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Predictors of First-year Undergraduate Academic Performance in a South African University

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Abstract

Many university students do not progress beyond their first year of study due to consequences of poor academic performance. Because there are considerable negative implications of dropping out of university, it is important to identify factors contributing to poor academic performance among undergraduates. This study aimed to assess the extent to which several lifestyle and psychological variables (stress, anxiety, depression, coping strategies, sleep disruption, quality of life, conscientiousness), as well as matric results, predict first-year undergraduate academic performance at a South African university. Using a set of standardized self-report questionnaires and archival retrieval of matric marks, I collected data regarding the potential predictor variables from 117 first-year psychology students enrolled in the Introduction to Psychology Part II (PSY1005S) course at the University of Cape Town (UCT). I gathered data for the outcome variable, academic performance (as measured by score on the mid-semester PSY1005S test), from the UCT Department of Psychology's student database. Results suggested that sleep disturbance (as measured by the Pittsburgh Sleep Quality Index) and matric marks both significantly predicted academic performance (overall R2 = .35). No other predictor, or set of predictors, accounted for a significant proportion of the variance in the outcome. These results suggest that, in order to improve academic performance, and to consequently decrease student attrition (and, eventually, increase graduation rates), South African universities should continue to use excellent matric results as a minimum admission requirement. Additionally, institution administrators should design interventions that target and improve levels of sleep disturbance amongst first-year undergraduates.

Keywords: academic performance; predictive factors; first-year university students; sleep disturbance; South Africa

First-year university life is filled with stressors that challenge students' academic, social, emotional, and functional well-being (Kotzé & Niemann, 2013). Although experiencing a certain amount of stress is necessary for optimal self-development, when stress becomes overwhelming the consequences can be debilitating, preventing students from reaching their full academic potential and advancing to subsequent years of study.

Several South African cohort studies, focused on first-time entering undergraduate students, have reported high dropout rates (see, e.g., CHE, 2013; Scott, Yeld, & Hendry, 2007). For instance, the Department of Higher Education and Training (2016) reported that 31.5% of students who entered undergraduate studies in the year 2000 dropped out after a single year of study. And, although attrition rates appear to be declining year-on-year, it is still of major concern that almost 20% of students who began undergraduate studies in 2012 dropped out after 1 year. Because leaving university prior to graduation has wide-ranging consequences for the individual, the institution, and the country's social and economic development, it is important to identify ways to increase retention rates from first to subsequent years of undergraduate study (Krumrei-Mancuso, Newton, Kim, & Wilcox, 2013; Pocock, 2012).

Data on institutional exclusion patterns and course success rates indicate that a large contributing factor to high first-year attrition in South African universities is poor academic performance, with higher-achieving students advancing in their undergraduate studies to a greater extent than that of their lower-achieving counterparts (CHE, 2013; Scott et al., 2007). Hence, in order to increase retention rates, it is important to identify variables that might predict poor academic performance in first-year university students in this country. The aim of the current study was to examine potential predictors of academic performance in attempt to achieve such identification. What follows below is an overview of literature that provides rationale for the inclusion of particular predictor variables in this study.

Traditional entry pathways into South African universities involve a successful completion of matric (i.e., grade 12 of high school), which includes adequate final exam matric results (van Broekhuizen, van der Berg, & Hofmeyr, 2017). The continued relevance of this traditional pathway is supported by a large body of literature that confirms a significant positive relationship between academic performance at the secondary school level and that in university (see, e.g., Anderton, Evans, & Chivers, 2016; Cassidy, 2012; Deryakulu, Büyüköztürk, & Özçınar, 2009; Friedman & Mandel, 2011; McKenzie & Schweitzer, 2001). For instance, Baard, Steenkamp, Frick, and Kidd (2010) found, using a

sample of 2103 first-year South African undergraduates, that the most significant predictor of academic performance was matric results.

Although matric results are often found to be the most important predictor of academic performance, existing literature suggests a number of lifestyle and psychological factors that are also predictive of student's academic success. Among these factors are psychological distress, the use of effective coping strategies, conscientiousness as a personality trait, physical activity, quality of life, and sleep quality.

High levels of psychological distress (primarily due to the experience of stress, and to symptoms of anxiety and depression) have been reported amongst many university student populations, including those in South Africa (Leibowitz, Van Der Merwe, & Van Schalkwyk, 2009). These reports are concerning because numerous studies have confirmed that there is a significant negative association between the experience of stress, anxiety, and depression and levels of academic performance in university students (see, e.g., Ahmed & Julius, 2015; Taylor, Vatthauer, Bramoweth, Ruggero, & Roane, 2013; Vitasari, Wahab, Othman, Herawan, & Sinnadurai, 2010). Moreover, because managing and reducing psychological distress requires the employment of effective coping strategies, it is not surprising that significant associations have also been found between the presence of various coping strategies and academic performance (see, e.g., Kuncharin & Mohamad, 2014; Struthers, Perry, & Menec, 2000).

In addition to the above mentioned psychological variables, a consistent significant positive relationship has been found between the personality trait of conscientiousness and academic performance in university students (see, e.g., Conard, 2006; Komarraju, Karau, & Schmeck, 2009; Mitrofana & Iona, 2013; Sheard, 2009). Possessing the personality of trait of conscientiousness has also been found to be associated with various health-related concepts (e.g., quality of life, physical activity) which are, in turn, predictive of academic performance (Huang et al., 2017). For instance, studies report significant positive associations between quality of life and academic performance, as well as between physical activity and academic performance, in university populations (DeBerard, Spielmans, & Julka, 2004; Shareef et al., 2015; Trockel, Barnes, & Egget, 2000).

Importantly, literature suggests that an association exists between all of the above mentioned psychological variables and sleep (see, e.g., Gray & Watson, 2002; Lemma, Gelaye, Berhane, Worku, & Williams, 2012; Ohayon, Carskadon, Guilleminault, & Vitiello, 2004; Zhi et al., 2016). Healthy, uninterrupted sleep is fundamental for cognitive processes such as learning, memory consolidation, critical thinking, and decision making (Lo, Groeger,

Cheng, Dijk, & Chee, 2016; Owens, 2014). Accordingly, it is reasonable to assume that good sleep quality might bear a positive relation to better academic performance. Indeed, numerous studies have found just such an association (see, e.g., Cates, Clark, Woolley, & Saunders, 2015; Gaultney, 2010; Phillips et al., 2017). For instance, Gilbert and Weaver (2010) found, using a sample of 557 undergraduate psychology students in the United States, that sleep disruption (as estimated by total score on the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989) was significantly negatively associated with academic performance, but only among female students. Similarly, in a cross-sectional study of 2173 Ethiopian university students, Lemma, Berhane, Worku, Gelaye, and Williams (2014) found that both male and female students with poorer sleep quality (i.e., PSQI total score > 5) achieved lower levels of academic performance (as measured by cumulative grade point average). Their analyses detected no significant association between sleep duration and academic performance, however.

In contrast, several published studies have indicated that sleep quality is unrelated to academic performance (see, e.g., Ahrberg, Dresler, Niedermaier, Steiger, & Genzel, 2012; Önder, Beşoluk, Iskender, Masal, & Demirhan, 2014). For instance, Alqarni, Alzahrani, and Alsofyani (2018) found, in a sample of 299 medical students, no significant association between academic performance (as measured by end of year grades) and sleep quality (as measured by the PSQI total score). Alhazzani, Masudi, and Algarni (2018) replicated these findings in a sample of 166 male medical students.

Sleep does not, of course, have independent and isolated effects on academic performance. Because associations between sleep and the other variables mentioned above have been confirmed (see, e.g., Gray & Watson, 2002; Lemma et al., 2012; Ohayon et al., 2004; Zhi et al., 2016), it is likely that they have effects on one another and that they interact to affect academic performances. The same applies for associations found between all of the lifestyle and psychological variables mentioned above. Hence, in order to improve the ecological validity of this design and to gain a holistic understanding of the predictors of academic performance, all of the predictor variables listed above were examined simultaneously.

Rationale, Specific Aims, and Questions

Given that many students at South African universities do not progress beyond their first year of study, as well as the considerable negative implications of leaving university without graduating, it is important to identify ways to increase retention rates from first to subsequent years of undergraduate study. Although it is, at present, unclear precisely how

many first-year university students drop out due to consequences of poor academic performance, extant data suggest this factor contributes considerably to high attrition rates (CHE, 2013; Scott et al., 2007).

