can differ in complexity from person to person. A pre match sports routine has been defined in a few different ways. Some people view it as cognitive and behavioral factors which deliberately enhance your stress levels and focus (Foster et al., 2006) and others simply define it as a set group of thoughts and behaviors (Crampton, 1989). Over the past 30 years pre match routines have grown in interest from sports psychologists, coaches, and sports performers. Creating, developing, understanding, and implementing a routine has been shown to be effective for consistently performing at a high level (Boutcher, 1990; Lobmeyer and Wasserman, 1986; Tenenbaum, 1993). Most recently, pre match routines have been most commonly described as a particular set of thoughts relevant to the athlete's sport, prior to their sport performance, in a structured format (Cotterill, 2010).

Pre match routines have been looked at throughout numerous different sports such as basketball, football, volleyball, water polo and many more, finding significant results for improving sports performance in each (Czech et al., 2004; Lidor & Mayan, 2005; Marlow et al., 1998; Vealey, 1988). The main strength that has been found with pre match routines is the link with the performer. The most common approach to testing the effects of a pre match routine was

to compare a control group against an experimental group. A study of ten female high performance basketball players showed an increase in free throws after bringing visuomotor behavior into their routine (Hall & Erffmeyer, 1983). Many other studies found that having a pre-match routine has been shown to positively impact performance (Czech et al., 2004; Hill & Borden, 1995; Lobmeyer & Wasserman, 1986). A correlation has been found between top performing athletes and the consistency of doing pre match routines. As seen above, research shows pre-match routines work. What pre-match routines are believed to actually do is improve focus (Boutcher, 1992; Czech et al., 2004), condition your body to perform specific movements for particular actions (Boutcher & Crews, 1987; Moran, 1996), improve consistency in performance (Wrisberg & Pein, 1992), prevent unwanted thoughts and promote beneficial thoughts during the tasks (Gould & Udry, 1994; Maynard, 1998), help reach optimal arousal (Marlow et al., 1998) and to help athletes perform under pressure (Mesagno, 2008). Although there is a lot of study backing the benefits of having a pre match routine there is still not enough depth of research into the subject. Many of the above studies are based upon suggestion (Beilock & Carr, 2001; Czech et al., 2004; Foster et al., 2006). Not enough work has gone into the mechanism of why pre match routines work. It can also be argued that inappropriate routines can result in a downfall in performance (Boutcher, 1990). In future research more mixed studies and larger samples are needed. It would be useful for coaches if more work was put into how the coach themselves can implement pre match routines into their players (Cotterill, 2010). As seen above, pre match routines can affect sports performances. This will be explored, alongside the other factors in the following study.

Rationale

As shown above, there have been numerous studies done on how sleep, mood, having a pre-match routine and romantic relationships effect sports performance. Although there is significant research on the impact of these factors, there is still not enough research around them. Every athlete thrives to reach their optimal sports performance, this study will aim to help athletes achieve this. When examining sleep, mood and sports performances, most studies look at either sleep and sports performance or mood and sports performance. This study will look at all three to determine the strength of the relationship these factors have on an athlete's sports performance and to try expand on previous research. With regards to pre-match routines, research has shown it can significantly impact sports performance, but more research is needed in this area. This study will aim to contribute to that. A lot of pre-match routine studies focus on how to perform for a specific action, this study will focus on how pre-match routines effect sports performance as a whole and aim to add more knowledge in this area overall. Previous research show that romantic relationships can influence mood and therefore effect sports performance. There is a serious lack of research examining the effect romantic relationships has on sports performance. This study will try and provide a greater insight to this relationship. Many athletes could vastly improve their sports performance by knowing the effect these factors have on their performance. A lot of athletes may not even think of the effect aspects like sleep, mood, routine and relationships would have on their performance. It could lead many athletes along the journey of reaching their optimal sports performance.

Aims, Research Questions, Hypotheses

The aim of this research is to investigate the affect sleep, mood, having a pre-match routine and romantic relationships have on an athlete's sports performance. The study will be focusing on athletes who often have to juggle work/college and a social life outside sport, to see

the effect sleep and mood has on an athlete's sports performance, to examine whether having a routine can be a useful tool in predicting a person's sport performance and to see how romantic relationships may effect a person's sports performance.

The first research question is to see if there is a difference between people who are performing well, performing moderately and not performing well (IV) in sports (i.e., 'sports performance') on outcomes of mood and sleep (DVs). The second research question is to examine the relationship between self-rated sports performance (CV), and sleep and mood (PVs). The third research question is to what extent do routine, relationships, sleep and mood (PVs) predict self-rated sports performance (CV). This study is hypothesizing that there is a difference between people who are performing well, performing moderately and are not performing well in sports on outcomes of mood and sleep. That there is a relationship between sleep and mood when predicting self-rated sports performance, and that having a pre-match routine and being in a romantic relationship will help to predict sports performances.

Method

Participants

Participants were recruited through convenience sampling and snowball sampling. Participants filled out a link that was sent through social media: Instagram, Snapchat, and WhatsApp. Some participants were asked to forward on the link to other potential participants and did so. As multiple regression analyses were ran in this study, G*Power: Statistical Power Analyses was used to conclude the sample size needed for a statistically significant analysis. From this, results from G power determined there was a 95% chance that the *R-squared* value

would produce a statistically significant value if the sample had 82 participants or above. No incentives were used to attract participants. 123 participants took part in the study. 90 males (73.2%) and 33 females (26.8%). The mean age was 23.04, with a standard deviation of 5.81. All participants completed the test entirely. Participants had to be at least 18 to take part in the study. Participants also had to give informed consent before taking part in the study. All participants played a team sport.

