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# Associations of Sleep Quality and Resilience among University Students with Depression

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## Abstract

University students are at risk of developing mental health problems, such as depression. Research findings show that both sleep and resilience have been found to be protective factors against psychological distress. Though several studies have investigated the relationship between sleep and resilience, there are no studies that have discussed the positive effects of good quality sleep on resilience among university students with elevated depressive symptoms. This study examined the effects of sleep as a resilience builder, with a specific aim to determine whether better sleep is associated with resilience among depressed university students in South Africa. Survey data was obtained online from a sample of university ($N$ = 122) students from a single South African university (UCT). Analysis revealed that students who reported high levels of depressive symptoms reported significantly higher levels of sleep disturbance. Furthermore, students who reported high levels of depressive symptoms reported significantly lower levels of resilience. Further analyses indicated that students with high levels of depressive symptoms, and concurrent high levels of sleep disturbance did not report lower levels of resilience. Additionally, students with depressive symptoms and better sleep quality did not have higher resilience than those with depressive symptoms and worse sleep quality. Although our study did not find sleep quality to be resilience builder in a sample with depressive symptoms, we suggest that future studies continue to explore this relationship, to gain insight into how sleep may impact resilience in these individuals, in order to inform better intervention options.


*Keywords*: depression, resilience, sleep, south africa, university

There is an abundance of literature highlighting the effects on sleep on everyday functioning. However, research has primarily focused on the detrimental effects of poor sleep quality with far fewer research studies considering the effects that healthy sleep has on the individual. Some findings point to the fact that healthy sleep may act as a resilience builder in the face of adversity, such as depression, but these findings are scarce. Moreover, although depression is experienced widely, students experience multiple challenges and are especially vulnerable to this psychiatric condition. Finding ways to build resilience to support students overcoming depression is crucial because good mental health facilitates the wellbeing of students - helping them adjust to the challenges of tertiary education.

## Sleep in University Students

Research shows that sleep is critical for everyday context (Buysse, 2014; Lange & Born, 2010; Liu et al., 2016; Worley, 2018). It forms an integral part in homeostatic functioning, giving it an important role in the maintenance of both mental and physical health (Liu et al., 2016). Consequently, sleep related disturbances can lead to impaired mental functioning with recurring poor sleep quality established as a significant risk factor for the development of mental illnesses, such as depression (American Psychiatric Association, 2013; Talbot et al., 2010).

University students are a group of persons who likely suffer from poor sleeping patterns (Forquer et al., 2008). The stress caused by academic requirements is often overwhelming and time-consuming, and can lead to sleep deprivation (Lund et al., 2010). Moreover, many students have to deal with a variety of social and personal stressors. When living in university residences, students have roommates who could have contrasting sleeping patterns which negatively affect their sleep quality (Forquer et al., 2008). Furthermore, there are serious consequences associated with sleep deprivation and poor sleep quality in this group of individuals. Research findings

show a strong association between diminished sleep quality/duration and elevated depressive symptoms in students (Li et al., 2020; Russell et al., 2019; Supartini et al., 2016). While the association between poor sleep quality/duration and depressive symptoms in students is well described, there is a lack of research on the mental health benefits of good sleep quality/duration for this group of individuals. This is the case despite an increasing interest in research to explore the benefits of wellbeing and health promotion (Buysse, 2014; Dietrich et al., 2016; Hamdan-Mansour et al., 2014; Milojevich & Lukowski, 2016).

One approach to examining university students' coping abilities has been through the measurement of their resilience. This concept of resilience has gained momentum in the research in recent years and has further been linked with sleep quality (Chatburn et al., 2014; Germain & Dretsch, 2016; Wang et al., 2020).

## Resilience in University Students

The definition of resilience is multi-faceted. There have been various definitions of the concept originating from different fields of study (see Southwick et al., 2014 for a detailed review). These different definitions of resilience provide an example of the fluidity of the concept. However, researchers generally agree that resilience can be defined as positivity, strength and adjustment in the face of adversity (Greene, 2010; Herrman et al., 2011; Tae Kim et al., 2021).

Within the university context, students experience multiple adversities challenging their resilience. Typically, students leave their known support systems, and this creates a sense of forced independence, and a loss of a sense of belonging, increasing social isolation (Meehan & Howells, 2018). Numerous students must, furthermore, deal with the frequent and copious academic requirements and financial constraints that occur during study (Pascoe et al., 2020).

The stress emanating from these factors is frequently associated with depression, anxiety and other mental health problems (Moylan et al., 2013; Pascoe et al., 2020; Shamsuddin et al., 2013). However, our understanding of what promotes student resilience is still underdeveloped (Stephens, 2013; Tempski et al., 2015). Although much literature can be found on resilience in relation to many variables, sleep as a resilience builder, is not often reported on, particularly within the university context.

There is ample literature discussing factors that affect resilience (Mealer et al., 2017). Elevated levels of depressive symptoms have been strongly associated with low resilience both within and outside the university context (Ahmed & Julius, 2015; Hamdan-Mansour et al., 2014; Wermelinger Ávila et al., 2018). In a systematic review, Wermelinger Ávila et al. (2018) determined that resilience is associated with depressive symptoms in geriatric populations, where fewer depressive symptoms was associated with greater resilience. Hamdan-Mansour et al. (2014) studied this relationship further among university students where it was found that depression was a predictor of resilience in this population. Anxiety, a concept often linked with depression (Jacobson & Newman, 2014; Jadoon et al., 2010), has also been studied in relation to student resilience. A recent study conducted by Drew and Matthews (2019) found a negative correlation between anxiety levels and resilience among student-athletes. Ahmed and Julius (2015) reported similar findings in a study focused on female students. Another factor affecting resilience is substance use. Fadardi et al. (2010) studied the relationship between resilience, motivational structure, and substance use amongst university students. Resilience was found to be an inverse predictor of substance abuse. Studies also reveal a negative relationship between PTSD and resilience (Anderson & Bang, 2012; Hébert et al., 2014; Horn & Feder, 2018). Yehuda and Flory (2007) consider PTSD as a predictor of one's response to adversity, and

further discuss it as having negative effects on resilience. While there are studies discussing the relationship between PTSD and resilience, much like sleep, this has not been heavily investigated in the university context.

## Sleep and Resilience in University Students

To date, a small body of literature has identified a strong relationship between sleep and resilience. The research has described diminished resilience as a result of poor sleep quality (Chatburn et al., 2014; Germain & Dretsch, 2016; Wang et al., 2020). This relationship is already identified at an early age. A study looking at the consequences of irregular bedtimes in children found that irregular bedtimes were associated with low resilience (Doi et al., 2018). In a longitudinal study measuring the sleep quality in young children, fewer sleep problems as well as high sleep rhythmicity were found to be predictive of behavioural control during adolescence and resilience in young adulthood (Wong et al., 2018). Moreover, studies using other samples, such as veterans, dance students, adolescents and university students also came to the conclusions that those who were better sleepers were more resilient (Arbinaga, 2018; Lee et al., 2016; Segovia et al., 2013; Wang et al., 2020). Despite employing different study designs, these studies used the common understanding that resilience entails successful adaptation in the face of adversity (Greene, 2010; Herrman et al., 2011; Tae Kim et al., 2021). The findings garnered from these studies are robust, because they typically use the same valid and reliable scales to measure resilience (Resilience Scale (RS) and the Connor-Davidson Resilience Scale (CD-RS)).

Despite these robust findings, not all of the research focused on resilience has found an association between sleep and resilience. For instance, in a study examining resilience of students within an Australian university, although a positive relationship between mindfulness and resilience was found, students with high and low levels of resilience did not differ in terms

of sleep quality. Though this study did use instruments to measure sleep quality and resilience consistent with the rest of the literature, its authors consider that their results may not be generalizable to universities globally due to the use of convenience sampling within a single university, in addition to the small sample size used. The researchers prioritised the internal reliability of their study, which possibly affected the generalisability of the research (McGillivray & Pidgeon, 2015). In contrast, a study conducted among Korean college students with a significantly larger sample size, in comparison to the Australian study, identified a significant association with sleep quality and resilience (Lee et al., 2016). This finding is consistent with the aforementioned literature that examined other populations (Wang et al., 2020). Nonetheless, research relating to the effects of sleep on resilience among university populations remains scarce (Lee et al., 2016; McGillivray & Pidgeon, 2015). This scarcity coupled with the identified inconsistency speaks to the need for further research among university populations.

## Rationale and Hypotheses

There is only some preliminary evidence that sleep is important for resilience, and even less literature investigating this association in university students. As evidenced through our review of the literature, research has yet to explore the relationship between sleep and resilience in the context of depression, which has been established as significantly prevalent among university students. This research aimed to determine whether healthy sleep was associated with resilience, and explore the effects of sleep as a resilience builder. Specifically, we aimed to answer the question as to whether good quality sleep has a significant role in determining the levels of resilience in a sample of university students exhibiting depressive symptoms. This type

of research would further contribute to the scarce literature on the relationship between sleep quality and resilience.

We hypothesized, in comparison to students who report low levels of depressive symptoms (healthy controls):

**Hypothesis 1:** Students who report high levels of depressive symptoms will report higher levels of sleep disturbance.

**Hypothesis 2:** Students who report high levels of depressive symptoms will report lower levels of resilience.

**Hypothesis 3:** Students who report high levels of depressive symptoms, and concurrent high levels of sleep disturbance will report lower levels of resilience.

**Hypothesis 4:** Of the students who report higher levels of depressive symptoms, those who report lower levels of sleep disturbance will report higher levels of resilience (compared to those who reported higher levels of sleep disturbance).