Hence, the proposed study aims to assess the contribution of several potential predictors to variance in academic performance within a sample of first-year undergraduate students at a South African university. The literature reviewed above has identified the following set of possible predictors: stress, anxiety, depression, coping strategies, sleep quality, physical activity, quality of life, conscientiousness and matric results. Demographic variables such as age and sex have been identified as potential predictors of academic performance in various university populations and so, despite some equivocal findings regarding their effects (see, e.g., Cassidy, 2012; Naderi, Abdullah, Aizan, Sharir, & Kumar, 2009; Pellizzari & Billari, 2012; Sheard, 2009; Wan Chik et al., 2012; Živčić-Bećirević, Smojver-Ažić, & Dorčić, 2017), I included the factors in this study's statistical modelling. However, no singly study has attempted to assess the degree to which each of these variables predicts academic performance in South Africa. Additionally, no single study has looked at the effect of sleep on academic performance in South African universities.

In light of the gap in the literature, this exploratory study aimed to investigate the following question:

What effects do levels of stress, levels of anxiety, levels of depression, coping strategies, sleep quality, physical activity, quality of life, conscientiousness, and matric results have on first-year undergraduate academic performance in South African universities? Based on previous research, I predicted that matric results would contribute the most to variance in the academic performance of first-year students at a South African university. Additionally, of particular interest in this study is whether sleep, both singly and in interaction with all of the above mentioned predictor variables, significantly predicts academic performance of those students.

Methods

Design and Setting

This study used a cross-sectional, relational design to assess the predictive effects of eleven predictor variables (age, sex, stress levels, anxiety levels, depression levels, coping strategies, sleep quality, physical activity, conscientiousness, quality of life, and matric results) on the outcome variable of academic performance. All data collection procedures took place within the University of Cape Town (UCT) Department of Psychology.

Participants

Sample. The sample consisted of 117 students (102 women and 15 men) all currently enrolled in the Introduction to Psychology Part II (PSY1005S) course, and all in their first year of study at UCT. They were aged between 18 and 41 years (M = 19.64, SD = 2.57).

Regarding recruitment, PSY1005S tutors advertised the study in their first tutorial of the second semester. Additionally, invitations to participate in this study were sent, via email (see Appendix A) and via the Student Research Participation Programme (SRPP) website (see Appendix B), to all students eligible to participate. Eligibility criteria required participants to (a) be currently enrolled in the PSY1005S course, and (b) have written the PSY1005S mid-semester class test.

Individuals who completed the questionnaire received either financial compensation (N = 76) or 1 SRPP point for course credit (N = 41), depending on when in the semester they completed the questionnaire. Those who participated earlier in the semester (i.e., before week 10) were entered into a prize giving draw.

Power analysis. An a priori power analysis, using G*Power software, with linear multiple regression analysis parameters set at effect size Cohen's f = .155 (medium effect size), 11 predictors, and α = .05, suggested that a sample size of 119 would be adequate to achieve statistical power of .80 (Faul, Erdfelder, Buchner, & Lang, 2009). I used that effect size estimate based on data presented by Önder et al. (2014).

Materials

Participants were administered a series of self-report questionnaires, described below, that gathered information regarding age, sex, stress, anxiety, depression, coping strategies, sleep, physical activity, quality of life, and conscientiousness. All of the standardized questionnaires described below have solid psychometric properties and have been used successfully in numerous studies of university populations, and in studies across several cultural contexts, including South Africa (see, e.g., Brazier et al., 1992; Dias, Silva, Maroco, & Campos, 2015; Dozois, Dobson, & Ahnberg, 1998; Fagaras, Radu, & Vanvu, 2015; Holden & Fekken, 1994; Jordaan, Spangenberg, Watson, & Fouche, 2007; Lee, 2012; Makhubela & Mashegoane, 2015; Ncama et al., 2008; Olley, Zeier, Seedat, & Stein, 2005; Olley, Seedat, Nei, & Stein, 2004; Pau & Naidoo, 2008; Pengpid & Peltzer, 2013; Suliman, Troeman, Stein, & Seedat, 2013; Thomas, Samanta, Dubey, Jose, & KP, 2015; Wang & Gorenstein, 2013; Zhang & Akande, 2002). Participants had the choice of answering the questionnaire via an online survey presented on the SurveyMonkey platform (www.surveymonkey.com), or on a printed hard copy.

Sociodemographic questionnaire. This purpose-designed self-report questionnaire was used to gather information regarding participants' *age* and *sex* (see Appendix C).

Perceived Stress Scale – 10-item Version (PSS-10). This self-report measure assesses the degree to which situations experienced by the respondent during the previous month were perceived as stressful (see Appendix D; Cohen & Williamson, 1988). Hence, the current study used this measure to gather information regarding participants' current *stress levels*. Each of the measure's 10 items is answered on a 5-point Likert-type scale, with responses ranging from 0 ("never") to 4 ("very often"). Item scores are summed to yield an overall score ranging from 0-40, with higher scores indicating greater stress levels.

State-Trait Anxiety Inventory – Trait Form (STAI-Trait). This self-report measure assesses participants' general tendency to be anxious (see Appendix E; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). Hence, the current study used this measure to gather information regarding participants' *anxiety levels*. Each of the measure's 20 items is answered on a 4-point Likert-type scale, with responses ranging from 1 ("almost never") to 4 ("almost always"). Item scores are summed to yield an overall score ranging from 20-80, with higher scores indicating greater anxiety levels (Julian, 2011).

Beck Depression Inventory-II (BDI-II). This self-report measure assesses the number and severity of depressive symptoms in adults (see Appendix F; Beck, Steer, & Brown, 1996). Hence, the current study used this measure to gather information regarding participants' current *depression levels*. Each of the measure's 21 items is answered on a 4-point Likert-type scale, with responses ranging from 0–3 based on severity of each item's specific manifestation of depression. Item scores are summed to yield an overall score ranging from 0-63, with higher scores indicating greater depression levels.

Brief Coping Orientations to Problems Experienced Scale (Brief COPE). This multidimensional self-report measure assesses the degree to which respondents use distinct coping reactions to stress (see Appendix G; Carver, 1997). Hence, the current study used this measure to gather information regarding participants *coping strategies*. Each of the measure's 28 items is answered on a 4-point Likert-type scale, with responses ranging from 1 ("I haven't been doing this at all") to 4 ("I've been doing this a lot"). The measure's 28 items are divided into 14 scales, each consisting of two items: (a) self-distraction, (b) active coping, (c) denial, (d) substance use, (e) emotional support, (f) instrumental support, (g) behavioral disengagement, (h) venting, (i) positive reframing, (j) planning, (k) humor, (l) acceptance, (m) religion, and (n) self-blame.

Pittsburgh Sleep Quality Index (PSQI). This self-report measure (see Appendix H; Buysse et al., 1989) is the primary instrument of concern in this study. It assesses *sleep disturbances and sleep quality* over the previous month. Each of the measure's 19 items contribute to a score on one of seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medications, and daytime dysfunction. Each component has a score ranging from 0-3, which are summed to yield an overall score ranging from 0-21, with higher scores indicating poorer sleep quality (Cates et al., 2015).

The PSQI has acceptable psychometric properties, with good internal consistency (α = .83), high test-retest reliability, and acceptable construct validity (Carpenter & Andrykowski, 1998). Furthermore, several studies of university student populations, and studies across several cultural contexts, including South Africa, have used the PSQI successfully (see, e.g., Aloba, Adewuya, Ola, & Mapayi, 2007; Beaudreau et al., 2012; Henry, Wolf, Ross, & Thomas, 2015).

International Physical Activity Questionnaire - Short Form (IPAQ-SF). This self-report measure assesses the respondent's duration and intensity of physical activities over the previous week (see Appendix I; Craig et al., 2003). Hence, the current study used this measure to gather information regarding participants' *physical activity*. Each of the measure's 7 items contribute to a continuous score expressed as MET-min per week (i.e., the rate of energy expended during an activity performed over a week), with higher scores indicating greater physical activity.

Medical Outcomes Study Short Form 36-item Health Survey (SF-36). This self-report measure assesses eight health-related concepts which, together, estimate the respondent's general *quality of life* (QoL; see Appendix J; Ware & Sherbourne, 1992). Each of the measure's 36 items contribute to a score on one of eight health-related subscales: (i) general health, (ii) physical functioning, (iii) pain, (iv) role limitations due to physical health, (v) energy/fatigue, (vi) social functioning, (vii) emotional well-being, and (viii) role limitations due to emotional problems. Each subscale has a score ranging from 0-100, with higher scores indicating greater quality of life. Four of the subscales (i-iv, listed above) are averaged to yield an overall Physical QoL score, and the other four (v-viii, listed above) are averaged to yield an overall Mental QoL score.