Design

The research was quantitative, cross-sectional, mixed within and between participant's design. More specifically, for research, question one, a between participants design was used. The independent variables were; optimal sports performance, moderate sports performance and poor sports performance and the dependent variables were sleep and mood. For research questions two and three, a within participants correlational design was employed. The predictor variables were mood (stress, depression, anxiety), sleep (sleep latency, sleep disturbances, daytime dysfunction), pre-match routine, relationship status and does being in a relationship improve performance and the criterion variable was self-rated sports performance.

Materials

To create my questionnaire, Google Forms was used. The questionnaire had demographic questions, a self-rated sports performance scale and involved two established scales, The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) (See appendix 1), and the Pittsburgh Sleep Quality Index (PSQI) (See appendix 2). The demographics questions were asked to find the age and gender of the participants, to see if they had a pre-match routine to get them physically and mentally prepared for a game, to see if they were in a relationship, if so, do they believe it benefits their sports performance. The self-rated sports performance scale asked

participants to rate their performance from 1 to 10, 1 = performing poorly and 10 = performing optimally. The scale was altered after the data was collected. See appendix three for examples of the demographic questions and the self-rated sports performance scale.

Sports Performance Scale

To assess self-rated sports performance, the first research question was to see if there was a difference between people who are performing well versus people who are not performing well in sports (i.e., 'sports performance') on outcomes of mood and sleep. The second research question was to see if there is a relationship between sleep, mood, and self-rated sports performance. The third research question is, to what extent do routine, relationships and other demographics as well as sleep and mood predict self-rated sports performance.

Participants were asked to rate their sports performance on a scale from 1-10, 1 = performing poorly and 10 = performing optimally. The responses were coded as both continuous and categorical variables; specifically, the continuous sports performance variable was scored on a scale of 1-10, with a higher score indicating better sports performance. In addition, participants were also sub-divided according to their perceived level of performance. The scores were subdivided to create 3 groups, performing poorly (1-3), performing moderately (4-7), and performing optimally (8-10).

Depression, Anxiety and Stress Scale - 21 Items (DASS-21)

The DASS-21 scale measures the emotional states of depression, anxiety, and stress over the past week. It is a self-rated questionnaire. Each scale contains 7 items. The scores for depression, anxiety and stress are found by adding the scores for the relevant items. The scoring for each question is 0-3. The DASS-21 scale is based on a dimensional conception of psychological disorders. The DASS-21 scale has no direct involvement in resulting in somebody

being admitted to a specific category in classified systems such as the International Classification of Diseases (ICD) and The Diagnostic and Statistical Manual of Mental Disorders (DSM) (Lovibond & Lovibond, 1995). The DASS-21 scale has shown to have significant reliability ($\alpha = 0.986$) and validity (Osman et al, 2012). More information on the DASS-21 can be found in Appendix 1.

Pittsburgh Sleep Quality Index: (PSQI)

To measure sleep, we used the Pittsburgh Sleep Quality Index (PSQI) (Buysse et al, 1989). This scale was made up of 10 questions, with some questions having multiple parts. Each question is scored 0-3 and then put together to form a global score with a range of 0-18, 0 indicating no difficulties and 18 indicating very bad difficulties. The questions are based around how you slept in the past month. It is a self-rated questionnaire. There were 6 different components of sleep in the PSQI: sleep quality, sleep latency, sleep duration, sleep disturbances, use of sleeping medication, and daytime dysfunction. The PSQI has been assessed and from that deemed to have acceptable measures of internal homogeneity, consistency, and validity (Buysse et al, 1989). More information on the PSQI can be found in Appendix 2.

Procedure

The data was collected through an online questionnaire. The results from the study were anonymous and it was a self-report questionnaire. The participant's information was stored safely on the researcher's computer and participants were treated with full respect. All NCI ethical guidelines were followed. A link was shared on social media platforms such as Snapchat, Instagram and WhatsApp. If participants wished to take part in the study, they pressed on the link. When they pressed into the link a participant information sheet came up (see appendix 6). On this was information all about the study such as what the study entails, why the study is being

done, the risks and benefits of doing the study, who can take part, what it means to take part and information about the researcher. They were then given a consent form (See Appendix 4). They had to read the consent form and give informed consent. Once they did this, they began the study.

The participants completed the study in their own time. It was estimated the study took 12-15 minutes. They started off by answering the demographic questions such as age, gender, their self-rated sports performance, if they have a pre match routine, their relationship status and if in a relationship, do they believe this improves their sports performance (See appendix 3). Next, they did the Pittsburgh Sleep Quality Index: (PSQI) (see appendix 2) which assessed the participants sleep (Buysse et al, 1989), and then moved on and completed the DASS-21 scale (see appendix 1), which assessed the participants mood (Lovibond & Lovibond, 1995). When all the required questionnaires were answered, they were given a debriefing page with helplines to call if needed (see appendix 5).

Results

Descriptive statistics

In Table one descriptive statistics were ran for the categorical variables: Gender, pre-match routine, relationship status and does being in a relationship improve performance. 26.8% of participants were female ($N = 33$) and 73.2% were male ($N = 90$). 61.8% of participants were not single and 35.6% of those participants believed being in a relationship improved sports performance. 48% of participants had a pre-match routine and 52% did not.

Table 1

Frequencies for categorical variables: Gender, Single, Relationships Improve Sports Performance & Pre-Match Routine to Get You Physically and Mentally Prepared for a Game.