## Methods

### Design

This study was conducted through the Department of Psychology of the University of Cape Town (UCT). The study consisted of a single online survey. This survey utilized several self-report measures to determine the students' sleep quality, resilience and depressive symptoms. Additional factors which may influence sleep quality, resilience and depression were recorded. These factors were posttraumatic symptoms, trait anxiety symptoms, alcohol abuse, and drug abuse. Participants who were free of depression, sleep disturbance, anxiety, PTSD, and alcohol/substance drug use disorders, were included in the healthy control group. Participants

who exhibited depressive symptoms, but were free of anxiety, PTSD, and alcohol/substance drug use disorders, were included in the experimental group.

## Participants

### *Recruitment and Eligibility criteria*

**Recruitment.** Participants for this study were university students from UCT. One hundred and ninety-one participants were recruited using convenience sampling via the UCT Psychology Department's Student Research Participants Program (SRPP; See Appendix) and UCT's Department of Student Affairs (DSA; See Appendix). The seventy-one participants who accessed the study via SRPP were awarded 1 SRPP point upon completion of the survey. One hundred and twenty participants were recruited via Department of Student Affairs Research Invitation email. These participants qualified for an entry in a raffle to win one of three gift vouchers (R500, R300, and R200) for a local online store.

Recruitment of participants occurred over 2 phases. In the first release of the survey via SRPP, one hundred and thirty-six students completed the survey. Seventy-one of those one hundred and thirty-six were eligible for the study. In the second release of the survey via DSA, two hundred and eighteen students completed the survey. One hundred and twenty of these students were eligible for the study.

**Eligibility criteria**. Students between the ages of 18 to 35, of any self-identified gender and fluent in English were eligible for participation. Participants were excluded from statistical analysis if they (a) had probable post-traumatic stress disorder (PTSD), (b) had existing severe anxiety, (c) were using psycho-active drugs, (d) had a substance use disorder and (e) had high levels of alcohol consumption. These exclusion criteria were put in place, as each of these factors

potentially had an independent effect on resilience and sleep quality (Conroy & Arnedt, 2014; Davies et al., 2016; Drew & Matthews, 2019; Inman et al., 1990).

**Power analysis**

G*Power (Version 3.1.9.3) was used to calculate the required sample size for this research to meet the suitable statistical demands of multiple regression analyses (Faul et al., 2009). Assuming $\alpha$ = .05, directional hypotheses, 2 predictors, a target power of .95 and a medium effect size (Cohen's $f$ = .15), a minimum of 107 participants were required for the regression. Sample size was also calculated a priori for one way ANOVA. A sample size of 159 participants was suggested to achieve a power of .95 using an effect size estimate of Cohen's $f$ = .25. This study achieved a final sample of 122 participants. This sample size is less than the one way ANOVA power analysis recommended, nevertheless this remains a relatively good sample size.

**Procedure**

Students received an invitation to take part in the study via their university email (See Appendix A; See Appendix B). The advertisement email explained that the study is concerned with the relationship between sleep and resilience, and specified age and student status as eligibility criteria. Students interested in the study were directed via a direct link in the invitation email to complete an online questionnaire via REDcap, which included both the screening and experimental measures (Harris et al., 2009). The questionnaire began with a digital informed consent form (see Appendix C; See Appendix D). Next, participants were instructed to complete the survey. The first four parts of the questionnaire included the socio demographic questions (age and gender) and screening instruments for the study while the remaining three parts included the experimental measures. The screening and experimental questionnaires took

approximately 10 and 20 minutes to complete, respectively. Participants ended the survey with a digital debriefing form (See Appendix E; See Appendix F) and a resource list (See Appendix G).

## Measures

### *Screening Instruments*

**Anxiety:** The State-Trait Anxiety Index (STAI) is a self-report questionnaire that assessed and differentiated between anxiety as a state and a trait (see Appendix H; Speilberger et al., 1970) Higher scores in either or both sections indicate high levels of trait and/or state anxiety. The trait section was used to exclude participants from further analysis. Students who scored ≥59 were excluded on the basis of having severe anxiety. The trait section consists of 20-items that require respondents to rate on a 4-point scale from almost never to almost always how they generally feel. Speilberger and Vagg (1984) report an internal consistency of .92. The STAI has been used successfully in the South African context (Roberts et al., 1999).

**PTSD:** The Primary Care Post-Traumatic Stress Disorder Screen (PC-PTSD) is a self-report questionnaire consisting of 5-items with yes/no answers and assesses the possibility of having PTSD (see Appendix I; Cameron & Gusman, 2003). This questionnaire was used to exclude participants with PTSD from the statistical analysis of the study. Students were excluded if they answered ‘yes’ to 3 or more of the questions as this indicates probable PTSD (Cameron & Gusman, 2003). The PC-PTSD has been effectively used in South Africa (Peltzer et al., 2013).

**Alcohol use:** The Alcohol Use Disorders Identification Test Consumption (AUDIT-C) self-report instrument is a shortened version of the AUDIT and has 3-items relating to consumption (see Appendix J). There are 5 choices per item and the measure records frequency of drinking, the quantity consumed in one setting, and frequency of binge drinking. The measure is scored out of 12, higher scores indicate that the individual is likely engaging in risky alcohol

use and potentially has alcohol dependence. This measure was used to exclude participants with high levels of alcohol consumption from analysis. Cut-off scores of 5 and 7 were used for females and males respectively, as this study used a student sample (DeMartini & Carey, 2012). Fleming et al. (1991) report a high internal consistency of .80. Furthermore, the AUDIT-C has been frequently used in South African studies (Peltzer et al., 2007; Tomlinson et al., 2014).

**Drug use.** The Drug Abuse Screening Test (DAST-10) is a 10-item measure of past-year drug use (See Appendix K; Bohn et al., 1991). All items assess drug use in general, without referring to specific types of drugs (e.g., "Are you unable to stop using drugs when you want to?"). Response choices are yes/no and each item is worth one point. Possible scores range from 0 to 10. Scores of 1–2 indicate potential drug problems and scores of >3 indicate moderate to severe drug problems. This measure was used to exclude participants with substance use disorders from further statistical analysis. Participants were excluded if they scored >0. The DAST-10's internal consistency ranges from .86 to .94 (Carey et al., 2003; Cocco & Carey, 1998). The DAST-10 also been used successfully in the South African context (Peltzer et al., 2009).

### *Experimental Instruments*

**Sleep:** The Pittsburgh Sleep Quality Index (PSQI) is a self-rating questionnaire that measures sleep disturbance during the previous month (see Appendix L; Buysse et al., 1989). It includes 19 items that are grouped into the following seven components: "subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medications and daytime dysfunction" (Buysse et al., 1989, p.195). Each item is scored on a scale from 0 to 3, and the seven component scores are summed to produce a global PSQI score, which ranges from 0 to 21. The participants were defined as experiencing sleep disturbance with

a PSQI global score of >4; the higher the score, the poorer the sleep quality. The PSQI is appropriate for use in South Africa as it has been applied successfully in that context (Henry et al., 2015; Redman et al., 2018). Moreover, Cronbach's alpha of .74 was reported in a student sample (Manzar et al., 2015).

**Resilience:** The Connor–Davidson Resilience Scale (CD-RISC) is a self-report instrument that assesses individual resilience (see Appendix M; Connor & Davidson, 2003). The CD-RISC is designed as a five-point rating scale with five response options (0=never; 4=almost always). The measure is comprised of 25 items where the final scores are obtained by summing the response to each item (range: 0–40), with higher values indicating higher levels of resilience. The scale has been found to be reliable and valid (Connor & Davidson, 2003). The CD-RISC has been used in several South African studies (Bruwer et al., 2008; Fincham et al., 2009; Rogers, 2016).

The Resilience Index (RI) is an additional 53 item self-report measure that assesses resilience (See Appendix N). Each item is scored on a scale from 0 to 4, and scores are summed to produce a global Resilience Index score, which ranges from 0 to 212. The Resilience Index has been found to be valid and reliable. The measure's internal consistency ranges from .86 to .94. Moreover, discriminant validity has been established with significant negative correlations with measures of sleep disturbances ($r = -.404$) and depression ($r = -.491$). The Resilience Index can be used in both high- and low-to-middle-income settings, which was understood as valuable for this study taking place in the South African context where there are big disparities within the population in terms of income (Leibbrandt et al., 2018). Additionally, this instrument encompasses a broad range of components (including exposure to toxic stress and early life stability) that other scales have been argued to lack (van Wyk et al., 2021). This study, therefore,

opted to utilize two resilience indices, as the Resilience Index is a newly developed instrument in need of more data to support its validity and reliability. The CD-RISC was therefore included in this research in the event that the Resilience Index did not provide valid results.

**Depression:** The Beck Depression Inventory-Second Edition (BDI-II) is a self-report questionnaire which assesses the presence of depressive symptoms (see Appendix O; Beck et al., 1996). The BDI-II is a 21-question inventory, and it is one of the most widely used instruments for measuring the severity of depression. The total score ranges from 0–63. According to Beck et al. (1996), a BDI score > 13 is indicative of depressive symptoms, whereas clinically significant depression is indicated by a score > 28. In the current study, The BDI-II was used to characterize depressive symptoms (BDI-II score > 13) and define healthy participants (BDI-II score < 14). The BDI-II shows great internal consistency for both non psychiatry and psychiatric populations (Beck et al., 1997). The BDI-II has been used in several South African studies of student samples (Peirson & Heuchert, 2000; Pillay et al., 2002).