The NEO Five-Factor Inventory (NEO-FFI) – Conscientious Subscale. This subscale of a widely-used self-report personality measure assesses participants' tendency to be conscientious (see Appendix K; Costa & McCrae, 1992). Hence, the current study used

this subscale to gather information regarding participants *conscientiousness levels*. Each of the subscale's 12 items is answered on a 5-point Likert-type scale, with responses ranging from 0 ("strongly disagree") to 4 ("strongly agree"). Item scores are summed to yield an overall score ranging from 0-48, with higher scores indicating greater conscientiousness.

Prior academic performance. The UCT student record database stores matric marks obtained by all of the university's currently enrolled undergraduate students. Hence, the current study used this database to gather information regarding participants' *matric results* as a proxy for prior academic performance. The matric results of each participant were captured as an overall score ranging from 0-100, which was calculated by averaging the six highest subject percentages.

Academic performance. The outcome variable of *academic performance* was measured using the participants' PSY1005S mid-semester test mark. The class test marks were captured as a percentage, and thus had a possible range of 0-100. With participants' consent, the test marks were accessed from the Department of Psychology's student result database.

Procedure

At the beginning of the second semester, first-year undergraduate students enrolled in the PSY1005S course at UCT received an email inviting them to participate. Embedded in the email was a link that redirected readers to the online survey. Students were also able to collect a hard copy of the questionnaire from their PSY1005S tutor.

The first page of the survey asked participants to complete an informed consent document. This document provided details of the study, assured participants that their participation was voluntary and that their information would be held confidential, and noted that they could withdraw from the study at any point without penalty (see Appendix L for financial compensation consent form; see Appendix M for SRPP compensation consent form). Additionally, the informed consent form requested authorisation for the principal investigator to access matric marks, academic transcripts, and mid-semester test marks.

After indicating their understanding of the consent form's contents, participants were asked to complete the set of measures described above, in the same order they are presented above. Subsequently, participants were directed to a page containing a debriefing form which provided contact details for the UCT Student Wellness Service, as well as the principal investigator's email address in case they had any questions (see Appendix N). After participants indicated that they had read the debriefing form, participation was complete.

To maintain confidentiality, the principal investigator was the only person to score the questionnaires and to enter the data into a computerized spreadsheet, and to gather the information regarding participants' matric results and PSY1005S mid-semester test marks from the appropriate databases. All study procedures were approved by UCT Department of Psychology's Research Ethics Committee (Reference number - PSY2018-024; see Appendix O).

Data Management and Statistical Analyses

I scored questionnaires according to the standard methods outlined in their respective test manuals. SPSS (version 25) was used for all statistical analyses, with the threshold for statistical significance set at $\alpha = .05$.

Descriptive statistics. As an initial analytic step, I generated descriptive statistics for all predictor variables and the outcome variable. I used these datasets to identify missing values or outliers (values > 3 *SD* above the relevant mean) in the distributions, and to create a table detailing the sample characteristics.

Factor analyses. Four separate principal component factor analyses investigated the underlying structures of (a) the PSS-10, STAI-Trait, and BDI-II, (b) Brief COPE, (c) PSQI, and (d) SF-36 measures, and sought to identify potential composite variables that could be used in subsequent analyses. Identifying composite variables is useful as it often allows for more robust measures of multidimensional concepts (Song, Lin, Ward, Fine, & Hill, 2013).

In each of the four factor analyses, factors were retained if their eigenvalues were greater than 1. Additionally, communalities were deemed acceptable if they were above .30, and factor loadings were deemed acceptable if they were greater than .40 on only one factor (Stevens, 1992). All factor analyses were conducted without rotation because there were sufficient numbers of primary loadings.

The first factor analysis investigated whether there was an underlying relationship between the PSS-10, STAI-Trait, and BDI-II scores, and whether it was therefore justified to create a composite variable representing that common construct. The second factor analysis sought to identify whether scores on the 14 subscales of the Brief COPE could be factored into a smaller set of discrete coping strategies. The third factor analysis assessed whether the PSQI global score was appropriate to use in the main analysis (i.e., the regression modelling described below). That is, it investigated whether the scores on each of the seven PSQI components loaded adequately onto a single factor. The fourth factor analysis assessed whether the eight health-related subscales on the SF-36 loaded appropriately and adequately onto the two factors specified by the test manual (viz., Physical QoL and Mental QoL).

Correlational analyses. This series of bivariate analyses, which used Pearson's *r* correlation coefficient, sought to describe the magnitude of association between each predictor variable and the outcome variable. Only those predictors that correlated with academic performance (i.e., the class test mark) at $p < .05$ were retained for use in regression modeling. Thereafter, another set of correlation analyses, also using Pearson's *r* correlation coefficient, sought to describe the magnitude of association between the interactions of the to-this-point retained predictor variables and the outcome variable.

Regression analysis. Because there was no a priori hypothesis regarding the magnitude of the effect of each predictor on the outcome, I chose the backwards linear regression method. First, a preliminary regression analysis assessed whether, once entered into the model, the set of retained predictor variables would still each individually account for a significant proportion of the variance in academic performance. Then, those variables that were still significantly predictive were entered into the final model.

Results

Outliers and Missing Values

Box-and-whisker plots identified one outlier from the age dataset, eight from the BDI-II, three from each of the denial, substance use, and behavioural disengagement subscales of the Brief COPE, three from the IPAQ-SF, four from the physical functioning subscale of the SF-36, and one from the NEO-FFI Conscientious subscale. Fifteen participants had missing matric results. The analyses described below were completed with all outliers and missing values excluded on a pairwise basis.

Factor Analyses

For all four factor analyses, communalities were above .30, unless otherwise specified, thus confirming that each of the examined variables shared some common variance with the others. Additionally, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was above the acceptable threshold of .50 (they were, respectively, .70, .69, .73, and .76) for all analyses. Moreover, Bartlett's Test of Sphericity was significant for all analyses ($p < .001$), indicating that each dataset was appropriate for factor analysis.

Factor analysis 1. Scores on the PSS-10, STAI-Trait, and BDI-II loaded heavily (.86, .92, and .87, respectively) onto a single factor. This single factor accounted for 77.72% of the observed variance in the scores. Hence, I concluded that the constructs measured by those instruments are related to a single underlying factor. For the purposes of this study, I named that factor *Psychological Distress*, and calculated a composite score representing it by

multiplying each individual's score on the three separate measures by that measure's factor loading score, and then summing the products.

Factor analysis 2. Initially, scores on the subscales of the Brief COPE appeared to load onto four factors. However, inspection of the factor loadings revealed that most subscale scores loaded onto more than one of those four factors. Hence, those scores that loaded equally onto more than one factor (viz., *active coping*, *emotional support*, and *self-blame*) were excluded from further participation in the factor analysis. After forced extraction of two factors, results indicated that each of the remaining subscales loaded heavily onto one of those two factors. The communality for *religious coping strategies* was .20, and therefore it was removed from the analysis.

Table 1 shows the remaining factor loadings. I named Factor 1 *Positive Coping* and Factor 2 *Negative Coping*. For each participant, I then calculated a score for each of the two factors by summing the raw scores on the contributing subscales and then taking the average.

Table 1

Factor Analysis 2: Factor loadings for subscale scores of the Brief COPE (N =118)

Subscale	Factor 1	Factor 2
Self-distraction	.49	
Denial		.64
Substance use		.59
Instrumental support	.70	
Behavioural disengagement		.80
Venting	.70	
Positive reframing	.64	
Planning	.65	
Humour	.43	
Acceptance	.55	

Note. Factor loadings < .40 have been suppressed. Brief COPE = Brief Coping Orientations to Problems Experienced.

Factor analysis 3. Initially, scores from the PSQI's seven components did not adequately load onto one factor. After forced extraction of one factor, results indicated that each of the seven components loaded heavily onto that factor. However, because the

communalities for the PSQI-6 and PSQI-4 components were below .30, the PSQI global score was deemed inappropriate for use in the regression analysis. Instead, I calculated a composite score for the PSQI by multiplying each score of the seven components by their respective factor loadings (see Table 2).