Variable	Frequency	Valid %
Gender		
Female	33	26.8%
Male	90	73.2%
Single		
Yes	47	38.2%
No	76	61.8%
Relationships Improve Sports Performance		
Yes	31	35.6%
No	56	64.4%
Pre-Match Routine to Get you Physically and Mentally Prepared for a game		
Yes	59	48%
No	64	52%

In Table 2, descriptive statistics were ran for all continuous variables: Total DASS-21 score, depression, anxiety, stress, the global PSQI score, sleep latency, sleep disturbance, daytime dysfunction and self-rated sports performance. Means (M), Medians (MD), Range and Standard Deviations were all found. Preliminary analysis was conducted on the data set which showed that none of the continuous variables were normally distributed. A significant result ($p < .05$) on the Kolmogorov-Smirnov statistic was found and an inspection of the histograms also indicated that the data was non-normally distributed, with most histograms being positively skewed. In line with the central limit theorem, the current data set was large enough to continue with our statistical analyses.

Table 2

Descriptive Statistics for all Continuous Variables, N = 123.

Variable	<i>M</i> [95% CI]	<i>SD</i>	Range
Global PSQI Score	5.91 (5.48 – 6.34)	2.39	14
Sleep Latency	1.54 (1.37 – 1.7)	0.91	3
Sleep Disturbance	1.05 (0.98 – 1.13)	0.42	2
Daytime Dysfunction	1.29 (1.13 – 1.41)	0.80	3
DASS-21	15.5 (13.49 – 17.54)	11.43	55
Stress	6.97 (6.08 – 7.85)	4.95	24
Depression	5.43 (4.5 – 6.36)	5.23	24
Anxiety	4.3 (3.54 – 5.06)	4.24	19
Self-Rated Sports Performance (1 = 1-3, 2 = 4-7, 3 = 8-10)	2.17 (2.08 – 2.26)	0.52	2

Inferential Statistics

A one-way between groups ANOVA was conducted to determine if there were differences in sports performance (i.e., those performing poorly, moderately or optimally in their sport field) on the outcomes of mood, with sub-scales anxiety, stress and depression and sleep with sub-scales sleep latency, sleep disturbance and daytime dysfunction. There was no statistically significant difference in mood and sleep scores for the three sports performance groups: Global PSQI, $F(2, 120) = 1.41, p = 0.25$; Total DASS-21, $F(2, 120) = 0.87, p = .42$; Sleep Latency, $F(2, 120) = 0.68, p = 0.51$; Sleep Disturbances, $F(2, 120) = 2.45, p = 0.09$; Daytime Dysfunction, $F(2, 120) = 0.36, p = 0.7$; Stress, $F(2, 120) = 1.00, p = 0.37$; Depression, $F(2, 120), p = 0.59$; Anxiety, $F(2, 120) = 0.61, p = 0.54$. These results showed that there was no difference between people who were

performing well, performing moderately, and people who were not performing well in sports (i.e., ‘sports performance’) on outcomes of mood and sleep.

A correlation was conducted examining the relationships between mood (anxiety, stress, depression), sleep (sleep latency, sleep disturbance, daytime dysfunction) and self-rated sports performance. Preliminary analyses were performed to check the assumptions of normality & linearity. As indicated above, the scores were not normally distributed so a non-parametric test was ran. The relationship between Mood (anxiety, stress, depression), sleep (sleep latency, sleep disturbance, daytime dysfunction) and self-rated sports performance was investigated using Spearman’s rank order correlation coefficient. As shown in Table 3, there was a small negative correlation between self-rated sports performance and sleep disturbance, $r = -.236$, $n = 123$, $p < .009$, with high levels of self-rated sports performance associated with low levels of sleep disturbance. None of the remaining correlations were significant with self-rated sports performance (all p ’s $>.05$), so the other variables had no relationship with self-rated sports performance. See Table 3.

Table 3

Spearman’s Rank Order Correlation Coefficient for Continuous Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. DASS-21 Scale (Mood)								
2. Stress	0.90**							
3. Depression	0.85**	0.63**						
4. Anxiety	0.86**	0.74**	0.61**					
5.PSQI (Sleep)	0.49**	0.41**	0.47**	0.38**				

6.Sleep Latency	0.36**	0.36**	0.27**	0.32**	0.77**			
7.Sleep Disturbances	0.28**	0.21**	0.22*	0.33**	0.41**	0.28**		
8. Daytime Dysfunction	0.47**	0.33**	0.55*	0.33*	0.65**	0.29**	0.17	
9. Self-Rated Sports Performance	-0.06	-0.03	-0.03	-0.09	-0.03	-0.07	0.24**	-0.04

Note: N = 123; Statistical significance: *p < .05; **p < .01.

Multiple regression analyses were performed to determine to what extent could self-rated sports performance be explained by mood with sub-scales of depression, anxiety, stress; sleep with sub-scales of sleep latency, sleep disturbance, daytime dysfunction; relationship status, does being in a relationship improve performance and having pre-match routine to get you physically and mentally prepared for a game. Preliminary analysis showed violations of normality, linearity, and homoscedasticity. Tests were also ran for multicollinearity and indicated that all Tolerance and VIF values were within an acceptable range and indicated that there was no violation of the assumptions of multicollinearity, which allowed the researcher to carry out the multiple regression tests. No a priori hypothesis determined the order in which the predictor variables were entered into the regression, therefore all variables were added in at the same time. Shown in Table 4, the predictor variables entered in the model explained 16.9% of the variance in self-rated sports performance scores ($F(12, 74) = 1.23, p = .263$). Variables sleep disturbances ($\beta = -0.27, p = 0.046$) and pre-match routine ($\beta = -0.26, p = 0.032$) were found to uniquely predict self-rated sports performance scores to a statistically significant level. This means sleep disturbance and pre-match routine can be useful for predicting self-rated sports performance to some extent.