## Ethical Considerations

Ethical approval for this study was permitted through the UCT Ethics Review Committee of the Faculty of Humanities, reference number PSY2021-031 (Appendix P). Digital informed consent was acquired before participants completed the questionnaire (see Appendix A; See Appendix B). Upon completion of the questionnaire, participants were directed to a digital debriefing form (See Appendix C; See Appendix D) and a resource list (See Appendix G) providing contact information of various resources that could be used to seek help if certain components of the questionnaire initiated mental or emotional discomfort. Participants who were ineligible due to having scored in the severe range of the screening questionnaires were referred to the Student Wellness Centre at UCT.

**Statistical analysis**

The statistical computing and graphics program R (R Core Team, 2020) was used for both descriptive and inferential statistical analysis to interpret the data. This study's α was set at .05 in accordance with standard convention (Jones & Sommerlund, 2007; Lee et al., 2016; McGillivray & Pidgeon, 2015).

**Descriptive statistics.** Responses from the two socio demographic questions of the questionnaire (age and gender), the STAI-T, the PC-PTSD, and the AUDIT-C were used in independent samples t-Tests to assess for significant differences in age, gender, trait anxiety, post-traumatic stress disorder symptoms, and alcohol abuse symptoms between the control group and depressed group. Pearson's correlations were performed on sleep, depression and resilience so as to provide preliminary results on the relationships between these variables in the dataset.

**Inferential statistics.** Independent samples t-tests, linear regression analysis, and analysis of variance in the form of a one-way ANOVA were used to analyse the data. Assumptions were only reported when violated. The type of inferential analysis used depended on the hypothesis.

**Hypothesis 1.** ***Between-group differences in sleep quality and depression.*** To evaluate whether students reporting high levels of depressive symptoms, relative to healthy controls, report higher levels of sleep disturbances, an independent sample *t*-test was run.

**Hypothesis 2.** ***Between-group differences in resilience and depression.*** To evaluate whether students reporting high levels of depressive symptoms, relative to healthy controls, report lower levels of resilience, an independent sample *t*-Test was run.

**Hypothesis 3.** ***The interaction of group status and sleep quality on resilience.*** A regression model was used to examine whether there was an interaction between group status

(participants with and without depressive symptoms) and sleep quality in predicting resilience to determine whether individuals with significant depressive symptoms and poor sleep have lower levels of resilience than (a) those reporting depressive symptoms and fair sleep and (b) healthy controls.

**Hypothesis 4.** ***Within-group (depression group) difference in sleep and resilience.*** Within the group of participants with depressive symptoms, a median split was used to further classify these participants as better or worse sleepers, using their PSQI score. To assess whether lower sleep disturbance was associated with higher levels of resilience within the depressed student group, a one-way ANOVA was run, comparing students with depressive symptoms and worse sleep, depressive symptoms and better sleep and healthy controls.

## Results

### Descriptive Analysis

Table 1 displays the sample characteristics. Both groups were consistent with respect to age and gender distribution. Overall, the sample had more females which was expected, as a significant portion of the participants (39%) were psychology students and most psychology students identify as female. The analyses detected no significant differences between each group's posttraumatic and alcohol use disorder symptoms. However, a significant difference in trait anxiety was discovered between both groups with the depressed sample having a higher rate of trait anxiety compared to healthy controls. Thus, all groups were matched on their screening measures' scores with the exception of anxiety. This was predictable as depression and anxiety are known to be associated (Jacobson & Newman, 2014; Jadoon et al., 2010). This difference in anxiety was taken into account when conducting inferential analyses, specifically our third and fourth hypotheses.

**Table 1**

*Descriptive Statistics: Between-Group Differences in Sample Characteristics (N = 122)*

| | Group | | | | | 95% CI | |
|---|---|---|---|---|---|---|---|
| Variable | Control (*n* = 72) | Depressed (*n* = 50) | *t* | *p* | ESE | LL | UL |
| Age (years) | | | 1.3 | .19 | .22 | -.29 | 1.41 |
| *M*(*SD*) | 21.40 (*2.94*) | 20.84 (*1.82*) | | | | | |
| Range | 18 - 32 | 18-25 | | | | | |
| Gender | | | | | | | |
| Female | 48 (67) | 32 (64) | 1.47 | .60 | .07 | -.34 | .23 |
| Male | 24 (33) | 17 (34) | | | | | |
| Non-Binary | 0 (0) | 1 (2) | | | | | |
| STAI-T | | | -9.1 | <.001*** | -1.57 | -15.00 | -9.65 |
| *M*(*SD*) | 37.12 (*8.88*) | 49.44 (*6.01*) | | | | | |
| Range | 20 – 58 | 31 – 58 | | | | | |
| PC-PTSD | | | -.71 | .47 | -.14 | -0.33 | 0.15 |
| *M*(*SD*) | .29 (.*59*) | .38 (.*73*) | | | | | |
| Range | 0 – 2 | 0 – 2 | | | | | |
| AUDIT-C | | | -1.42 | .15 | -.26 | -1.19 | 0.19 |
| *M*(*SD*) | 2.00 (*1.94)* | 2.50 (*1.89*) | | | | | |
| Range | 0 – 2 | 0 – 2 | | | | | |

*Note.* For *Gender*, raw numbers are presented with group percentages in parentheses. For *Age*, *STAI-T, PC-PTSD, AUDIT-C*, means are presented, with standard deviations in parentheses. ESE = effect size estimate (Cohen's *d*); CI = confidence interval; LL = lower limit; UL = upper limit; STAI-T = State-Trait Anxiety Index – Trait; PC-PTSD = Primary Care – Post-Traumatic Stress Disorder; AUDIT-C = Alcohol Use Disorders Identification Test – Consumption; All listed *p*-values are two-tailed. ***p < .001.

Descriptive statistics of the major variables (sleep, depression and resilience) in the study are presented in Table 2. Pearson's correlations were performed on these major variables to explore preliminary results. Results revealed the highest correlation showed a positive

relationship between sleep disturbances and depression suggesting as scores on sleep disturbances increased, scores on depression increased. Results revealed a negative association between depression and resilience indicating that as scores on depression increased, scores on resilience decreased. Additionally, an inverse relationship was seen between sleep disturbance and resilience such that sleep disturbance scores increased, resilience scores decreased. The CD-RISC and RI were positively correlated. Because the RI exhibited stronger results within this South African context with the other major variables, subsequent analyses in relation to resilience were conducted solely using the RI, as the CD-RISC served as an additional measure should the newly-developed RI not have delivered meaningful results.

**Table 2**

*Descriptive Statistics: Correlations Between Main Research Variables (N = 122)*

| Variable | | *M* | *SD* | 1. | 2. | 3. | 4. |
|---|---|---|---|---|---|---|---|
| 1. | PSQI | 5.17 | 3.01 | - | | | |
| 2. | BDI-II | 11.19 | 8.55 | .77*** | - | | |
| 3. | CD-RISC | 66.52 | 13.20 | -.31*** | -.43*** | - | |
| 4. | RI | 138.98 | 19.02 | -.51*** | -.55*** | .67*** | - |

*Note.* M= mean; SD = standard deviation; PSQI = Pittsburgh Sleep Quality Index; BDI-II = Beck Depression Inventory Second Edition; CD-RISC = Connor-Davidson Resilience Scale; RI = Resilience Index. ***p < .001.

**Inferential Statistics**

***Between-group differences in sleep quality and depression.***

An independent sample t-test was run to evaluate whether there is a significant difference in sleep scores between participants with depression and healthy controls. Results are shown in

Table 3. A significant Shapiro-Wilk normality test ($p < .001$) indicated that the resilience dataset was not normally distributed. Additionally, a significant Levene's Test for homogeneity of variances ($p < .001$) indicated that the groups had differing variances. Therefore, a non-parametric test was run to account for these violated assumptions. The respective means of the sleep scores for both groups suggested a difference, with the depressed group having a higher mean. A Mann-Whitney U test showed that this difference was significant. The results indicate that participants who report higher levels of depressive symptoms report significantly higher levels of sleep disturbance relative to healthy controls. The effect size for this analysis was found to exceed Cohen's (1988) convention for a large effect ($d = .80$).

***Between-group differences in resilience and depression.***

An independent sample t-test was run to evaluate the difference between resilience scores between participants with depression and healthy controls. Results are shown in Table 3. The means for each group indicated a difference in resilience scores, with participants with depression having a lower mean resilience score. This difference was also found to be significant, indicating that participants who report higher levels of depressive symptoms report significantly lower levels of resilience relative to healthy controls. The effect size for this analysis was also found to exceed Cohen's (1988) convention for a large effect ($d = .80$).

**Table 3**

*Independent Sample T-Tests Showing Between-Group Differences in Sleep and Resilience (N=122)*

| | Group | | | | | 95% CI | |
|---|---|---|---|---|---|---|---|
| Variable | Control (*n* = 72) | Depressed (*n* = 50) | *t* | *p* | ESE | LL | UL |
| Sleep | | | 2.34 | <.001*** | 2.34 | 1.87 | 2.81 |
| *M*(*SD*) | 3.28 (*0.91*) | 7.90 (*2.89*) | | | | | |
| Range | 1 - 4 | 3-15 | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Resilience | | | -5.85 | <.001*** | -1.05 | -1.44 | -.66 |
| *M*(*SD*) | 146.21 (*17.88*) | 128.58 (*15.58*) | | | | | |
| Range | 103 - 187 | 102-161 | | | | | |

*Note.* Means are presented, with standard deviations in parentheses. ESE = effect size estimate (Cohen's *d*); CI = confidence interval; LL = lower limit; UL = upper limit; Sleep = Pittsburgh Sleep Quality Index; Resilience = Resilience Index. All listed *p*-values are one-tailed. ***p < .001.