Table 2

Factor Analysis 3: Factor loadings and communalities for individual components of the PSQI (N = 117)

Component Number and Name	Factor 1	Communality
PSQI-1: Subjective sleep quality	.79	.63
PSQI-2: Sleep latency	.69	.48
PSQI-3: Sleep duration	.55	.30
PSQI-4: Habitual sleep efficiency	.50	.25
PSQI-5: Sleep disturbance	.65	.43
PSQI-6: Use of sleep medications	.44	.19
PSQI-7: Daytime dysfunction	.60	.36

Note. PSQI = Pittsburgh Sleep Quality Index.

Factor analysis 4. Scores from the eight health-related subscales on the SF-36 did not did not load onto the Physical QoL and Mental QoL factors in the ways specified by the test manual. When I forced the analysis to extract two factors, subscale scores that loaded onto Factor 2 loaded equally onto Factor 1. Therefore, scores on each of the eight subscales were entered into the regression model independently.

Sample Characteristics

Table 3 presents descriptive statistics for the sample. Of note here is the average class test mark of the 117 students in this study did not differ significantly from the marks of those not in the sample who took the test (N = 493), M = 59.52, SD = 20.12, $t(608) = 1.28$, $p = .20$, $d = .14$.

Table 3

Descriptive Statistics: Predictor variables and outcome variable (N = 117)

Variable	*n*	*M*	*SD*	Range
Predictor				
Psychological Distress				
Composite score	116	78.76	23.28	30-141
PSS-10	117	21.74	6.54	7-39
STAI-Trait	117	48.85	11.53	21-80
BDI-II	109	16.31	8.99	0-41
Brief COPE				
Positive coping	117	60.44	12.55	34-96
Negative coping	114	38.11	12.92	25-71
PSQI				
Composite score	117	5.17	2.30	1-11
PSQI-1: Subjective sleep quality	117	1.44	0.81	0-3
PSQI-2: Sleep latency	117	1.59	1.06	0-3
PSQI-3: Sleep duration	117	1.17	0.98	0-3
PSQI-4: Habitual sleep efficiency	117	0.62	0.96	0-3
PSQI-5: Sleep disturbance	117	1.34	0.57	0-3
PSQI-6: Use of sleep medications	117	0.52	0.96	0-3
PSQI-7: Daytime dysfunction	117	1.46	0.87	0-3
IPAQ-SF	114	2882.85	2109.70	33-8640
SF-36				
General health	117	59.74	22.03	10-100
Physical functioning	113	89.07	11.81	55-100
Pain	117	73.02	23.11	13-100
Physical role functioning	117	64.74	37.31	0-100
Energy	117	44.65	20.32	0-95
Social functioning	117	67.20	26.36	0-100
Emotional well-being	117	54.80	21.58	4-96
Emotional role functioning	117	40.45	40.60	0-100
NEO-FFI Conscientious Subscale	116	27.90	7.35	9-43
Matric Results	102	74.69	6.35	62-91
Outcome				
Class Test Mark	117	62.12	17.86	22-98

Note. PSS-10 = Perceived Stress Scale – 10-item Version; STAI-Trait = State-Trait Anxiety Inventory-Trait Form; BDI-II = Beck Depression Inventory-Second Edition; Brief COPE = Brief Coping Orientations to Problems Experienced; PSQI = Pittsburgh Sleep Quality Index; IPAQ-SF = International Physical Activity Questionnaire – Short Form; SF-36 = Medical Outcomes Study Short Form 36-item Health Survey; NEO-FFI Conscientious Subscale = NEO Five-Factor Inventory (NEO-FFI) – Conscientious Subscale.

Correlational Analyses

Psychological distress, $r(116) = -.25$, $p = .008$, and PSQI-5: Sleep disturbance, $r(117) = -.26$, $p = .005$, were significantly negatively correlated with class test mark. SF-36 physical functioning score, $r(113) = .20$, $p < .001$, NEO-FFI Conscientious subscale score, $r(116) = .30$, $p = .001$), and matric results, $r(102) = .56$, $p = .036$, were also positively correlated with that outcome. All other correlations were not statistically significant, rs < .14, ps > .06. Hence, only the five predictors listed above were retained for evaluation in the regression model.

Additionally, the interaction between sleep disturbance and psychological distress, $r(116) = -.31$, $p = .001$, as well as that between sleep disturbance and physical functioning, $r(113) = -.20$, $p = .031$, were significantly negatively correlated with class test marks. Hence, these two interactions were also retained for evaluation in the regression model.

Regression Analysis.

The overall model for the preliminary analysis was statistically significant, $F(2, 94) = 24.14$, $p < .001$. It suggested a model containing only matric results and PSQI-5: Sleep disturbance as significant predictors of class test mark. In other words, the other variables entered into the preliminary model (psychological distress, physical functioning, conscientiousness, the interaction between sleep disturbance and psychological distress, and the interaction between sleep disturbance and physical functioning) were no longer significantly predictive of the outcome.

The overall model for the final regression analysis was statistically significant, $F(2, 99) = 246.04$, $p < .001$, and accounted for 35% of total variance in class test marks. Beta values suggested that, of the two predictor variables evaluated in the final model, matric results were a stronger predictor of the outcome (see Table 4). The data in that table also indicate that, for every one extra point on the PSQI-5: Sleep disturbance component, the student's class test mark would drop by 6.97% (i.e., more sleep disturbance was associated with poorer academic performance). In contrast, for every 1% increase in matric results, there was a 1.48% increase in class test marks. Regarding multicollinearity for the predictor variables, both matric results and PSQI-5: Sleep disturbance scores had VIF values below 1 and tolerance values greater than .2, indicating no cause for concern.

Table 4

Final Backwards Linear Regression Model: Predicting Class Test Marks (N = 102)

Predictor	*B*	*SE B*	*β*	*t*	*p*
(Constant)	-39.52	18.89		-2.09	.039*

Matric results	1.48	0.24	.51	6.21	< .001***
PSQI-5: Sleep disturbance	-6.97	2.75	-.21	-2.53	.013*

Note. R^2 =.35. Adjusted R^2 = .33. Degrees of freedom were (2, 99). PSQI = Pittsburgh Sleep Quality Index.

*p < .05. **p < .01. ***p <. 001.

Discussion

The main aim of this study was to identify variables that predict academic performance within a sample of first-year undergraduate students at a South African university. Of particular interest was whether (a) as reported in previously published studies, matric results contribute most strongly to variance in university-level academic performance; and (b) sleep disruption, either singly or in interaction with other lifestyle and psychological variables (e.g., stress, anxiety, depression, coping strategies, physical activity), significantly predicts variance in that performance.

Overall, the current analyses suggested that only matric results and sleep disturbance (i.e., waking up in the middle of the night or early morning, and lack of comfort during sleep due to problems with pain, breathing, body temperature, and bad dreams) were significantly associated with score on a first-year Psychology class test. Specifically, higher matric marks and fewer sleep disturbances were associated with better scores on that test. None of the other variables that I evaluated (age, sex, stress, anxiety, depression, coping strategies, overall sleep quality, subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, use of sleeping medications, daytime dysfunction, physical activity, quality of life, and conscientiousness) was a significant predictor of the outcome.

As predicted, matric results were the strongest predictor of academic performance in this study. This finding is consistent with those from several previously published studies of university students, including those enrolled in South African universities (see, e.g., Anderton et al., 2016; Baard et al., 2010; Cassidy, 2012; Friedman & Mandel, 2011; McKenzie & Schweitzer, 2001). A possible explanation for this finding is that both matric results and university academic success reflect a student's capacity to perform well in a classroom environment (e.g., to cope well with test anxiety and exam pressures, to manage time efficiently, and to use effective study skills).

This finding regarding the predictive value of matric results provides helpful insight into the structure of South African educational system, and particularly the bridge between secondary and tertiary education. Specifically, it suggests that, even though there is a variation in quality of education across South African high schools, the standardised matric

exam is a good predictor of how well an individual will perform at university. Hence, this study validates the use of matric results as the primary selection criterion for entry into South African universities, and replicates previous data suggesting it is the best predictor of future academic performance (see, e.g., Anderton et al., 2016; Baard et al., 2010; Deryakulu et al., 2009; McKenzie & Schweitzer, 2001).

The observed association between levels of sleep disturbance and class test marks is consistent with the results of similar previous studies of undergraduate samples. For instance, Lemma et al. (2014) reported a negative association between academic performance and sleep disturbance in a sample of 2173 university students (see, e.g., Gilbert & Weaver, 2010; Sarbazvatan, Amini, Aminisani, & Shamshirgaran, 2017). Of note here is that Lemma et al. (2014) also used the PSQI to estimate sleep disturbance.