Table 4*Multiple Regression Model for Predicting Self-Rated Sports Performance*

Variable	R ²	B	SE	β	<i>t</i>	<i>p</i>
Model	16.9%					
Global PSQI Score (Sleep)		-.10	0.18	-0.15	-0.33	0.74
Sleep Latency		.15	0.34	0.9	0.44	0.66
Sleep Disturbances		-1.04*	0.51	-.27	-2.01	.046
Daytime Dysfunction		0.41	0.35	.21	1.15	0.25
DASS-21 (Mood)		-0.92	0.21	-.67	-0.44	0.66
Stress		0.12	0.2	0.37	0.57	0.57
Anxiety		0.06	0.18	0.16	0.33	0.74
Depression		0.07	0.19	0.24	0.38	0.71
Pre-Match Routine		-0.82*	0.38	-0.26	-2.2	0.032
Single		-0.51	0.37	-0.16	-1.38	0.17
Relationships Improve Sports Performance		0.28	0.38	0.09	0.74	0.46

Note: AdjR²=0.25; β = standardized beta value; B = unstandardized beta value; N = 123; Statistical significance: **p* < .05; ***p* < .01.

Discussion

This study aimed to provide a better understanding of factors which can affect a person's sport performance. Although there are many different factors which can affect somebody's sports performance, prior research has shown that sleep, mood (depression, anxiety, stress), having a pre-match routine and romantic relationships are all associated with a person's sports performance (Czech et al., 2004; Jowett & Cramer, 2009; Morgan et al, 2001; Mummery, 2005; Terry, 2000). As a result, the researcher sought out to analyse the effect sleep and mood has on an athletes' sports performance, to examine whether having a routine can be a useful tool in predicting a person's sport performance and to see how romantic relationships may affect a person's sports performance. Overall, the results showed that sleep disturbances both correlate and predict sports performance, and that having a pre-match routine predict sports performance.

For research question one it was hypothesized, from past research, that there would be a difference between people who are performing well, people who are performing moderately and people who are not performing well in sports on the outcomes of mood and sleep. This was examined using an ANOVA analysis; results showed that there was a non-significant difference between the levels of sports performance on the outcomes of mood and sleep. These findings suggest that high or low levels of mood and sleep quality will have no effect on an individual's sports performance. As a result, hypothesis one was rejected. For my second hypothesis, a Spearman's rank order correlation analysis was run to determine if there was a relationship between sports performance, and sleep and mood. A negative correlation was found between sleep disturbances and sports performances. This finding indicates when sleep disturbances go down sport performance goes up. All other factors were non-significant. This hypothesis was partially accepted. For my third hypothesis, a multiple regression was ran to examine if sleep, mood, having a pre-match routine and being in a romantic relationship helps to predict sports

performance. The overall model was non-significant. However, sleep disturbances and having a pre-match routine showed to uniquely predict sports performance to a statistically significant level.

In relation to overall sleep quality, this was consistent with some earlier studies which found sleep quality to have minimal to no effect on physical/sport performance outcomes (Fullagar et al., 2015; Mougin et al., 1991; Reilly & Deykin, 1983). In contrast to these outcomes, a large number of studies have found a difference in an individual's sports performance on the outcomes of sleep, specifically sleep disturbances, which is consistent to the findings in hypothesis two and three. (Abdelmalek, S et al., 2013; Gupta, 2016; Morgan et al., 2001; Souissi N, et al., 2013). An explanation for the association between sleep disturbances and sport performance could be down to several reasons. Studies have shown sleep disturbances decreases power, slows down reaction times, causes cognitive impairment, reduces maximal work rate, results in fatigue and brings about sleep-related performance anxieties (Abdelmalek, S et al., 2013; Gupta et al., 2016; Morgan et al., 2001; Samuels, 2008; Souissi N, et al., 2013). Similarly, studies have also found correlations between getting a deeper sleep and sports performance. Another explanation could be due to the hormonal responses which take place during sleep. Playing sport activates hormonal systems which contain characteristics which help repair and grow muscle, these systems will under perform when sleep quality is poor, for example when somebody suffers from sleep disturbances (Gratti & De Palo, 2011). Although findings showed a lot of consistency with sleep and sports performance, this was not the case with mood and sports performance.

In relation to mood, my findings were not consistent with previous research. Prior research suggests sports performance will have a significant difference on the outcomes of mood

and can be a huge determining factor in performing optimally (Andrade et al., 2016; Bali, 2015; Brandt et al., 2017; Terry, 2000). A reason that the results were not consistent could be down to the fact a lot of previous research which looked at sleep, mood and sports performance was done in a practical setting, where the researchers themselves could measure outcomes, rather than in this study it was all self-answered questionnaires. Although mood was not found to be associated with sports performance in this study, mood and sleep were very strongly correlated. Mood, anxiety, stress, depression, sleep, sleep latency, sleep disturbance and daytime dysfunction all correlated to a statistical significance of $p < 0.01$ apart from sleep disturbances with daytime dysfunction which was very interesting. Previous research has shown there is a relationship between sleep and mood (O'Donnell et al., 2018; Pilcher & Huffcutt, 1996). A study examining people on a daily diary method found that poorer daily moods were linked with poorer sleep quality and longer sleep latency (Kouros & El-Shiek, 2015). Similarly, mental stress has been found to have an influence on sleep-disturbances (Lastella et al., 2015; Sargent et al., 2014; Tuomilehto et al., 2017). Interestingly, Triantafillou et al., (2019) found significant results between the relationship of mood and sleep and further found that sleep quality has a significantly larger effect on mood than the reverse. From the research here we can see sleep and mood have a relationship from either mood, stress, anxiety or depression effecting sleep or the other way around, which is consistent with the findings from our correlation in this study. I find this to be an interesting and intertying relationship as the above studies show that stress can cause sleep disturbances which can in turn cause anxiety and depression which can in turn cause insomnia and so on. Although this was not an aim of my study, the results do suggest that other researchers should examine the relationship between sleep and mood. Most research in this area focuses on the negative effects these factors have on each other, more research should focus on