***The interaction of depression group status and sleep quality on resilience.***

Regression analyses were conducted to predict the relationship between resilience, and sleep and depression, and to investigate whether an interaction was found between sleep and depression. The analysis also controlled for the presence of anxiety symptoms. Since sleep quality and depressive symptoms were highly correlated with each other in this study, and since anxiety is known to be highly correlated with depression (Jacobson & Newman, 2014), the coefficients were checked for multicollinearity. The Eigenvalue and Condition Index scores were investigated. The anxiety coefficient was found to be problematic (*e* = 0.04; *CI* = 9.95). Furthermore, a Farrar-Glauber test was conducted to further investigate the multicollinearity of the variables. Although the earlier scores for anxiety proved to be problematic, the results given in the Farrar-Glauber test proved otherwise. Many of the scores for anxiety within this test were not concerning (*VIF* = 1.48; *TOL* = 0.67; *Wi* = 45.35; *Leamer* = 0.82; *Klein* = 0), indicating that there might be no multicollinearity issue with anxiety. Depression had a Klein score of 1. This suggests that the variance of the model was being reduced due to it, but upon investigation, this was proven to not be the case, as the Adjusted $R^2$ = 0.32 was found to reduce without this variable. The correlation coefficient of depression and anxiety showed that these two variables were not highly correlated, (*r* = 0.52).

A stepwise strategy was used to investigate the predictors of resilience. Three models were made. The first model contained the two main variables, sleep and depression. The obtained Adjusted $R^2 = 0.26$ ($F$ (2, 188) = 34.23, $p < 0.01$), indicated that the predictors accounted for 26% of the variance in the resilience scores. The results of the analysis showed that sleep ($t = -3.28$, $p < 0.01$) has a significant negative relationship with resilience- meaning that as one's sleep disturbance increases, resilience decreases. The results for depression ($t = -4.76$, $p < 0.01$) also indicated a significant negative relationship with resilience- meaning that as one's depressive symptoms increase, their resilience decreases.

The next model included the two main variables (sleep and depression) and an interaction (sleep x depression). This model did not explain any more variance than the previous one (Adjusted $R^2 = 0.26$, $F$ (3, 187) = 23.1, $p < 0.01$). The interaction effect was found to be insignificant ($t = 0.94$, $p = 0.34$). The sleep ($t = -2.88$, $p < 0.01$) and depression ($t = -3.10$, $p < 0.01$) variables, although still significant, were less impactful.

A third model was created including the two main variables (sleep and depression), and the control variable (anxiety). The obtained Adjusted $R^2 = 0.34$ ($F$ (3, 187) = 34.09, $p < 0.01$), indicated that the predictors accounted for 34% of the variance in the resilience scores and therefore explained the highest proportion of variance from the three models. Sleep ($t = -2.67$, $p < 0.01$), depression ($t = -2.31$, $p < 0.05$) and anxiety ($t = -5.00$, $p < 0.01$) were found to all be significant predictors of resilience.

***Within-group (depression group) difference in sleep and resilience.***

An Analysis of Variance was conducted, taking the resilience scores as the dependent variable, and group status (depressed good sleepers, depressed bad sleepers, and healthy controls) and anxiety as the independent variables. Results are shown in Table 4. A median split

(*M* = 7) differentiated the good sleepers from the bad sleepers in the two depressed groups. As the independent samples t-Test showed a significant difference between depressed individuals and controls in terms of anxiety (see Table 1), a one-way ANCOVA was considered to incorporate the covariate (anxiety) i.e., the additional continuous independent variable. However, the assumption that the covariate and group status variable were independent was violated ($p < .001$), therefore the covariate was no longer considered and a one-way ANOVA was conducted using group status as the independent variable. A one-way ANOVA showed that resilience was different across the groups. Tukey's HSD test for multiple comparisons found that the mean value was significantly different between participants with depressive symptoms and poorer sleep quality and the control group, and that the mean value also significantly differed between participants with depressive symptoms and better sleep quality and control group. However, the mean values of the two groups with depressive symptoms did not differ. Thus, of the students who reported higher levels of depressive symptoms, those who reported lower levels of sleep disturbance did not report significantly higher levels of resilience

**Table 4**

*Analysis of Variance Showing* Within-Group (Depression Group) Difference in Sleep and Resilience *(N = 122)*

| | Group | | | | | |
|---|---|---|---|---|---|---|
| | Control | DG | DB | | | |
| Variable | (*n* = 72) | (*n* = 25) | (*n* = 25) | *F/ t* | *p* | ESE |
| RI | 146.21 (17.88) | 132.00 (16.20) | 125.16 (14.44) | 17.07 | < .001*** | .23 |
| Contrast 1 | | | | 3.62 | .001** | .81 |
| Contrast 2 | | | | -5.36 | <.001*** | -1.23 |
| Contrast 3 | | | | 3.62 | .32 | .45 |

*Note.* Means are presented with standard deviations in parentheses. Control = Control Group; DG = Depressive Good Sleeper; DB = Depressive Bad sleeper; ESE = effect size estimate (in

this case, $\eta^2$ for *F* statistic and Cohen's *d* for *t* statistic); RI = Resilience Index. Contrast 1 compares the Control to DG; Contrast 2 compares the Control group to DB. Contrast 3 compares the DG to DB. Degrees of freedom were (2, 119). **p < .01. ***p < .001.

## Discussion

We utilised a systematic approach to understanding the associations between sleep quality and resilience among university students with and without depressive symptoms. We first set out to replicate findings that students with a high burden of depressive symptoms have poor sleep quality. Next, we also set out to replicate findings that students with a high burden of depressive symptoms have poor resilience. Following this, we investigated whether students with a high burden of depressive symptoms, and concurrent high levels of sleep disturbance reported lower levels of resilience. Finally, our primary objective was to examine whether increased sleep quality in students with a high burden of depressive symptoms increased their levels of resilience. This study found that (1) students with elevated depressive symptoms do have poorer sleep quality than those without these symptoms, (2) students with elevated depressive symptoms do have lower levels of resilience than those without these symptoms, (3) students with higher depressive symptoms, anxiety, and sleep disturbance are likely to have lower levels of resilience, (4) students with elevated depressive symptom but different levels of sleep quality do not differ in terms of their resilience.

### Hypothesis 1: Between-group differences in sleep quality and depression

Preliminary correlational results supported a notable positive relationship between sleep disturbance and depressive symptoms. The results infer that university students with higher levels of depressive symptoms are more likely to report higher levels of sleep disturbance. This initial association was born out by significant differences between groups where students with a

high burden of depressive symptoms had significantly higher levels of sleep disturbance. This strong and positive relationship between depressive symptoms and sleep disturbance is well-described in the literature. Specifically, this result is consistent with research within the university context (Li et al., 2020; McGillivray & Pidgeon, 2015; Russell et al., 2019; Supartini et al., 2016). For example, a meta-analytic finding incorporating 32 articles supports the strong relationship between sleep and depression in this population (Dinis & Bragança, 2018)

**Hypothesis 2: Between-group differences in resilience and depression**

A significant negative association was established between depression and resilience. University students with higher levels of depressive symptoms are more likely to report lower levels of resilience. This finding suggests that an individual who is able to manage depressive symptoms successfully can be expected to have high levels of resilience. Though no meta-analytic findings refer to this relationship among university students to date, this finding is consistent with several previous studies that specifically observed this relationship among university students (Hamdan-Mansour et al., 2014; McGillivray & Pidgeon, 2015; Stallman, 2011). Moreover, this outcome is consistent with the research that identified depression as one significant factor that influences university students' mental and psychological functions (Hamdan-Mansour & Marmash, 2007). Ultimately, the findings relating to the first two hypotheses match the literature.

**Hypothesis 3: Interaction effect of depression group status and sleep quality status**

Significant results were found between sleep and resilience. This finding is consistent with the findings of other studies within the field. For instance, when studying the relationship between sleep quality and resilience for dance students, Arbinaga (2018) found both sleep quality and duration to be a significant predictor of resilience, and further concluded that dance

students with poorer sleep quality and shorter sleep periods were more at risk of having lower resilience scores. Similar findings were also seen in the study by Seelig et al. (2016) who investigated sleep and resilience amongst a US military cohort. These authors concluded that reduced sleep quality, created through the presence of insomnia, predicted resilience through affecting other aspects that are closely related to the concept- such as lower self-rated health and lower workdays. Ultimately, it can be concluded that the results of the analysis match the literature around the subject.

The other main variable, depression, was found to be a significant predictor of resilience as well. Anxiety, which is often closely linked to depression (Jacobson & Newman, 2014), was also found to be significant. This covariate variable was controlled for during the study and only added to the variance explained by the model. This indicates that as a university student's sleep disturbance, depression or anxiety levels increase, their resilience is likely to decrease, consistent with findings from previous studies. Ahmed and Julius (2015) investigated the relationship between academic performance, resilience, depression, anxiety and stress among female college students. When focusing on these variables specifically, it was found that there was a significant relationship between depression and resilience as well as anxiety and resilience. Drew and Matthews (2019) also found this when investigating depression, anxiety, resilience and help-seeking behaviour among student athletes.

The hypothesis that stated that there would be an interaction effect between sleep and depression, was proven to be false. This result was somewhat surprising, since preliminary correlation analyses showed that 1) those with depressive symptoms tended to have poorer sleep and low resilience and 2) poor sleep quality was associated with low resilience. However, although these initial associations between depressive symptoms, sleep and resilience were

found, a direct test of the interaction of depressive symptoms with sleep dysfunction was not associated with lower resilience. This is quite inconsistent with the current literature that often identifies a correlation between sleep and depressive symptoms (Dinis & Bragança, 2018; Lovato & Gradisar, 2014). One possible explanation for this result could rest on the fact that we did not sample participants with clinical depression, who may have more severe depressive symptoms and sleep dysfunction (Kanady & Harvey, 2015; Lopresti et al., 2013) and therefore any associations may be more easily identified.