In contrast to previous studies, however, the present study identified sleep disturbance as the only sleep-related component important for academic success in undergraduate students. Here, self-reports regarding overall sleep quality, subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, use of sleeping medications, and daytime dysfunction were not significantly associated with academic performance. However, in prior studies, inconsistent levels of sleep efficiency and use of sleep medications were associated with poor academic performance (see, e.g., Cates et al., 2015; Taylor et al., 2013). Additionally, unlike numerous studies reporting associations between sleep quality and academic performance (see, e.g., Cates et al., 2015; Gaultney, 2010; Phillips et al., 2017), in this study sleep quality (as measured by PSQI global score > 5) was not significantly correlated with academic performance. Of note, however, is that the sleep quality of the current sample was generally poor (73% of participants (n = 85) obtained a PSQI global score > 5). Hence, if sleep quality was more normally distributed in the samples used by previous studies, clinically impaired sleep quality might have had a much more significant effect on academic performance in those samples.

Nonetheless, it is noteworthy that in this sample only students who experienced high levels of sleep disturbance (regardless of their sleep quality) were at risk of performing poorly academically. This pattern of data may have arisen because the reported sleep disturbances may typically occur during those stages of sleep that are particularly be associated with learning and memory consolidation (Maquet, 2001), and thus may have a disproportionate effect on academic performance. Alternatively, this may be because, as demonstrated in previous studies, sleep disturbance effects poor academic performance because of its interaction with other variables predictive of academic success in

undergraduate students, such as stress and quality of life (see, e.g., Almojali, Almalki, Alothman, Masuadi, & Alaqeel, 2017; Kalyani, Jamshidi, Salami, & Pourjam, 2017; Zhi et al., 2016).

Consistent with these latter findings, correlational analyses of the current data suggested that an interaction between sleep disturbance and psychological distress, as well as that between sleep disturbance and physical functioning, was significantly associated with academic performance. However, the significance of these associations did not survive entry into the regression model alongside other potential predictor variables. A possible reason for this is that sleep disturbance has a very powerful effect to the extent that weaker effects cannot be seen.

The finding that sleep disturbance was the only sleep-related component that is predictive of academic performance, as well as the finding that its predictive qualities are independent in nature, suggests a specific intervention target that might increase success in university. Perhaps more importantly, these results indicate that sleep disturbance is a modifiable risk factor for academic performance *even after* students have already been admitted to university. That is, according to these results, over and above all other lifestyle and psychological predictor variables, targeting sleep disturbance may be the most effective way to improve academic success among first-year university students in South African universities.

Because the domains of psychological distress and sleep disturbance have some overlap, it is likely that interventions for stress management would improve sleep. However, the findings presented here argue for extra attention to the sleep domain, which health centres at university could easily translate into real-world application. Numerous empirical studies provide evidence supporting such intervention (see, e.g., Brown, Buboltz, & Soper, 2006; Suen, Tam, & Hon, 2010). For instance, Tsai and Li (2004) examined the effectiveness of a "Sleep Management" course (100 min./week). Using lectures, practice of self-evaluation, and group discussion to educate 241 Taiwanese undergraduate students on sleep hygiene, results indicated an improvement in sleep quality, but not sleep disturbance. Other evidence, however, demonstrates that teaching undergraduate university students about sleep hygiene (e.g., going to be bed without being thirsty and maintaining a regular sleep-wake schedule) does improve sleep disturbance patterns (Brown, Buboltz, & Soper, 2002). These findings suggest that sleep-hygiene education is an effective intervention strategy to improve sleep in undergraduate students. Accordingly, it may be advantageous for South African universities to put programmes in place to teach proper sleep hygiene, and to educate first-year

undergraduate students on the effects of sleep disturbance on academic performance. Furthermore, students at risk of academic failure should be screened for sleep disturbance and treated accordingly. Unfortunately, few universities (in South Africa and elsewhere) have undertaken to put such measures in place.

The current investigation did not replicate findings from numerous previous studies regarding the predictive power of sociodemographic variables (age, sex) with regard to university academic performance. These negative findings may be explained by (a) the restricted age range of the current sample (18-30), and (b) the fact that there are many more female than male students in first-year psychology courses at UCT. Alternatively, there may in fact be few age- and sex-based differences in university students' academic performance. This is demonstrated by Sheard (2009) who found that, in a sample of 135 undergraduate students, sex was significantly associated with academic performance (as measured by final degree grade point average; GPA), however, it only explained between 1 and 2% of the total variance in GPA. Additionally, Sheard (2009) reported that age also had little effect on GPA.

The current investigation also did not replicate findings from numerous previous studies regarding the predictive power of stress, anxiety, and depression with regard to university academic performance. The lack of significant association between psychological distress and academic performance in the final model could also be explained by the fact that this study used a sample of specifically first-year students. Generally, studies that find no significant association between psychological distress and academic performance use a sample of first-year university students (see, e.g., Del-Ben et al., 2013; McKenzie & Schweitzer, 2001; Trockel et al., 2000). In contrast, prior studies that have found a significant association between those two variables have used samples of students in their second or third year of undergraduate studies (see, e.g., Aritzeta et al., 2017; Kadhiravan & Kumar, 2012; Lund, Reider, Whiting, & Prichard, 2010; Taylor et al., 2013; Vitasari et al., 2010). Indeed, significant differences have been found between the prevalence of psychological distress in students in their first year of university compared to those in subsequent years, with some studies demonstrating increased psychological distress in first-year students (see, e.g., Bassols et al., 2014; Ramteke & Ansari, 2016) while others demonstrate increased psychological distress in later years of study (see, e.g., Eckberg, Pidgeon, & Magyar, 2017).

Similarly, the current negative finding regarding conscientiousness as a predictor was unexpected, both in the light of previous literature (see, e.g., Conard, 2006; Komarraju et al., 2009; Mitrofana & Iona, 2013) and the fact that behaviours associated with the personality trait of conscientiousness (i.e., the tendency to be diligent, reliable, achievement oriented, and

self-determined) should translate into enhanced academic performance (Bartley & Roesch, 2011). This inconsistent finding may be accounted for by the fact that previous researchers who have reported a significant association between conscientiousness and academic performance have done so upon assessing its predictive power in relation to other personality traits, such as neuroticism, openness, extraversion, and agreeableness (see, e.g, Conard, 2006; O'Connor & Paunonen, 2007), however, the present study assessed the predictive power of conscientiousness as a single personality variable in comparison with other lifestyle and psychological variables (e.g., stress, anxiety, depression, coping strategies and physical activity).

Limitations and Directions for Future Research

Several methodological limitations must be considered when drawing inferences from this study's findings. First, the sample was relatively restricted in that participants were recruited from only one South African university, and from only one course within that university. Although this design element ensured that the outcome measure of academic performance was collected from the same class test, taken on the same day and under the same circumstances by all participants, it does limit the generalizability of the results. Future studies investigating predictors of academic performance would benefit from using a sample of first-year university students from a variety of different universities.

Second, data for all predictor variables other than matric results were collected via self-report questionnaires. The weaknesses of self-report measures (e.g., their lack of correlation with observed behaviour, their vulnerability to social desirability influences) has been covered extensively in the psychological literature (see, e.g., Fan et al., 2006; Shaughnessy, Zechmeister, & Zeichmeister, 2011; Warnecke et al., 1997). Nonetheless, the use of such measures was the most feasible in this case, particularly given time and resource constraints on data collection and the simultaneous desire to recruit as large a sample as possible. Future studies using both subjective and objective measures of, for instance, sleep and psychological distress should therefore seek to replicate the current findings.

Third, the current results are correlational, and one therefore cannot infer causality from them. Prior research demonstrates that sleep disturbance is associated with other predictor variables of academic performance (see, e.g., Gray & Watson, 2002; Lemma et al., 2012; Ohayon et al., 2004; Zhi et al., 2016). Thus, it is possible that students who perform poorly academically engage in behaviours which, in turn, cause sleep disturbance (e.g., high levels of stress, symptoms of anxiety and depression; Lemma et al., 2012). Alternatively, high levels of sleep disturbance may lead to behaviours which, in turn, cause poor academic

performance (e.g., electronic media use, substance use; Owens, 2014). Accordingly, the use of longitudinal analyses in future research is necessary to identify a more direct causal relationship between prior academic performance and sleep disturbance on academic performance.