how much of a positive effect improving one of these factors could have on the other factor. This should be done with a control group or a longitudinal study.

In hypothesis three, having a pre-match routine and being in a relationship were also analysed. In the multiple regression, having a pre-match routine showed to significantly predict sports performance. This was consistent with prior research (Czech et al., 2004; Lidor & Mayan, 2005; Marlow et al., 1998; Vealey, 1988). Past studies have shown numerous possibilities for this finding. Having a pre-match routine has been shown to allow the athlete to improve their focus, maintain consistency in performance, prevent unwanted thoughts, promote good thoughts, reach optimal arousal, condition their body for specific movements and help athletes improve under pressure (Boutcher & Crews, 1987; Boutcher, 1992; Czech et al., 2004; Gould & Udry, 1994; Maynard, 1998; Wrisberg & Pein, 1992). Unlike the findings from having a routine, being in a relationship was not found to predict sports performance. Results were non-significant.

Past studies have found associations of being in a relationship and sports performance, inconsistent with our findings. Research has shown that sports self-efficacy and relationship self-efficacy significantly correlate (Byl & Naydenova, 2016). Similarly, the quality of relationships has been shown to effect sports performance (Jowett & Cramer, 2009; Rogers & May, 2003). Prior research shows the perception of support from a partner and qualities such as trust, commitment and communication have been shown to have a relationship with sports performance (Eggleston, 2020; Jowett & Cramer, 2009; Kelley & Stahelski, 1970; Kenny, 1994; Kiesler, 1996). A reason our findings may not have been consistent with past studies is because some of the participants may have been in unhealthy relationships. Studies have shown that being in an unhealthy relationship can worsen sports performance and that being in a healthy relationship will better it (Eggleston, 2020; Jowett & Cramer, 2009; Kelley & Stahelski, 1970;

Kenny, 1994; Kiesler, 1996). This may have taken away from the hypothesis that being in a relationship will help predict sports performance as being in a relationship has shown to both worsen and better sports performance. As well as that, our population was also quite young and might not be in serious relationships, which could lead to the question that serious relationships may only have a determining factor. Similarly, a lot of significant studies spoke about a 'loving relationship' and had higher mean ages (Rogers & May, 2003). As the data set is quite young, a lot of the participants may be in a relationship but might not be in love which could be another reason for the results.

Future Research

Regarding future research, these factors could be examined in a longitudinal study throughout a sports season, assessing how their mood, sleep, relationships and the addition of a pre-match routine impacts sports performance on a weekly basis with more measures to get a more precise finding. In regard to having a pre-match routine, a lot of studies just look at a routine for a specific action (Hall & Erffmeyer, 1983). More research needs to look at how having a pre-match routine to enhance the athlete's overall sports performance. As well as that, much of the research on pre-match routines is dated, more recent studies are needed.

Future studies should look at why sleep disturbances constantly come up over other issues related to sleep. Furthermore, there is a great basis to look at how improving an athlete's sleep, and mood will in turn improve their sports performance and to what extent this effect will have. I would suggest this being done with a control group or as a longitudinal study to reduce cohort differences. When speaking about the association between romantic relationships and sports performance a lot more research is needed on the association in general. Very little research has gone into this. Studies need to be done on how much of an effect being in a healthy

or unhealthy relationship has on an athlete's sports performance. Research shows how the perception of support from a partner and qualities such as trust, commitment and communication are all important factors in being in a relationship which benefits an athlete's sports performance (Eggleston, 2020; Jowett & Cramer, 2009; Kelley & Stahelski, 1970; Kenny, 1994; Kiesler, 1996). Research could be done on these factors of a relationship and how much each factor is associated with the strength of the relationship and in turn related to sports performance.

Limitations

There are several limitations that should be highlighted. Firstly, convenience sampling and snowball sampling limited the generalisability of the results. In convenience sampling and snowball sampling all participants will generally be from the same geographical area. They may also have similar cultural backgrounds and socioeconomic statuses (Emerson, 2015). With more than one similar factor, this may skew the data, which was evident in the current data set. It would be interesting for future research to look at these factors through a global scale to reduce sampling bias. Although this may have affected the generalisability of the study, a strength of this study was sample size. G power indicated the researcher would need 82 participants, and the data set had 123 participants. This increased the likelihood of the accurate mean values, provided a smaller margin for error, and allowed us to identify outliers. Our sample consisted of 90 males (73.2%) and 33 females (26.8%) and ranged from 18 – 49. This made our sample more generalisable. Secondly, the study was cross sectional and correlational so temporal or causal relationships between factors cannot be suggested. As it is cross sectional we cannot differentiate between cause and effect and may experience cohort differences. As spoken about previous, a longitudinal study should be ran throughout a sports season to allow for precise measurements and findings. Thirdly, the study was a self-administered questionnaire, which always poses its