Investigating these associations could positively impact the discussion surrounding resilience within a university space, which could further lead to innovative methods of resilience building. Such methods can be incorporated into previously existing mental health services and systems in order to facilitate the wellbeing of students.

**Hypothesis 4: Within-group (depression group) difference in sleep and resilience.**

This study's fourth, and primary hypothesis was not confirmed. However, there was a notable difference between the respective groups with elevated depressive symptoms and the healthy controls, which relates back to the findings for our second hypothesis, and further showcases the strong relationship between depressive symptoms and resilience. Nevertheless, there was no significant difference in the resilience capacity between the students with higher depressive symptoms coupled with lower sleep disturbance, and students with higher depressive symptoms coupled with higher sleep disturbance. We must therefore conclude that better sleep quality did not act as a resilience builder among students with depressive symptoms.

Despite this unexpected result, our study was innovative in that it considered the positive aspect of sleep within a sample of university students with elevated levels of depressive symptoms. Though other studies have investigated the relationships between resilience,

depression and sleep (Liu et al., 2016; McGillivray & Pidgeon, 2015; Tafoya et al., 2019), to the best of our knowledge previous research had yet to explore the potential for better sleep quality to increase resilience among depressive university students specifically. As evidenced by the results from our first three hypotheses, coupled with previous research findings, there is a clear indication that individuals with better sleeper quality achieve higher levels of resilience, while students with elevated depressive symptoms achieve lower levels. This suggests that students with better sleep quality and/or lack of depressive symptoms are better equipped with abilities that enable them to successfully take on new challenges and difficulties associated with their academic and personal lives, which is of high importance within this context (Ahmed & Julius, 2015; Hamdan-Mansour et al., 2014; McGillivray & Pidgeon, 2015).

It was therefore within reason that we suggested that individuals with elevated levels of depressive symptoms, but with better sleep quality, may have a noticeable advantage in terms of resilience. However, interpretation of this lack of a significant result has to consider that measuring levels of resilience and depressive symptoms includes concentrating on a person's capability to manage diverse negative effects (Hamdan-Mansour et al., 2014). Thus, it remains possible that the association between resilience and depressive symptoms is too strong for better sleep quality to meaningfully increase low resilience levels in a student sample with a high burden of depressive symptoms. Moreover, it should be noted that research has highlighted that additional factors, such as mindfulness, academic performance and perceived social support for example, do influence university students' resilience besides sleep quality (Ahmed & Julius, 2015; Hamdan-Mansour et al., 2014; McGillivray & Pidgeon, 2015). Therefore, the construct of resilience when it is coupled with depressive symptoms is likely more complex than this study design has accounted for.

**Study Limitations and Implications**

Some limitations of this study's findings should be noted. First, data collection occurred over two phases where the second phase took place over a more stressful period (compared to the first) for students i.e., in the month leading up to the year-end university exams. This particularly stressful time may have influenced students perceived mental states, sleep disturbance and/or resilience, and consequently their reported results. Second, considering that this study used self-report measures to assess resilience, depression and sleep disturbance, it is possible that memory distortions may have affected the accuracy of the reports (Liu et al., 2016). Future studies utilizing this method of convenience sampling should be aware of these limitations. Third, as this study was conducted online, there is a potential reason for inaccurate reports. The short amount of time it takes to complete this study's questionnaire does not suggest any fatigue from participants, however there is no assurance that participants were not being facetious, knowingly deceptive, or fraudulent with their responses (Ball, 2019). Future research could benefit from using objective measures to control for these limitations. Lastly, the lack of significant differentiation found between good sleepers with depressive symptoms and bad sleepers with depressive symptoms may be related to these groups' small sample size. A larger sample size would be imperative to appropriately investigate this relationship (McGillivray & Pidgeon, 2015).

This study goes past theoretical implications and also has many practical implications for university systems and those within it. These findings around the relationship between resilience, sleep, depression and anxiety, could potentially help students to better cope with university-related adversities. Although better quality sleep did not improve resilience for students with depressive symptoms specifically, it was found to improve resilience in general. Therefore,

based on our findings, many university students can focus on improving their sleep quality as a preventative measure to prohibit the occurrence of depressive symptoms and increase resilience. As noted by Seelig et al. (2016), low quality sleep affects other aspects of life that can lead to low resilience, so focusing on sleep quality is very helpful. Despite the limitations of our study, it has positive implications on the need for promoting positive mental health in university and integrating this into the curriculum, through academic practices that focus on engagement regarding mental health issues. Because a relationship between resilience, sleep, depression and anxiety has been found, the aim of future research should be to learn how these variables interact through using more objective methods and recruiting a clinical sample

## Summary and Conclusion

This study supports existing research that has identified significant associations between sleep quality and depressive symptoms, and between depressive symptoms and resilience within the university context. Sleep quality, depressive symptoms and anxiety were significant predictors for resilience, but these did not interact to influence resilience. The distinction between students with a high burden of depressive symptoms, but a differing sleep quality, was not supported, suggesting sleep was not a resilience builder in this sample.

In conclusion, his study contributes to the understanding of the construct of resilience and its association with sleep quality and depressive symptoms in a South African university population.

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## Appendix A

## SRPP Advertisement

Dear fellow UCT students,

Our names are Juliet Ohajunwa and Matthieu Ortscheit. We are currently completing our Honours in Psychology at the University of the Cape Town. As part of this degree, we are required to conduct a research study to collect data through an online questionnaire.

We are investigating the association of sleep quality and resilience (ability to overcome adversity) among University students. All UCT students between the ages of 18 and 35 are invited to participate. Your participation would be greatly appreciated.

Participation in this study requires the completion of a questionnaire. The questionnaire should take about 20 – 30 minutes of your time, and participation is purely voluntary and all responses are anonymous. By completing the questionnaire, you are providing consent for your responses to be used in the data analysis stage of the research. You may also exit the questionnaire at any time, should you feel that you no longer want to participate in the research.

If you are an undergraduate Psychology student at UCT, you may receive 1 SRPP point to go towards the second semester of the 2021 academic year.

You can access the questionnaire by clicking the link below. There is additional information on the research contained within the questionnaire, should you require further clarification on the purpose and manner of the research:

Link to questionnaire

This study has been approved by the UCT Ethics Review Committee of the Faculty of Humanities.

Should you require further information, or would like to follow up on the results of the research, please contact us (ohjsif001@myuct.ac.za or ortmat003@myuct.ac.za or our supervisor, Gosia Lipinska (gosia.lipinska@uct.ac.za)

Kind regards

Matthieu Ortscheit – Researcher ORTMAT003@myuct.ac.za

Juliet Ohajunwa – Researcher OHJSOF001@myuct.ac.za

Gosia Lipinska – Supervisor

gosia.lipinska@uct.ac.za

## Appendix B

## DSA Advertisement

Dear fellow UCT students,

You are invited to participate in a research study that aims to study whether good quality sleep can be used as a factor to increase resilience for university students who face adversity.

We plan on doing this by exploring the relationship between sleep and resilience. This research also aims to add to the current literature surrounding sleep and resilience within the university context. This study is being conducted by Honours students, Juliet Ohajunwa and Matthieu Ortscheit as partial fulfilment of the Psychology Honours degree at the University of Cape Town.

If you are a UCT student you will be included in a draw for a chance to win 1 of 3 Takealot vouchers worth R500, R300, and R200.

Participation in this study requires the completion of a questionnaire. The questionnaire should take about 20 – 30 minutes of your time, and participation is purely voluntary, and all responses are anonymous. By completing the questionnaire, you are providing consent for your responses to be used in the data analysis stage of the research. You may also exit the questionnaire at any time, should you feel that you no longer want to participate in the research.

If you wish to participate in this study:

• You must be a UCT student

• You must be within the ages of 18-35

You can access the questionnaire by clicking the link below. There is additional information on the research contained within the questionnaire, should you require further clarification on the purpose and manner of the research: https://redcap.uct.ac.za/surveys/?s=YDL94WTLT4

This study has been approved by the UCT Ethics Review Committee of the Faculty of Humanities. Should you require further information or would like to follow up on the results of the research, please contact us (ohjsof001@myuct.ac.za or ortmat003@myuct.ac.za or our supervisor, Gosia Lipinska (gosia.lipinska@uct.ac.za).

Kind regards,

Matthieu Ortscheit – Researcher: ortmat003@myuct.ac.za

Juliet Ohajunwa – Researcher: ohjsof001@myuct.ac.za

Gosia Lipinska – Supervisor: gosia.lipinska@uct.ac.za

## Appendix C

## Informed Consent Form SRPP

**UNIVERSITY OF CAPE TOWN**

Department of Psychology
UCT Sleep Sciences and Clinical Neuropsychology
Rondebosch, 7701
Tel: 27 21 6503417 Fax: 27 21 6504104

# Consent to Participate in a Research Study

**Project title:**

Associations of Sleep Quality and Resilience among University Students with Depression

**What is this study about?**

You are invited to participate in a research study that aims to study whether good quality sleep can be used as a factor to increase resilience for university students who face adversity. We plan on doing this by exploring the relationship between sleep and resilience. This research also aims to add to the current literature surrounding sleep and resilience within the university context. This study is being conducted by Honours students, Juliet Ohajunwa and Matthieu Ortscheit as partial fulfilment of the Psychology Honours degree at the University of Cape Town.

**What will I have to do in this study?**

This is an online study where you will answer questions in a set of psychological tests that measure your level of depression, anxiety, resilience, sleep quality, PTSD, and alcohol and drug usage. This set of tests will take approximately 30 minutes of your time and will be completed in one session. The tests will be administered in English.