Summary and Conclusion

The current findings suggest that relatively poor matric results and relatively high levels of sleep disturbance contribute significantly to poor academic performance among first-year South African university students. Of note was that no other measured variable (age, sex, stress, anxiety, depression, coping strategies, quality of life, and conscientiousness) was a significant predictor of the outcome. This implies that, in order to improve academic performance, and to consequently decrease student attrition (and, eventually, increase graduation rates), South African universities should continue to use excellent matric results as a minimum admission requirement. Additionally, institution administrators should design interventions that target and improve levels of sleep disturbance amongst first-year undergraduates.

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Appendix A

Announcement to PSY1005S Students for Recruitment

Hi Everyone,

I am an Honours student currently running a research study through the Department of Psychology. This study is of great significance and attempts to better understand the experience of being a first-year student at a South African university.

If you decide to participate in this study, you will be asked for permission to access your matric results, your PSY1005S mid-semester weighted average (i.e., overall PSY1005S academic performance up until, and including, your mid-semester PSY1005S test results), as well as access to your academic transcript. Thereafter, you will be asked to complete several questionnaires, via an online survey, that will gather biographical information (e.g., your age and sex), as well as information about your mood, sleep, and physical activity. The questionnaire can be found at: www.surveymonkey.com/r/study

These questionnaires should take about 45 minutes to complete.
Upon completion, interested participants will be entered into a raffle for a chance to win 1 of 4 vouchers for Cavendish Square (1 x R750, 1 x R500, 1 x R300, 1 x R200).

If you have any further questions, please don't hesitate to email me at:
1styear.psych.study@gmail.com

Thank you!

Appendix B

SRPP Announcement to Undergraduate Students for Recruitment

Subject PSY1005S - Get 1 SRPP point by completing an online questionnaire

Hi Everyone,

I am an Honours student currently running a research study through the Department of Psychology. This study is of great significance and attempts to better understand the experience of being a first-year student at a South African university.

To participate in this study, you need to be:

Currently be enrolled in the PSY1005S course at UCT

If you meet the above criterion and you decide to participate in this study, you will be asked for permission to access your matric results as well as your PSY1005S mid-semester weighted average (i.e., overall PSY1005S academic performance up until, and including, your mid-semester PSY1005S test results). Thereafter, you will be asked to complete several questionnaires, via an online survey, that will gather biographical information (e.g., your age and sex), as well as information about your mood, sleep, and physical activity. The questionnaire can be found at: www.surveymonkey.com/r/study

These questionnaires should take about 45 minutes to complete.
Upon completion, you will receive **1 SRPP point**.

If you have any further questions, please don't hesitate to email me at:
1styear.psych.study@gmail.com

Thank you!

Kind regards,
Raphaella Lewis

Appendix C

Sociodemographic Questionnaire

Sociodemographic Questionnaire	
Full name:	
Student number:	
Telephone:	Home: Cell:
Email address:	
Sex:	
Age:	
Place of birth:	
Home language:	
High school attended:	

Appendix D

Perceived Stress Scale (PSS-10)

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the most important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Appendix E

State-Trait Anxiety Inventory – Trait Form (STAI-Trait)

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 *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.

1 = Almost Never 2 = Sometimes 3 = Often 4 = Almost Always

1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I feel satisfied with myself	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I feel like a failure	1	2	3	4
6. I feel rested	1	2	3	4
7. I am “calm, cool and collected”	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that really doesn’t matter	1	2	3	4
10. I am happy	1	2	3	4
11. I have disturbing thoughts	1	2	3	4
12. I lack self-confidence	1	2	3	4

13. I feel secure	1	2	3	4
14. I make decisions easily	1	2	3	4
15. I feel inadequate	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thoughts run through my mind and it bothers me	1	2	3	4
18. I take disappointment so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests	1	2	3	4

Appendix F

Beck Depression Inventory-II (BDI-II)

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the **way you have been feeling during the past two weeks, including today**. Select the number beside the statement that you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleep Pattern) and Item 18 (Changes in Appetite).

1. Sadness		**12. Loss of Interest**	
0	I do not feel sad.	0	I have not lost interest in other people or activities.
1	I feel sad much of the time.	1	I am less interested in other people or things than before.
2	I am sad all of the time	2	I have lost most of my interest in other people or things.
3	I am so sad or unhappy that I can't stand it.	3	It's hard to get interested in anything.
2. Pessimism		**13. Indecisiveness**	
0	I am not discouraged about my future.	0	I make decisions as well as ever.
1	I feel more discouraged about my future than I used to be.	1	I find it more difficult to make decisions than usual.
2	I do not expect things to work out for me.	2	I have much greater difficulty in making decisions than I used to.
3	I feel my future is hopeless and will only get worse.	3	I have trouble making any decisions.
3. Past Failure		**14. Worthlessness**	
0	I do not feel like a failure	0	I do not feel I am worthless.

1	I have failed more than I should have.	1	I don't consider myself as worthwhile and useful as I used to be.
2	As I look back, I see a lot of failures.	2	I feel more worthless as compared to other people.
3	I feel I am a total failure as a person.	3	I feel utterly worthless.
4. Loss of Pleasure		**15. Loss of Energy**	
0	I get as much pleasure as I ever did from the things I enjoy.	0	I have as much energy as ever.
1	I don't enjoy things as much as I used to.	1	I have less energy than I used to have.
2	I get very little pleasure from the things I used to enjoy.	2	I don't have enough energy to do very much.
3	I can't get any pleasure from the things I used to enjoy.	3	I don't have enough energy to do anything.
5. Guilty Feelings		**16. Changes in Sleep Pattern**	
0	I don't feel particularly guilty.	0	I have not experienced any change in my sleeping pattern.
1	I feel guilty over many things I have done or should have done	1a 1b	I sleep somewhat more than usual. I sleep somewhat less than usual.
2	I feel quite most of the time.	2a 2b	I sleep a lot more than usual. I sleep a lot less than usual.
3	I feel guilty all of the time.	3a 3b	I sleep most of the day. I wake up 1-2 hours early and can't get back to sleep.
6. Punishment Feelings		**17. Irritability**	
0	I don't feel I am being punished.	0	I am no more irritable than usual.
1	I feel I may be punished.	1	I am more irritable than usual.

2	I expect to be punished.	2	I am much more irritable than usual.
3	I feel I am being punished.	3	I am irritable all the time.
7. Self-Dislike		**18. Change in Appetite**	
0	I feel the same about myself as ever.	0	I have not experienced any changes in my appetite
1	I have lost confidence in myself.	1a 1b	My appetite is somewhat less than usual. My appetite is somewhat more than usual.
2	I am disappointed in myself.	2a 2b	My appetite is much less than usual. My appetite is much more than usual.
3	I dislike myself.	3a 3b	I have no appetite at all. I crave food all the time.
8. Self-Criticalness		**19. Concentration Difficulty**	
0	I don't criticise or blame myself more than usual.	0	I can concentrate as well as ever.
1	I am more critical of myself than I used to be.	1	I can't concentrate as well as usual.
2	I criticise myself for all my faults.	2	It's hard to keep my mind on anything for very long.
3	I blame myself for everything bad that happens.	3	I find I can't concentrate on anything.
9. Suicidal Thoughts or Wishes		**20. Tiredness or Fatigue**	
0	I don't have any thoughts of killing myself.	0	I am no more tired or fatigued than usual.
1	I have thoughts of killing myself, but I would not carry them out.	1	I get more tired or fatigued more easily than usual.
2	I would like to kill myself.	2	I am too tired or fatigued to do a lot of the things I used to do.

3	I would kill myself if I had the chance	3	I am too tired or fatigued to do most things I used to do.
10. Crying		**21. Loss of Interest in Sex**	
0	I don't cry any more than I used to.	0	I have not noticed any recent change in my interest in sex.
1	I cry more than I used to.	1	I am less interested in sex than I used to be.
2	I cry over every little thing.	2	I am much less interested in sex now.
3	I feel like crying, but I can't.	3	I have lost interest in sex completely.
11. Agitation			
0	I am no more restless or wound up than usual.		
1	I feel more restless or wound up than usual.		
2	I am so restless or agitated that it's hard to stay still.		
3	I am so restless or agitated that I have to keep moving or doing something.		