own issues. Participants may have been unsure about what certain questions meant and just answered anyway, errors are tougher to detect, and the participants may be more likely to rush the questionnaire than if it was done in person (Norman et al., 2018). Future research could get the participants to fill out the questionnaire in person. Fourthly, some scales were not optimal. The self-rated sports performance scale was not detailed enough. In the questionnaire there should have been more sub-categories to provide better detail for how the participants were rating themselves. The researcher did alter the scale after the data was collected as spoken about in the method section, but it may have been more beneficial for there to be even more detail in the scale and for the participants to be given this detail. With regards to the pre-match routine question, some people may have counted very small actions as a pre-match routine, and some people may have not counted big actions as a pre-match routine. Although our questionnaire was not overly specific, we did still find significant results for how having a pre-match routine can predict sports performance. Not many studies have found an association with pre-match routines and overall sports performance, mainly just parts of a sports performance. This will benefit future research in this area. Lastly, we ran into problems with the relationship question, as we hypothesized that being in a relationship will help predict sports performance but did not account for being in a healthy/unhealthy relationship and the effect this may have. There was a lack of research looking at the association between how romantic relationships associate with sports performance. More research is needed in this area.

Practical Implications

Overall, the research was partially consistent with prior research, and showed that lowering sleep disturbances may lead to a higher level of sports performance and that having a pre-match routine and is associated with higher sports performance. Although it was not

intended, our results also showed a link between sleep and mood. Overall, these findings have implications for ways to improve sports performance and how bettering sleep or mood can improve one another. Our results highlight the effect sleep disturbances have on sports performances, show that pre-match routines can improve sports performance and that improving sleep will improve mood and the same the other way around. Our results could be beneficial to those who want to improve their own or others sports performance and supports the theory that improving sleep will improve performance and that having a pre-match routine will improve sports performance. It shows that nutrition and training are not the only factors which improve sport performance. The findings with sleep and mood will also be beneficial for researchers looking at the relationship between sleep and mood. Government policies could be aimed at promoting this information and ways to do it to improve overall the overall well-being of the public. There could also be implications for sports associations to bring in facilities to improve their players mood and sleep which could in turn improve their sports performance. The introduction of pre-match routines for each player in the squad would be beneficial too.

Conclusion

The current study explores factors effecting sports performance: sleep, mood, having a pre-match routine and being in a romantic relationship. Significant results were found in the correlation and regression analysis between sleep disturbances and sports performance. The results showed as sleep disturbances go down, sports performance goes up and that the level of sleep disturbances can be used to predict sports performance. Having a pre-match routine was as well a significant predictor for sports performance. This meant that having a pre-match routine could act as a predictor for higher sports performance. All other factors had a non-significant effect on sports performance. Future studies should examine these factors in a longitudinal study,

throughout the course of a sports season to allow for a closer assessment of these factors and the relationship they have with the athlete's sports performance throughout the season. Additionally, more detailed scales are needed for the self-rated sports performance questionnaire and the question of having a pre-match routine or not. With regards to whether being in a relationship effects sports performance, a more in-depth analysis is needed looking at the characteristics and strength of the athlete's relationship and to what effect these characteristics have on sports performance. As the psychology around sports performance continues to grow, research needs to keep progressing in this field, particularly research in pre-match routines and how relationships effect sports performance. Although the finding of the association between mood and sleep was not the aim of study, the relationship found had to be looked in to. From this, government polices should be put in place polices to promote how strong the relationship between these factors is and explaining how much of a positive effect improving one of these factors may have one another. As well as that, sport associations should promote the benefits improving sleep and having a pre-match routine will have on an athlete's sports performances.

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Appendices

Appendix 1

DASS21		Name:	Date:		
Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week . There are no right or wrong answers. Do not spend too much time on any statement.					
The rating scale is as follows:					
0	Did not apply to me at all				
1	Applied to me to some degree, or some of the time				
2	Applied to me to a considerable degree or a good part of time				
3	Applied to me very much or most of the time				
1 (s)	I found it hard to wind down	0	1	2	3
2 (a)	I was aware of dryness of my mouth	0	1	2	3
3 (d)	I couldn't seem to experience any positive feeling at all	0	1	2	3
4 (a)	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5 (d)	I found it difficult to work up the initiative to do things	0	1	2	3
6 (s)	I tended to over-react to situations	0	1	2	3
7 (a)	I experienced trembling (e.g. in the hands)	0	1	2	3
8 (s)	I felt that I was using a lot of nervous energy	0	1	2	3
9 (a)	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10 (d)	I felt that I had nothing to look forward to	0	1	2	3
11 (s)	I found myself getting agitated	0	1	2	3
12 (s)	I found it difficult to relax	0	1	2	3
13 (d)	I felt down-hearted and blue	0	1	2	3
14 (s)	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15 (a)	I felt I was close to panic	0	1	2	3
16 (d)	I was unable to become enthusiastic about anything	0	1	2	3
17 (d)	I felt I wasn't worth much as a person	0	1	2	3
18 (s)	I felt that I was rather touchy	0	1	2	3
19 (a)	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	0	1	2	3
20 (a)	I felt scared without any good reason	0	1	2	3
21 (d)	I felt that life was meaningless	0	1	2	3

DASS-21 Scoring Instructions

The DASS-21 should not be used to replace a face to face clinical interview. If you are experiencing significant emotional difficulties you should contact your GP for a referral to a qualified professional.

Depression, Anxiety and Stress Scale - 21 Items (DASS-21)

The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) is a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress.