**Will I face any risks or inconveniences during the study?**

Some of the topics of the study focus on mental health, trauma and substance abuse which one can find triggering or emotionally strenuous. Other than this, due to it being an online

study, the possibility of risk and inconvenience is minimal as you will be able to participate in the comfort of your own home.

**What are the benefits of participation?**

There are no direct benefits for participating in this study. However, you will be helping us add to the ongoing discussion surrounding resilience building for university students.

**Do I get compensation for participation?**

You will get 1 SRPP point for completing this study.

**Are there any costs or charges for participating?**

Participation in this study is free. It is only necessary that you have a technological device and internet connection.

**What happens to my information?**

The information that is gotten from you during this study remains completely confidential. If you have used any illicit substances, the police will not be informed. The information obtained in this study will not become part of your medical record in any way. The only people who will be able to access this information will be the research, supervisor, and co-supervisor. Information will be stored on password protected devices and used strictly for data analysis.

**What happens if I do not want to continue the study?**

There is no penalty for stopping the study. It is understandable that some of the emotional content discussed could make you uncomfortable. If this is so, you are free to refuse to answer any question that makes you feel this way. Participation is completely voluntary and if at any stage you would like to stop with the study, you can do this. Although this is the case, it is important to note that SRPP points are only awarded upon completion of the study.

**What if I have questions after participating?**

You will be given a debriefing after finishing the study. If you have further questions about the research study, please feel free to contact the researchers:


| | |
|---|---|
| Juliet Ohajunwa | Matthieu Ortscheit |
| 063 247 4024 | 084 011 9900 |
| ohjsof001@myuct.ac.za | ortmat003@myuct.ac.za |

If you have any questions about your participant rights or problems experienced during participation, feel free to contact the supervisor:

Dr Gosia Lipinska
UCT Sleep Sciences and Clinical Neuropsychology
Department of Psychology
University of Cape Town
021 640 3415
gosia.lipinska@uct.ac.za

If you have any questions relating to the ethics of the study, please contact:

Rosalind Adams
Department of Psychology
University of Cape Town
021 650 3417
rosalind.adams@uct.ac.za

If any part of this study caused you distress and you would like to seek help with your mental health, please find the details of the health and counselling services made available by UCT below:

| Health Service: | Counselling Service: |
|---|---|
| +27 (0)21 650 1020 | +27 (0)21 650 1017 |
| faranaz.murat@uct.ac.za | lerushda.cheddie@uct.ac.za |
| http://www.dsa.uct.ac.za/student-wellness/health-services/overview | http://www.dsa.uct.ac.za/student-wellness/counseling-services/overview |

Please sign below if you understand what is involved and agree to participate:

_____ _____

Signature of Participant Date

| | |
|---|---|
| _____ | _____ |
| Signature of Researcher | Date |
| _____ | _____ |
| Signature of Researcher | Date |

## Appendix D

## Informed Consent Form DSA

**UNIVERSITY OF CAPE TOWN**


Department of Psychology
UCT Sleep Sciences and Clinical Neuropsychology
Rondebosch, 7701
Tel: 27 21 6503417 Fax: 27 21 6504104

### Consent to Participate in a Research Study

**Project title:**

Associations of Sleep Quality and Resilience among University Students with Depression

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**Will I face any risks or inconveniences during the study?**

Some of the topics of the study focus on mental health, trauma and substance abuse which one can find triggering or emotionally strenuous. Other than this, due to it being an online

study, the possibility of risk and inconvenience is minimal as you will be able to participate in the comfort of your own home.

**What are the benefits of participation?**

There are no direct benefits for participating in this study. However, you will be helping us add to the ongoing discussion surrounding resilience building for university students.

**Do I get compensation for participation?**

If you are a UCT student that is not studying psychology, upon completion of this survey, you will be included in a draw for a chance to win 1 of 3 Takealot vouchers worth R500, R300, and R200.

**Are there any costs or charges for participating?**

Participation in this study is free. It is only necessary that you have a technological device and internet connection.

**What happens to my information?**

The information that is gotten from you during this study remains completely confidential. If you have used any illicit substances, the police will not be informed. The information obtained in this study will not become part of your medical record in any way. The only people who will be able to access this information will be the research, supervisor, and co-supervisor. Information will be stored on password protected devices and used strictly for data analysis.

**What happens if I do not want to continue the study?**

There is no penalty for stopping the study. It is understandable that some of the emotional content discussed could make you uncomfortable. If this is so, you are free to refuse to answer any question that makes you feel this way. Participation is completely voluntary and if at any stage you would like to stop with the study, you can do this. Although this is the case, it is important to note that SRPP points are only awarded upon completion of the study.

**What if I have questions after participating?**

You will be given a debriefing after finishing the study. If you have further questions about the research study, please feel free to contact the researchers:


| | |
|---|---|
| Juliet Ohajunwa | Matthieu Ortscheit |
| 063 247 4024 | 084 011 9900 |

ohjsof001@myuct.ac.za ortmat003@myuct.ac.za

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Dr Gosia Lipinska
UCT Sleep Sciences and Clinical Neuropsychology
Department of Psychology
University of Cape Town
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University of Cape Town
021 650 3417
rosalind.adams@uct.ac.za

If any part of this study caused you distress and you would like to seek help with your mental health, please find the details of the health and counselling services made available by UCT below:

Health Service:
+27 (0)21 650 1020
faranaz.murat@uct.ac.za
http://www.dsa.uct.ac.za/student-wellness/health-services/overview

Counselling Service:
+27 (0)21 650 1017
lerushda.cheddie@uct.ac.za
http://www.dsa.uct.ac.za/student-wellness/counseling-services/overview

Please sign below if you understand what is involved and agree to participate:

_____ _____

Signature of Participant Date

| | |
|---|---|
| _____ | _____ |
| Signature of Researcher | Date |
| _____ | _____ |
| Signature of Researcher | Date |

## Appendix E

## Debriefing Form SRRP

**UNIVERSITY OF CAPE TOWN**


Department of Psychology
UCT Sleep Sciences and Clinical Neuropsychology
Rondebosch, 7701
Tel: 27 21 6503417 Fax: 27 21 6504104

# Debriefing Form

**Project title**

Associations of Sleep Quality and Resilience among University Students with Depression

Thank you for your participation in this study.

**What was the purpose of this research study?**

The goal of this study is to analyse the relationship between sleep quality and resilience among university students with who experience depressive symptoms. The main purpose of this research is to study whether good quality sleep can be used as a factor to increase resilience for university students who face adversity. This research aims to add to the current literature surrounding sleep and resilience within the university context.

**What was done during this study?**

During this study, you had to answer questions in psychological tests measuring your level of depression, anxiety, resilience, sleep quality, PTSD, and alcohol and drug usage. This data will be analysed in order to explore whether good quality sleep helps depressed students build their resilience.

If you have further questions about the research study, please feel free to contact the researchers:

Juliet Ohajunwa
063 247 4024
ohjsof001@myuct.ac.za

Matthieu Ortscheit
084 011 9900
ortmat003@myuct.ac.za

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University of Cape Town
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University of Cape Town
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rosalind.adams@uct.ac.za

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| faranaz.murat@uct.ac.za | lerushda.cheddie@uct.ac.za |
| http://www.dsa.uct.ac.za/student-wellness/health-services/overview | http://www.dsa.uct.ac.za/student-wellness/counseling-services/overview |

Your participation in this study is kindly appreciated. Your SRPP point will reflect within 2 weeks from the date of the study.

## Appendix F

## Debriefing Form DSA

**UNIVERSITY OF CAPE TOWN**


Department of Psychology
UCT Sleep Sciences and Clinical Neuropsychology
Rondebosch, 7701
Tel: 27 21 6503417 Fax: 27 21 6504104

# Debriefing Form

**Project title**

Associations of Sleep Quality and Resilience among University Students with Depression

Thank you for your participation in this study.

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The goal of this study is to analyse the relationship between sleep quality and resilience among university students with who experience depressive symptoms. The main purpose of this research is to study whether good quality sleep can be used as a factor to increase resilience for university students who face adversity. This research aims to add to the current literature surrounding sleep and resilience within the university context.

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If you have further questions about the research study, please feel free to contact the researchers:

Juliet Ohajunwa
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ohjsof001@myuct.ac.za

Matthieu Ortscheit
084 011 9900
ortmat003@myuct.ac.za

If you have any questions about your participant rights or problems experienced during participation, feel free to contact the supervisor:

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UCT Sleep Sciences and Clinical Neuropsychology
Department of Psychology
University of Cape Town
021 640 3415
gosia.lipinska@uct.ac.za

If you have any questions relating to the ethics of the study, please contact:

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Department of Psychology
University of Cape Town
021 650 3417
rosalind.adams@uct.ac.za

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| Health Service: | Counselling Service: |
|---|---|
| +27 (0)21 650 1020 | +27 (0)21 650 1017 |
| faranaz.murat@uct.ac.za | lerushda.cheddie@uct.ac.za |
| http://www.dsa.uct.ac.za/student-wellness/health-services/overview | http://www.dsa.uct.ac.za/student-wellness/counseling-services/overview |

A more detailed resource list can be found on the next page- giving information of services outside of UCT available to help. Your participation in this study is kindly appreciated. Once the winners of the draw have been randomly selected, an announcement will be made.

## Appendix G

## Resource List

Mental health is indisputably important. It is necessary for one to seek help if they are confronted with realisations that could jeopardise their mental health. Because of the nature of our study, this topic becomes ever more important. If any of the discussions brought about mental or emotional discomfort, along with the UCT resources given in your debriefing form, the following resources can be used to seek help.