Appendix G
Brief COPE Scale

These items deal with ways you've been coping with the stress in your life. There are many ways to try and deal with stress. These items ask what you've been doing to cope with this stress. Obviously, different people deal with things in different ways, but I'm interested in how you've tried to deal with it. Each item says something about a particular way of coping. I want to know to what extent you've been doing what the item says. How much or how frequently. Don't answer on the basis of whether it seems to be working out or not – just whether or not you are doing it. Use these response choices. Try to rate each item separately in your mind from others. Make your answers as true FOR YOU as you can.

1 = I haven't been doing this at all 2 = I've been doing this a little bit
3 = I've been doing this a medium amount 4 = I've been doing this a lot

1. I've been turning to work or other activities to take my mind off things.	1	2	3	4
2. I've been concentrating my efforts on doing something about the situation I'm in.	1	2	3	4
3. I've been saying to myself "this isn't real.".	1	2	3	4
4. I've been using alcohol or other drugs to make myself feel better.	1	2	3	4
5. I've been getting emotional support from others.	1	2	3	4
6. I've been giving up trying to deal with it.	1	2	3	4

7. I've been taking action to try make the situation better.	1	2	3	4
8. I've been refusing to believe that it has happened.	1	2	3	4
9. I've been saying things to let my unpleasant feelings escape.	1	2	3	4
10. I've been getting help and advice from other people.	1	2	3	4
11. I've been using alcohol or other drugs to help me get through it.	1	2	3	4
12. I've been trying to see it in a different light, to make it seem more positive.	1	2	3	4
13. I've been criticising myself.	1	2	3	4
14. I've been trying to come up with a strategy about what to do.	1	2	3	4
15. I've been getting comfort and understanding from someone.	1	2	3	4
16. I've been giving up the attempt to cope.	1	2	3	4
17. I've been looking for something good in what is happening.	1	2	3	4
18. I've been making jokes about it.	1	2	3	4

19. I’ve been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	1	2	3	4
20. I've been accepting the reality of the fact that it has happened.	1	2	3	4
21. I've been expressing my negative feelings.	1	2	3	4
22. I've been trying to find comfort in my religion or spiritual beliefs.	1	2	3	4
23. I've been trying to get advice or help from other people about what to do.	1	2	3	4
24. I've been learning to live with it.	1	2	3	4
25. I've been thinking hard about what steps to take.	1	2	3	4
26. I've been blaming myself for things that happened.	1	2	3	4
27. I've been praying or meditating.	1	2	3	4
28. I've been making fun of the situation	1	2	3	4

Appendix H

Pittsburgh Sleep Quality Index (PSQI)

INSTRUCTIONS:

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

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

0 = Not during the past month 1 = Less than once a week

2 = Once or twice a week 3 = Three or more times a week

5a. During the past month, how often have you had trouble sleeping because you Cannot get to sleep within 30 minutes	0	1	2	3
5b. During the past month, how often have you had trouble sleeping because you wake up in the middle of the night or early morning?	0	1	2	3
5c. During the past month, how often have you had trouble sleeping because you have to get up to use the bathroom?	0	1	2	3
5d. During the past month, how often have you had trouble sleeping because you cannot breathe comfortably?	0	1	2	3
5e. During the past month, how often have you had trouble sleeping because you cough or snore loudly?	0	1	2	3
5f. During the past month, how often have you had trouble sleeping because you feel too cold?	0	1	2	3

5g. During the past month, how often have you had trouble sleeping because you feel too hot?	0	1	2	3
5h. During the past month, how often have you had trouble sleeping because you had bad dreams?	0	1	2	3
5i. During the past month, how often have you had trouble sleeping because you had pain?	0	1	2	3
5j. During the past month, how often have you had trouble sleeping because of any other reason: Please describe _____	0	1	2	3

0 = Very good 1= Fairly good 2 = Fairly bad 3 = Very bad

6. During the past month, how often have you had trouble sleeping because you Cannot get to sleep within 30 minutes	0	1	2	3

0 = Not during the past month 1 = Less than once a week

2 = Once or twice a week 3 = Three or more times a week

7. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?	0	1	2	3
8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?	0	1	2	3

0 = Not a problem at all 1 = Only a very slight problem

2 = Somewhat of a problem 3 = A very big problem

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?	0	1	2	3

10. Do you have a bed partner or roommate?

□ Yes □ No

Only answer the following if you said “yes” to question 10:

0 = Not during the past month 1 = Less than once a week

2 = Once or twice a week 3 = Three or more times a week

10a. Ask your roommate how often in the past month you have had loud snoring	0	1	2	3
10b. Ask your roommate how often in the past month you have had long pauses between breaths while asleep	0	1	2	3
10c. Ask your roommate how often in the past month you have had legs twitching or jerking while you sleep	0	1	2	3
10d. Ask your roommate how often in the past month you have had episodes of disorientation or confusion during sleep	0	1	2	3
10e. How often during the past month have you had trouble sleeping because of any other reason: Please describe: _____	0	1	2	3

Appendix I

International Physical Activity Questionnaire – Short Form

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ days per week

☐ No vigorous physical activities → ***Skip to question 3***

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ hours per day _____ minutes per day

☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ days per week

☐ No moderate physical activities → ***Skip to question 5***

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ hours per day _____ minutes per day

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ days per week

☐ No walking ➡ ***Skip to question 7***

6. How much time did you usually spend **walking** on one of those days?

_____ hours per day _____ minutes per day

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ hours per day _____ minutes per day

☐ Don't know/Not sure

Appendix J

Medical Outcomes Study Short Form 36-item Health Survey (SF-36)

Please answer the 36 questions of the Health Survey completely, honestly, and without interruptions.

General Health:

1. In general, would you say your health is:

☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor

2. Compared to one year ago, how would you rate your health in general now?

☐ Much better than one year ago ☐ Somewhat worse than one year ago

☐ Somewhat better than one year ago ☐ Much worse than one year ago

☐ About the same

Limitations of activities:

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

3. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

4. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

5. Lifting or carrying groceries

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

6. Climbing several flights of stairs

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

7. Climbing one flight of stairs

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

8. Bending, kneeling, or stooping

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

9. Walking more than 1.6 km

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

10. Walking several blocks

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

11. Walking one block

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

12. Bathing or dressing yourself

☐ Yes, limited a lot ☐ Yes, limited a little ☐ No, not limited at all

Physical Health Problems:

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

13. Cut down on the amount of time you spent on work or other activities

☐ Yes ☐ No

14. Accomplished less than you would like

☐ Yes ☐ No

15. Were limited in the kind of work or other activities

☐ Yes ☐ No

16. Had difficulty performing the work or other activities (for example, it took extra effort)

☐ Yes ☐ No

Emotional Health Problems:

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

17. Cut down on the amount of time you spent on work or other activities

☐ Yes ☐ No

18. Accomplished less than you would like

☐ Yes ☐ No

19. Didn't do work or other activities as carefully as usual

☐ Yes ☐ No

Social Activities:

20. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

☐ Not at all ☐ Slightly ☐ Moderately ☐Quite a bit ☐ Extremely

Pain:

21. How much physical pain have you had during the past 4 weeks?

☐ None
☐ Very mild
☐ Mild
☐ Moderate
☐ Severe
☐ Very severe

22. During the past 4 weeks, how much did the pain interfere with your normal work (including both work outside the home and housework)?

☐ Not at all
☐ A little bit
☐ Moderately
☐ Quite a bit
☐ Extremely

Energy and Emotions:

These questions are about how you feel and how things have been with you during the past 4 weeks. Please give the one answer that is closest to the way you have been feeling for each item.

23. Did you feel full of life?

☐ All of the time
☐ Most of the time
☐ A good bit of the time
☐ Some of the time
☐ A little of the time
☐ None of the time

24. Have you been a very nervous person?

☐ All of the time
☐ Most of the time
☐ A good bit of the time
☐ Some of the time
☐ A little of the time
☐ None of the time

25. Have you felt so down in the dumps that nothing could cheer you up?

☐ All of the time
☐ Most of the time
☐ A good bit of the time
☐ Some of the time
☐ A little of the time
☐ None of the time

26. Have you felt calm and peaceful?

☐ All of the time ☐ Some of the time
☐ Most of the time ☐ A little of the time
☐ A good bit of the time ☐ None of the time

27. Did you have a lot of energy?

☐ All of the time ☐ Some of the time
☐ Most of the time ☐ A little of the time
☐ A good bit of the time ☐ None of the time

28. Have you felt downhearted and blue?

☐ All of the time ☐ Some of the time
☐ Most of the time ☐ A little of the time
☐ A good bit of the time ☐ None of the time

29. Did you feel worn out?

☐ All of the time ☐ Some of the time
☐ Most of the time ☐ A little of the time
☐ A good bit of the time ☐ None of the time

30. Have you been a happy person?

☐ All of the time ☐ Some of the time
☐ Most of the time ☐ A little of the time
☐ A good bit of the time ☐ None of the time

31. Did you feel tired?

☐ All of the time ☐ Some of the time
☐ Most of the time ☐ A little of the time
☐ A good bit of the time ☐ None of the time

Social Activities:

32. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives etc.)