Each of the three DASS-21 scales contains 7 items, divided into subscales with similar content. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset / agitated, irritable / over-reactive and impatient. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items.

The DASS-21 is based on a dimensional rather than a categorical conception of psychological disorder. The assumption on which the DASS-21 development was based (and which was confirmed by the research data) is that the differences between the depression, anxiety and the stress experienced by normal subjects and clinical populations are essentially differences of degree. The DASS-21 therefore has no direct implications for the allocation of patients to discrete diagnostic categories postulated in classificatory systems such as the DSM and ICD.

Recommended cut-off scores for conventional severity labels (normal, moderate, severe) are as follows:

NB Scores on the DASS-21 will need to be multiplied by 2 to calculate the final score.

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Lovibond, S.H. & Lovibond, P.F. (1995). Manual for the Depression Anxiety & Stress Scales. (2nd Ed.) Sydney: Psychology Foundation.

Appendix 2

Name: _____ Date: _____

Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. **Please answer all questions.**

1. During the past month, what time have you usually gone to bed at night? _____
2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? _____
3. During the past month, what time have you usually gotten up in the morning? _____
4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) _____

5. During the <u>past month</u> , how often have you had trouble sleeping because you...	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a. Cannot get to sleep within 30 minutes				
b. Wake up in the middle of the night or early morning				
c. Have to get up to use the bathroom				
d. Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				
g. Feel too hot				
h. Have bad dreams				
i. Have pain				
j. Other reason(s), please describe:				
6. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
8. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?				
	Very good	Fairly good	Fairly bad	Very bad
9. During the past month, how would you rate your sleep quality overall?				

	No bed partner or room mate	Partner/room mate in other room	Partner in same room but not same bed	Partner in same bed
10. Do you have a bed partner or room mate?				
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
If you have a room mate or bed partner, ask him/her how often in the past month you have had:				
a. Loud snoring				
b. Long pauses between breaths while asleep				
c. Legs twitching or jerking while you sleep				
d. Episodes of disorientation or confusion during sleep				
e. Other restlessness while you sleep, please describe:				

Scoring the PSQI

The order of the PSQI items has been modified from the original order in order to fit the first 9 items (which are the only items that contribute to the total score) on a single page. Item 10, which is the second page of the scale, does not contribute to the PSQI score.

In scoring the PSQI, seven component scores are derived, each scored 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). Higher scores indicate worse sleep quality.

Component 1: Subjective sleep quality—question 9

Response to Q9	Component 1 score
Very good	0
Fairly good	1
Fairly bad	2
Very bad	3

Component 1 score: _____

Component 2: Sleep latency—questions 2 and 5a

Response to Q2	Component 2/Q2 subscore
≤ 15 minutes	0
16-30 minutes	1
31-60 minutes	2
> 60 minutes	3

Response to Q5a	Component 2/Q5a subscore
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Sum of Q2 and Q5a subscores	Component 2 score
0	0
1-2	1
3-4	2
5-6	3

Component 2 score: _____

Component 3: Sleep duration—question 4

Response to Q4	Component 3 score
> 7 hours	0
6-7 hours	1
5-6 hours	2
< 5 hours	3

Component 3 score: _____

Component 4: Sleep efficiency—questions 1, 3, and 4

Sleep efficiency = (# hours slept/# hours in bed) X 100%

hours slept—question 4

hours in bed—calculated from responses to questions 1 and 3

Sleep efficiency	Component 4 score
> 85%	0
75-84%	1
65-74%	2
< 65%	3

Component 4 score: _____

Component 5: Sleep disturbance—questions 5b-5j

Questions 5b to 5j should be scored as follows:

Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Sum of 5b to 5j scores	Component 5 score
------------------------	-------------------

0	0
1-9	1
10-18	2
19-27	3

Component 5 score: _____

Component 6: Use of sleep medication—question 6

Response to Q6	Component 6 score
----------------	-------------------

Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Component 6 score: _____

Component 7: Daytime dysfunction—questions 7 and 8

Response to Q7	Component 7/Q7 subscore
----------------	-------------------------

Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Response to Q8	Component 7/Q8 subscore
----------------	-------------------------

No problem at all	0
Only a very slight problem	1
Somewhat of a problem	2
A very big problem	3

Sum of Q7 and Q8 subscores	Component 7 score
----------------------------	-------------------

0	0
1-2	1
3-4	2
5-6	3

Component 7 score: _____

Global PSQI Score: Sum of seven component scores: _____

Copyright notice: The Pittsburgh Sleep Quality Index (PSQI) is copyrighted by Daniel J. Buysse, M.D. Permission has been granted to reproduce the scale on this website for clinicians to use in their practice and for researchers to use in non-industry studies. For other uses of the scale, the owner of the copyright should be contacted.

Citation: Buysse, DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. *Psychiatry Research* 28:193-213, 1989

Appendix 3

From 1-10, rate your current sports performance for your team(s) (1 = Performing poorly) (10 = Performing optimally):

Do you have a set routine before a match to help get you focused and feeling ready physically and mentally?

YES **NO**

Are you single? (If yes move onto section 3 please)

YES **NO**

Do you think being in a relationship improves your sports performance?

YES **NO**

Appendix 4

In agreeing to participate in this research I understand the following:

- This research is being conducted by Rory Gavin, an undergraduate student at the School of Business, National College of Ireland.
- The method proposed for this research project has been approved in principle by the Departmental Ethics Committee, which means that the Committee does not have concerns about the procedure itself as detailed by the student. It is, however, the above-named student's responsibility to adhere to ethical guidelines in their dealings with participants and the collection and handling of data.
- I am over 18.
- If I have any concerns about participation, I understand that I may refuse to participate or withdraw at any stage.
- I have been informed as to the general nature of the study and agree voluntarily to participate.
- There are no known expected discomforts or risks associated with participation.
- I have read the information sheet attached and by ticking the box below, I consent to participate in the study.