**For Anxiety and Depression:**

The website, 7 Cups of Tea is used for mental health support. Their site hosts forums to help people dealing with issues such as depression and anxiety:

- https://www.7cups.com/

SupportGroups.com is a free online forum that aims to bring people together through life challenges by providing concise, up-to-date information and a meeting place for individuals, friends, and family members who offer pathways to help:

- https://www.supportgroups.com/

There are also free, confidential hotlines that can be called for help:

- Adcock Ingram Depression and Anxiety Helpline: (0800) 70 80 90
- South African Depression & Anxiety Group – SADAG: (0800) 12 13 14
- SADAG Mental Health Line: (011) 234 4837
- Befrienders Bloemfontein: (0027) 51 444 5000
- SADAG Suicide Crisis Line: 0800 567 567
- Cipla Whatsapp Chat Line: 076 882 2775

**For PTSD:**

Anxiety Disorder Association of America (ADAA) offers self-help information online as well as information on PTSD support groups. You can look at their website to find a support group that can help you:

- https://adaa.org/supportgroups

SADAG provides information about PTSD. What it is, who is affected, what the symptoms are, and methods for recovery and treatment:

- https://www.sadag.org/index.php?option=com_content&view=article&id=1835&Itemid=174

Health line also provides information about PTSD:

- https://www.healthyplace.com/ptsd-and-stress-disorders

Online counselling is available with Better Help. Although it is not free, financial aid is available:

- https://www.betterhelp.com/get-started/?go=true&transaction_id=1028bed355552756f7a01412120e22&utm_source=affiliate&utm_campaign=157&utm_medium=Desktop&utm_content=&utm_term=&not_found=1&gor=start

There are also hotlines available (many of the previous hotlines stated for Anxiety and Depression can also be used):

- South African Depression & Anxiety Group – SADAG: (0800) 12 13 14
- SADAG Mental Health Line: (011) 234 4837
- SADAG Suicide Crisis Line: 0800 567 567
- Lifeline Johannesburg: 0861 322 322

**For Alcohol and Substance Abuse:**

There are many hotlines available for you:

- Department of Social Development Substance Abuse Line 24hr helpline. For alcohol and substance abuse rehabilitation and helpline
  - Tel: 0800 12 13 14
  - SMS: 32312
- Alcoholics Anonymous South Africa. Worldwide fellowship for alcoholics supporting those choosing to be sober. Only requirement for membership is a desire to stop drinking
  - 0861 HELPAA (435 722)
- Narcotics Anonymous SA. NA is a non-profit organisation for recovering drug addicts who meet regularly to help each other stay clean
  - (0881) 30 03 27
- Al-Anon. This line was established for the families and friends of alcohol abusers
  - 0861 ALANON (25 26 66)
- SA National Council on Alcoholism and Drug Dependence. Sanca provides specialised and affordable prevention and treatment services for alcohol and other drug dependence
  - 08611 REHAB (73422)
- Unhooked. A Christian Based Non-Profit Substance Abuse Recovery Organisation focusing on Outpatient Treatment, Addiction Counselling, Substance abuse prevention and Intervention
  - (081) 456 3945

Your participation in this study is kindly appreciated. We are hopeful that the resources above will provide you with the help and assistance needed.

## Appendix H

## State-Trait Anxiety Index

State Anxiety:

A number of statements which people have used to describe themselves are given below. Read each statement and then select the appropriate number to the right of the statement to indicate how you feel right now, that is, at this moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

Possible answers : (1) Not at all ; (2) Somewhat ; (3) Moderately so ; (4) Very much so.

1. I feel calm.
2. I feel secure.
3. I am tense.
4. I feel strained.
5. I feel at ease.
6. I feel upset .
7. I am presently worrying over possible misfortunes.
8. I feel satisfied.
9. I feel frightened.
10. I feel comfortable.
11. I feel self-confident.
12. I feel nervous.
13. I am jittery.
14. I feel indecisive.
15. I am relaxed.
16. I feel content.
17. I am worried.
18. I feel confused.

19. I feel steady.
20. I feel pleasant.

Trait Anxiety :

A number of statements which people have used to describe themselves are given below. Read each statement and then select the appropriate choice to the right of the statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

Possible answers : (1) Almost never ; (2) Sometimes ; (3) Often ; (4) Almost always.

1. I feel pleasant
2. I feel nervous and restless
3. I feel satisfied with myself
4. I wish I could be as happy as others seem to be
5. I feel like a failure
6. I feel rested
7. I am « calm, cool, and collected »
8. I feel that difficulties are piling up so that I cannot overcome them
9. I worry too much over something that really doesn’t matter
10. I am happy
11. I have disturbing thoughts
12. I lack self-confidence
13. I feel secure
14. I make decisions easily
15. I feel inadequate
16. I am content
17. Some unimportant thought runs through my mind and bothers me
18. I take disappointments so keenly that I can’t put them out my mind

19. I am a steady person
20. I get in a state of tension or turmoil as I think over my recent concerns and interests

## Appendix I

### Primary Care Post-Traumatic Stress Disorder Screen

Sometimes things happen to people that are unusually or especially frightening, horrible, or traumatic. For example : a serious accident or fire ; a physical or sexual assault or abuse ; an earthquake or flood ; a war ; seeing someone be killed or seriously injured ; having a loved one die through homicide or suicide.

Have you ever experienced this kind of event ? Yes No

| In the past month, have you : | Yes | No |
|---|---|---|
| Had nightmares about the event(s) or thought about the event(s) when you did not want to ? | | |
| Tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s) | | |
| Been constantly on guard, watchful, or easily startled ? | | |
| Felt numb or detached from people, activities, or your surroundings ? | | |
| Felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused | | |

## Appendix J

## Alcohol Use Disorders Identification Test – Consumption

How often do you have a drink containing alcohol ?

- Never
- Monthly or less
- 2-4 times a month
- 2-3 times a week
- 4 or more times a week

How many standard drinks containing alcohol do you have on a typical day when you are drinking ?

- 0
- 1 or 2
- 3 or 4
- 5 or 6
- 7 to 9
- 10 or more

How often do you have six or more drinks on one occasion ?

- Never
- Less than monthly
- Monthly
- Weekly
- Daily or almost daily

## Appendix K

### Drug Abuse Screening Test (DAST-10)

The following questions concern information about your possible involvement with drugs *not including alcoholic beverages* during the past 12 months.

« Drug abuse » refers to (1) the use of prescribed or over-the-counter drugs in excess of the directions, and (2) any nonmedical use of drugs.

The various classes of drugs may include cannabis (marijuana, hashish), solvents (e.g., paint thinner), tranquilizers (e.g., Valium), barbiturates, cocaine, stimulants (e.g., speed), hallucinogens (e.g., LSD) or narcotics (e.g., heroin). Remember that the questions *do not* include alcoholic beverages.

| Please answer every question. If you have difficulty with a statement, then choose the response that is mostly right. **In the past 12 months…** | | | **Circle** |
|---|---|---|---|
| 1. | Have you used drugs other than those required for medical reasons ? | Yes | No |
| 2. | Do you abuse more than one drug at a time ? | Yes | No |
| 3. | Are you unable to stop abusing drugs when you want to ? | Yes | No |
| 4. | Have you ever had blackouts or flashbacks as a result of drug use ? | Yes | No |
| 5. | Do you ever feel bad or guilty about your drug use ? | Yes | No |
| 6. | Does your spouse (or parents) ever complain about your involvement with drugs ? | Yes | No |
| 7. | Have you neglected your family because of your use of drugs ? | Yes | No |
| 8. | Have you engaged in illegal activities in order to obtain drugs ? | Yes | No |

| | | | |
|---|---|---|---|
| 9. | Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs ? | Yes | No |
| 10. | Have you had medical problems as a result of your drug use (e.g. memory loss, hepatitis, convulsions, bleeding) ? | Yes | No |

## Appendix L

## Pittsburgh Sleep Quality Index

During the past month : When have you usually gone to bed ?

During the past month : How long has it taken you to fall asleep each night ?

During the past month : When have you usually gotten up in the morning ?

How many hours of actual sleep do you get at night ?

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. Possible answers : (1) Not during the past month ; (2) Less than once a week ; (3) Once or twice a week ; (4) Three or more times a week.

During the past month :

- I cannot get back to sleep within 30 minutes
- Wake up in the middle of the night or early morning
- I have to get up to use the bathroom
- I cannot breathe comfortably
- I cough or snore loudly
- I feel too cold
- I feel too hot
- I have bad dreams
- I have pain
- Other reason(s), how often do you have trouble sleeping because of this reason(s)
- How often have you taken medicine (prescribed or « over the counter ») to help you sleep ?
- How often have you had trouble staying awake while driving, eating meals, or engaging in social activity ?
- How much of a problem has it been for you to keep up enthusiasm to get things done ?

During the past month, how would you rate your sleep quality overall ? *

- Very good
- Fairly good
- Fairly bad
- Very bad

## Appendix M

### Connor-Davidson Resilience Scale (CD-RISC)

Please read the following statements. Click indicate the below which best indicates your feelings about that statement by selecting and writing one of the possible answers (numbers) for each statement.

Possible answers : (0) Not true at all ; (1) Rarely true ; (2) Sometimes true ; (3) Often true ; (4) True nearly all the time

1. I am able to adapt when changes occur.
2. I have at least one close and secure relationship that helps me when I get stressed.
3. When there are no clear solutions to my problems, sometimes fate or God can help
4. I can deal with whatever comes my way.
5. Past successes give me confidence in dealing with new challenges and difficulties.
6. I try to see the humorous side of things when I am faced with problems.
7. Having to cope with stress can make me stronger.
8. I tend to bounce back after illness, injury, or other hardships.
9. Good or bad, I believe that most things happen for a reason.
10. I give my best effort no matter what the outcome may be.
11. I believe I can achieve my goals, even if there are obstacles.
12. Even when things look hopeless, I don't give up.
13. During times of stress/crisis, I know where to turn for help.
14. Under pressure, I stay focused and think clearly.
15. I prefer to take the lead in solving problems rather than letting others make all the decisions.
16. I am not easily discouraged by failure.
17. I think of myself as strong person when dealing with life's challenges and difficulties.
18. I can make unpopular or difficult decisions that affect other people, if it is necessary.
19. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.
20. In dealing with life's problems, sometimes you have to act on a hunch without knowing why.
21. I have a strong sense of purpose in life.