☐ All of the time ☐ Some of the time
☐ Most of the time ☐ A little of the time
☐ A good bit of the time ☐ None of the time

General Health:

How true or false is each of the following statements for you?

33. I seem to get sick a little easier than other people

☐ Definitely true ☐ Mostly false

☐ Mostly true ☐ Definitely false

☐ Don’t know

34. I am as healthy as anybody I know

☐ Definitely true ☐ Mostly false

☐ Mostly true ☐ Definitely false

☐ Don’t know

35. I expect my health to get worse

☐ Definitely true ☐ Mostly false

☐ Mostly true ☐ Definitely false

☐ Don’t know

36. My health is excellent

☐ Definitely true ☐ Mostly false

☐ Mostly true ☐ Definitely false

☐ Don’t know

Appendix K

NEO-FFI – Conscientiousness Subscale

Read each statement carefully. For each statement select the response that best represents your opinion.

0 = Strongly disagree
1 = Disagree
2 = Neutral
3 = Agree
4 = Strongly agree

1. I keep my belongings clean and neat.	0	1	2	3	4
2. I'm pretty good about pacing myself so as to get things done on time.	0	1	2	3	4
3. I am not a very methodical person.	0	1	2	3	4
4. I try to perform all the tasks assigned to be conscientiously.	0	1	2	3	4
5. I have a clear set of goals and work toward them in an orderly fashion.	0	1	2	3	4
6. I waste a lot of time before settling down to work.	0	1	2	3	4
7. I work hard to accomplish my goals.	0	1	2	3	4
8. When I make a commitment, I can always be counted on to follow through.	0	1	2	3	4
9. Sometimes I'm not as dependable or reliable as I should be.	0	1	2	3	4
10. I am a productive person who always gets the job done.	0	1	2	3	4
11. I never seem to be able to get organised.	0	1	2	3	4
12. I strive for excellence in everything I do.	0	1	2	3	4

Appendix L

Informed Consent Document – Financial Compensation

Purpose

I am a UCT Psychology Honours student investigating the extent to which certain variables affect the experience of being a first-year undergraduate student at a South African university.

Procedure

If you decide to participate in this study, you will be asked to provide consent for the researchers to access your matric results, PSY1005S mid-semester weighted average (i.e., overall PSY1005S academic performance up until, and including, your mid-semester PSY1005S test results), academic transcript, as well as complete several questionnaires, via an online survey, that will gather biographical information (e.g., your age and sex), as well as information about your mood, sleep, and physical activity. The questionnaires should take about 45 minutes to complete, and you will be entered into a raffle for a chance to win 1 of 4 vouchers for Cavendish Square (1 x R750, 1 x R500, 1 x R300, 1 x R200).

Possible Risks

Participation incurs no anticipated risk of physical, psychological or social harm.

Possible Benefits

If you complete the online questionnaire and give consent to accessing your matric results, PSY1005S mid-semester weighted average, as well as your academic transcript, you will be entered into a raffle for a chance to win 1 of 4 vouchers for Cavendish Square (1 x R750, 1 x R500, 1 x R300, 1 x R200).

Voluntary Participation

Participation in this study is completely voluntary. You may withdraw your consent and stop participation in this study at any time, without having to give a reason and without any kind of penalty or negative consequence. Information already collected will not be used if you stop participation.

Confidentiality

Information collected in this study will be kept confidential and stored in computers with security passwords. Only the researchers will have access to the information collected. Any

publications or reports about the study will not identify you or any other participant in the study.

Further Questions

If you have any study related questions, problems, or emergencies, you can contact me on: 1styear.psych.study@gmail.com

If you have any questions about your rights as a study participant, or any comments about the study, please contact:
Rosalind Adams at the UCT Department of Psychology.
Phone: 021 650 3417
Email: rosalind.adams@uct.ac.za

Signature

I have read the above information and am satisfied with my understanding of the study and its possible risks and benefits. I hereby voluntarily consent to participate in this research study and authorise access, collection and use of my matric results, PSY1005S mid-semester weighted average, academic transcript and the information obtained for the online questionnaires.

_____

Name of Participant

_____ _____

Signature of Participant Date

Appendix M

Informed Consent Document – SRPP

Purpose

I am a UCT Psychology Honours student investigating the extent to which certain variables affect the experience of being a first-year undergraduate student at a South African university.

Procedure

If you decide to participate in this study, you will be asked to provide consent for the researchers to access your matric results, PSY1005S mid-semester weighted average (i.e., overall PSY1005S academic performance up until, and including, your mid-semester PSY1005S test results), academic transcript, as well as complete several questionnaires, via an online survey, that will gather biographical information (e.g., your age and sex), as well as information about your mood, sleep, and physical activity. The questionnaires should take about 45 minutes to complete, and you will receive 1 SRPP point upon completion.

Possible Risks

Participation incurs no anticipated risk of physical, psychological or social harm.

Possible Benefits

If you complete the online questionnaire and give consent to accessing your matric results, PSY1005S mid-semester weighted average, as well as your academic transcript, you will receive 1 SRPP point.

Voluntary Participation

Participation in this study is completely voluntary. You may withdraw your consent and stop participation in this study at any time, without having to give a reason and without any kind of penalty or negative consequence. Information already collected will not be used if you stop participation.

Confidentiality

Information collected in this study will be kept confidential and stored in computers with security passwords. Only the researchers will have access to the information collected. Any publications or reports about the study will not identify you or any other participant in the study.

Further Questions

If you have any study related questions, problems, or emergencies, you can contact me on:
1styear.psych.study@gmail.com

If you have any questions about your rights as a study participant, or any comments about the study, please contact:
Rosalind Adams at the UCT Department of Psychology.
Phone: 021 650 3417
Email: rosalind.adams@uct.ac.za

Signature

I have read the above information and am satisfied with my understanding of the study and its possible risks and benefits. I hereby voluntarily consent to participate in this research study and authorise access, collection and use of my matric results, PSY1005S mid-semester weighted average, academic transcript and the information obtained for the online questionnaires.

_____

Name of Participant

_____ _____

Signature of Participant Date

Appendix N
Debriefing Form

Dear Participant,

Thank you for your involvement in this study. The aim of this research project is to investigate the extent to which certain variables, singly and in interaction, predict first-year undergraduate academic performance in a South African university. The variables investigated in this study were age, sex, levels of stress, levels of anxiety, levels of depression, coping strategies, sleep quality, physical activity, quality of life, and matric results.

To gather information regarding these variables, you were asked to fill in questionnaires and provide access to your matric results. In order to analyse whether these variables predict academic performance, you were asked to provide access to your PSY1005S mid-semester weighted average (i.e., overall PSY1005S academic performance, up until, and including PSY1005S mid-semester test), as well as your academic transcript.

Please remember that the information you provided for this study will be kept confidential.

If you have any further questions, please feel free to email them to me, Raphaella Lewis, at 1styear.psych.study@gmail.com. If you have any complaints about the study, please contact Rosalind Adams at the UCT Department of Psychology, rosalind.adams@uct.ac.za

If you are experiencing any personal, emotional or psychological problems as a result of your participation in this study, or in general, please contact the UCT Student Wellness Counselling Services or the 24-hour UCT Student Careline.

UCT Student Wellness Counselling Services:
Phone: 021 650 1017
Email: lerushda.cheddie@uct.ac.za
24-hour UCT Student Careline:
Phone: 0800 24 25 26 (free from a Telkom line or SMS 31393 for a "call-me-back")

Appendix N

Ethical Approval

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 6503417
Fax No. (021) 6504104

20 September 2018

Miss Raphaella Lewis
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Miss Lewis

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for the amended protocol, submitted 17 September 2018, to your study, Predictors of First-year Undergraduate Academic Performance in a South African University. The reference number remains PSY2018024.

I wish you all the best for your study.

Yours sincerely,

Lauren Wild (PhD)

Associate Professor

Chair: Ethics Review Committee