- I understand what my data is being used for and the importance of my participation in this study.
- All data from the study will be treated confidentially. The data from all participants will be compiled, analysed, and submitted in a report to the Psychology Department in the School of Business. No participant's data will be identified by name at any stage of the data analysis or in the final report.
- At the conclusion of my participation, any questions or concerns I have will be fully addressed.
- I may withdraw from this study at any time and may withdraw my data at the conclusion of my participation if I still have concerns.

Signed: _____

Participant _____

Researcher _____ **Date** _____

Appendix 5

Thank you for participating in my study I really appreciate it. If you feel any distress from a result of taking part in this study, I have left some help lines I would urge you to call below. If at any time you wish to retract your participation contact me at x19365621@student.ncirl.ie and I will do that for you gladly. All the best, Rory.

USEFUL HELPLINES

HSE - 1850 24 1850
The dedicated helpline if you or someone you know may have symptoms of Coronavirus or been in contact with someone who has

TravelWise - 01 613 1733
The Department of Foreign Affairs helpline for people with travel related concerns about Coronavirus

ALONE - 0818 222 024
Open 8am-8pm for older people who have concerns or are facing difficulties relating to Coronavirus

SeniorLine - 1800 804 591
Free phone service, open everyday 10am-10pm, which now supports older people with concerns about Coronavirus

Asthma Advice - 1800 445 464
Free call back service available to people with asthma and the parents/carers of young people with asthma.

COPD Advice - 1800 832 146
Chronic obstructive pulmonary disease call back service, not to be used as an emergency service

Askonefamily - 01 662 9212
Helpline for people parenting alone, sharing parenting and for those separating

Samaritans - 116 123
If you are worried or finding it difficult to cope, this helpline is free and open day and night.

Pieta House - 1800 247 247
Free 24/7 professional helpline for people at risk of suicide & self-harm, and those bereaved by suicide

Women's Aid - 1800 341 900
24 hour support for women living with abusive partners, **if you have concerns about your immediate safety please contact the Gardai on 999**

Rape Crisis Centre - 1800 778 888
Free 24 hour service for women and men who have been raped, sexually assaulted, sexually harassed or sexually abused at any time in their lives

FLAC - 1890 350 250 or 01 874 5690
If you have a legal query, the Free Legal Advice Centres helpline is open Monday to Friday 9.30am-1pm and 2-5pm

Workers Rights Centre - 1890 747 881
SIPTU helpline, open 8.30am-5.30pm Monday to Friday, for issues related to work

Threshold - 1800 454 454
If you are a renter and worried about the security of your tenure during the pandemic this helpline is open Monday to Friday 9am-9pm

MABS - 0761 07 2000
Advice service for money management and debt issues, open weekdays 9am-8pm

Appendix 6

Participant Information Sheet

Factors Effecting Sports Performance: Sleep, mood, and Demographics

You are being invited to take part in this research study. Before deciding whether to take part, please take the time to read this document, which explains why the research is being done and what it would involve for you. If you have any questions about the information provided, please do not hesitate to contact me using the details at the end of this sheet.

What is this study about?

I am a final year student in the BA Psychology programme at the National College of Ireland. My name is Rory Gavin, and I am 21 years old. As part of our degree, we must carry out an independent research project.

What will taking part in the study involve?

For my project, my first research question is to see if there is a difference between people who are performing well versus people who are not performing well in sports on outcomes of mood and sleep. My second research question is to see if there is a relationship between sleep and mood when predicting self-rated sports performance. My third research question is what extent do routine, relationships and other demographics predict self-rated sports performance. My research aims are to highlight the affect external factors can have on athlete's sports performances. If you decide to take part in this study, you will be asked to complete an online questionnaire. This questionnaire will include questions about your mood (Depression, Anxiety and stress), sleep and demographics (gender, age, relationship status, and if you have a routine for sport) and sports performance.

Who can take part?

Anyone over the age of 18 who plays team sports is eligible to take part in this study.

Do I have to take part?

Participation in this research is voluntary; you do not have to take part, and a decision not to take part will have no consequences for you. If you do decide to take part, you can withdraw from

participation at any time by simply contacting me by the information I will leave at the bottom of this sheet.

Taking part

There are no direct benefits to you for taking part in this research. However, the information gathered will contribute to research that helps us to understand more about the factors that affect sports performance.

There is a small risk that some of the questions contained within this survey may cause minor distress for some participants. If you experience this, you are free to discontinue participation and exit the questionnaire. Contact information for relevant support services is also provided at the end of the questionnaire.

Will taking part be confidential and what will happen to my data?

The questionnaire is anonymous, it is not possible to identify a participant based on their responses to the questionnaire. All data collected for the study will be treated in the strictest confidence.

Will taking part be confidential and what will happen to my data?

Responses to the questionnaire will be stored securely in a password protected/encrypted file on my computer. Only the me and my supervisor will have access to the data. Data will be retained for 5 years in accordance with the NCI data retention policy.

What will happen to the results of the study?

The results of this study will be presented in my final dissertation, which will be submitted to National College of Ireland.

Who should you contact for further information?

You can contact me the researcher Rory Gavin by my email x19365621@student.ncirl.ie. You can also contact my supervisor Dr Michelle Kelly whose email is Michelle.Kelly@ncirl.ie