22. I feel in control of my life.
23. I like challenges.
24. I work to attain my goals no matter what roadblocks I encounter along the way.
25. I take pride in my achievements.

## Appendix N

## Resilience Index

Please provide the following information:

Name/Participant ID:

Age:

Gender:

Directions:

You will be presented with a number of statements below, please indicate your level of agreement with each by marking the appropriate column. There are no right or wrong answers. Please respond as honestly as possible and don't think too long before you answer. Possible answers : (0) Strongly disagree; (1) Disagree; (2) Neutral/Unsure; (3) Agree; (4) Strongly agree

1. I believe that my life has meaning
2. I try to incorporate humor into my life and laugh as much as possible
3. I am optimistic about my life and my future
4. I am thankful for the things I have in life
5. I exercise/work out on a regular
6. I tend to try and remain present (in the moment)
7. I tend to think about and worry about the future
8. I tend to think about and be preoccupied with the past
9. I regard myself as a charitable person (self-sacrifice for something that does not directly benefit you)
10. I tend to hold grudges against people who I feel have wronged me
11. I tend to easily forgive those who have wronged me
12. I tend to easily forget about events where I felt wronged
13. Even if someone has wronged me in some way, in my mind I always wish the well
14. I have belied system that guides my decision-making (e.g.Religion, a clear set of values/moral codes)

15. I believe in taking steps to help others and promote their welfare and happiness, even if it sometimes comes at a personal cost
16. I believe in taking steps to help others and promote their welfare and happiness, but not at any personal cost to me
17. I tend to look for the positives when something negative happens to me
18. I often feel I have little or no control over my environment
19. I regularly feel that things are out of my hands
20. I take proactive steps when I foresee a problem or challenge in the future (e.g preparation)
21. I find it easy to rely on others
22. I can count on others' support when I need it
23. I often feel that people may desert me
24. When I want to, I am easily able to bond with someone
25. I am open to others relying on me
26. I can trust that others will care for me
27. I feel understood by others
28. People around me are encouraging
29. I feel I belong in my family/friend/work/study group
30. I tend to shy away from challenges
31. I feel a sense of accomplishment when I reflect on times I overcame adversity
32. When I encounter a stressful event that I have experienced before, I have the skills and experience to overcome it
33. I don't feel any more equipped to overcome adversity now compared to when I was faced with similar situations in the past
34. I can recover easily from stumbling blocks in my path
35. I have a positive outlook on my ability to cope with setbacks
36. I feel psychologically equipped to deal with the challenges of life
37. I know my psychologically strengths and weaknesses
38. I know how and where to allocate my energy and time when completing a task
39. I gain confidence when I achieve a goal
40. Throughout my life, I experienced several string stressful events/periods

41. During strong stressful times I knew things would eventually get better
42. During strong stressful times I felt I had no control over the situation
43. While growing up (up to age 18): I had someone I regarded as a mentor
44. While growing up, I had someone I looked up to
45. While growing up, I often had to take on the role of an adult
46. While growing up, I had someone who set good examples for me to follow
47. While growing up, I was able to psychologically adapt to typical life challenges, like losing a friendship or having a sick relative
48. While growing up, I felt safe
49. While growing up, I felt protected against harm
50. While growing up, I had everything I needed to survive (food, shelter)
51. While growing up, I felt loved
52. While growing up, I felt supported
53. While growing up, I felt properly taken care of

## Appendix O

### Beck Depression Inventory II

For each item, 1 through 21, check the severity, 0, 1, 2, or 3, which best describes your experience today or in recent weeks.

| | | |
|---|---|---|
| 1. | 0 | I do not feel sad |
| | 1 | I feel sad |
| | 2 | I am sad all the time and I can't snap out of it |
| | 3 | I am so sad and unhappy that I can't stand it |
| | | |
| 2. | 0 | I am not particularly discouraged about the future |
| | 1 | I feel discouraged about the future |
| | 2 | I feel I have nothing to look forward to |
| | 3 | I feel the future is hopeless and that things cannot improve |
| | | |
| 3. | 0 | I do not feel like a failure |
| | 1 | I feel I have failed more than the average person |
| | 2 | As I look back on my life, all I can see is a lot of failures |
| | 3 | I feel I am a complete failure as a person |
| | | |
| 4. | 0 | I get as much satisfaction out of things as I used to |

| | | |
|---|---|---|
| | 1 | I don’t enjoy things the way I used to |
| | 2 | I don’t get real satisfaction out of anything anymore |
| | 3 | I am dissatisfied or bored with everything |
| | | |
| 5. | 0 | I don’t feel particularly guilty |
| | 1 | I feel guilty a good part of the time |
| | 2 | I feel quite guilty most of the time |
| | 3 | I feel guilty all of the time |
| | | |
| 6. | 0 | I don’t feel I am being punished |
| | 1 | I feel I may be punished |
| | 2 | I expect to be punished |
| | 3 | I feel I am being punished |
| | | |
| 7. | 0 | I don’t feel disappointed in myself |
| | 1 | I am disappointed in myself |
| | 2 | I am disgusted with myself |
| | 3 | I hate myself |

| | | |
|---|---|---|
| | | |
| 8. | 0 | I don’t feel I am any worse than anybody else |
| | 1 | I am critical of myself for my weaknesses or mistakes |
| | 2 | I blame myself all the time for my faults |
| | 3 | I blame myself for everything bad that happens |
| | | |
| 9. | 0 | I don’t have any thoughts of killing myself |
| | 1 | I have thoughts of killing myself, but I would not carry them out |
| | 2 | I would like to kill myself |
| | 3 | I would kill myself if I had the chance |
| | | |
| 10. | 0 | I don’t cry any more than usual |
| | 1 | I cry more now than I used to |
| | 2 | I cry all the time now |
| | 3 | I used to be able to cry, but now I can’t cry even though I want to |
| | | |
| 11. | 0 | I am no more irritated by things than I ever was |
| | 1 | I am slightly more irritated now than usual |

| | | |
|---|---|---|
| | 2 | I am quite annoyed or irritated a good deal of the time |
| | 3 | I feel irritated all the time |
| | | |
| 12. | 0 | I have not lost interest in other people |
| | 1 | I am less interested in other people than I used to be |
| | 2 | I have lost most of my interest in other people |
| | 3 | I have lost all of my interest in other people |
| | | |
| 13. | 0 | I make decisions about as well as I ever could |
| | 1 | I put off making decisions more than I used to |
| | 2 | I have greater difficulty in making decisions more than I used to |
| | 3 | I can’t make decisions at all anymore |
| | | |
| 14. | 0 | I don’t feel that I look any worse than I used to |
| | 1 | I am worried that I am looking old or unattractive |
| | 2 | I feel there are permanent changes in my appearance that make me look unattractive |
| | 3 | I believe that I look ugly |
| | | |

| | | |
|---|---|---|
| 15. | 0 | I can work about as well as before |
| | 1 | It takes an extra effort to get started at doing something |
| | 2 | I have to push myself very hard to do anything |
| | 3 | I can't do any work at all |
| | | |
| 16. | 0 | I can sleep as well as usual |
| | 1 | I don't sleep as well as I used to |
| | 2 | I wake up 1-2 hours earlier than usual and 77in dit hard to get back to sleep |
| | 3 | I wake up several hours earlier than I used to and cannot get back to sleep. |
| | | |
| 17. | 0 | I don't get more tired than usual |
| | 1 | I get tired more easily than I used to |
| | 2 | I get tired from doing almost anything |
| | 3 | I am too tired to do anything |
| | | |
| 18. | 0 | My appetite is no worse than usual |
| | 1 | My appetite is not as good as it used to be |

| | | |
|---|---|---|
| | 2 | My appetite is much worse now |
| | 3 | I have no appetite at all anymore |
| | | |
| 19. | 0 | I haven't lost much weight, if any, lately |
| | 1 | I have lost more than five pounds |
| | 2 | I have lost more than ten pounds |
| | 3 | I have lost more than fifteen pounds |
| 20. | 0 | I am no more worried about my health than usual |
| | 1 | I am worried about physical problems like aches, pains, upset stomach, or constipation |
| | 2 | I am very worried about physical problems and it's hard to think of much else |
| | 3 | I am so worried about my physical problems that I cannot think of anything else |
| | | |
| 21. | 0 | I have not noticed any recent change in my interest in sex |
| | 1 | I am less interested in sex than I used to be |
| | 2 | I have almost no interest in sex |
| | 3 | I have lost interest in sex completely |

**Appendix P**

**Ethical Approval**

# UNIVERSITY OF CAPE TOWN


## Department of Psychology

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03 September 2021

Sofunne Ohajunwa and Mattheiu
OrtscheitDepartment of Psychology
University of Cape
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Dear Sofunne and Mattheiu

I am pleased to inform you that ethical clearance has been given by an Ethics ReviewCommittee of the Faculty of Humanities for the amendments to your study, *Associations of Sleep Quality and Resilience among University Students with Depression.* The reference number is PSY2021-031.

I wish you all the best for your

study.Yours sincerely

Lauren Wild
(PhD)
Associate
Professor
Chair: Ethics Review Committee