RELATIONSHIP OF SLEEP QUALITY, PERCEIVED STRESS, AND CREATIVITY AMONG UNDERGRADUATES IN MALAYSIA

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE BACHELOR OF SOCIAL SCIENCE (HONS) PSYCHOLOGY FACULTY OF ARTS AND SOCIAL SCIENCE UNIVERSITI TUNKU ABDUL RAHMAN

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Relationship of Sleep Quality, Perceived Stress, and Creativity among Undergraduates in Malaysia

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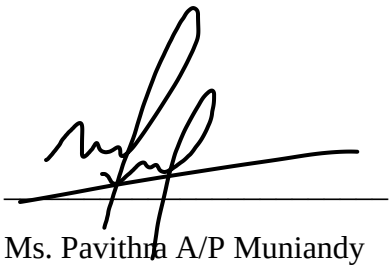
APPROVAL FORM

This research paper attached hereto, entitled "Relationship of the Sleep Quality, Perceived Stress, and Creativity among Undergraduates in Malaysia" prepared and submitted by "Chiew Yong Nuo, Logish A/L Baskaran, and Tan Wei Hou" in partial fulfillment of the requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.



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Ms. Pavithra A/P Muniandy

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Abstract

There is a paucity of research on the relationship between sleep quality, and perceived stress towards creativity among Malaysian undergraduate students. This study proposed to determine the relationship of sleep quality, perceived stress, and creativity among the undergraduate students in UTAR and creativity level among the undergraduate students in UTAR was explored. In this thesis, two hypotheses were constructed which assume there is a significant relationship between sleep quality and creativity; there is a significant relationship between perceived stress and creativity. This thesis used cross-sectional design, and convenience sampling method to get the data. A total of 140 people was reached after the survey was sent to undergraduates, age from 18-24 years old through WhatsApp, Microsoft Team, and QR code. The number of male respondents is 67 and female respondents are 75 with majority of them are Chinese, followed by Indian, Malay, and Punjabi. The research location was conducted at UTAR Kampar Campus, Perak. Next, the scales involved are Sleep Quality Scale (SQS), Perceived Stress Scale (PSS), Self-rated Creativity Scale (SRCS) and analyzed by Pearson Correlation Coefficient. The result reported the non-significant relationship of sleep quality and creativity. However, a significant negative relationship was found between perceived stress and creativity. In conclusion, this study provided a new insight towards the creativity area and the people who suffer from stress. Future researchers are encouraged to use mixed methods to achieve better results.

Keywords: Creativity, Sleep Quality, Perceived Stress

DECLARATION

We declare that the materials contained in this paper is the end result of our own work and that due acknowledgement has been given in the bibliography and references to ALL sources be they printed, electronic, or personal.

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Abbreviations

1. UTAR	-	University Tunku Abdul Rahman
2. SQS	-	Sleep Quality Scale
3. PSS	-	Perceived Stress Scale
4. SRCS	-	Self-Rated Creativity Scale
5. REM	-	Rapid movement sleep
6. SWS	-	Slow-wave sleep
7. ACTH	-	Adrenocorticotropic hormone
8. GCs	-	Glucocorticoids
9. SPSS	-	Statistical Package for Social Science
10. VIF	-	Variance Inflation Factor

Chapter I

Introduction

1.0 Introduction

In this chapter, there are few things will be discussed regarding the topic. It will include background of study, problem statement, research questions, hypotheses, research objectives, significance of study, conceptual definition, and operational definition.

1.1 Background of Study

Creativity has been recognized as one of the important skills that should be developed among the students from higher education in the 21st century. Due to the high pace of life development, most humans are free from physical competition to survive. Nowadays, work demands high creativity in problem-solving as it is more beneficial to any party that can solve the problems fast or get the ideas in a creative way. According to Puccio (2017), as early as 1990, the United States had recognized creative thinking as the necessary skills in the workplace. In Malaysia, the Education Minister, Datuk Seri Mahdzir Khalid agreed that creativity is one of the essential components in getting the students more employable and adapted for the 21st century (Arumugam, 2016). The importance of creativity to society is unquestionable.

Scholars had highlighted the importance of creativity in different types of education systems especially in higher education. Importance and effects of creativity towards individuals and society through higher education has been emphasized (Cheng, 2019; Egan et al., 2017). This has led the government from different countries to emphasize creativity in their education system such as Hong Kong (Ho, 2020), Russia (Matraeva et al., 2019), and Singapore (Tan & Ng, 2020).

In Malaysia, creativity is also a famous topic that researchers are interested in. However, most of the scholars are relating students' creativity with academic performance (Bolandifar & Noordin, 2013), teachers' perspectives of creativity (Kasmaienezhadfard et al., 2015), and barriers to creativity (Nordin & Malik, 2015). Despite various studies on creativity, there is a gap in the lack of studies towards sleep quality of students and how it will affect their creativity in Malaysia's higher education. Sleep is the essential part of an individual health and well-being such as cognitive performance, mood, and physiological processes (Hirshkowitz et al., 2015). Past study explained that when an individual has a bad sleep quality, their cognitive performance will be affected, so will creativity (King et al., 2017). There is lack of research to support whether the undergraduates in Malaysia will have the same result when they suffer from a bad sleep quality.

Apart from sleep quality, students' perceived stress level towards creativity is also a lack of study in Malaysia. Stress is undoubtable a common issue faced by students in the 21st century due to the high pace of the learning environment. The demands of the environment and the ability to cope with the demands are the main responsibilities of students. Perceived stress level is the insufficient power to cope with demands of the environment (Lafraxo et al., 2021) and it is varied among students due to their different capabilities. In past studies, stressor can increase or decrease creativity level depending on the stressor intensity. When the student is in a low stress situation, they will perform in higher creativity, vice versa (Smith & Lilly, 2016). In contrast, an electroencephalography research done in China stated that stress will only decrease the students' creativity level, especially in primary formation of creative thinking (Wang et

al., 2019). There is a need to conduct research among undergraduates in Malaysia to examine the relationship of perceived stress and creativity.

In conclusion, there is a need to study about sleep quality, perceived stress, and creativity among undergraduates in Malaysia. Creativity has been the concern issue in this 21st century as it is an important skill in work or education setting. By having a high creativity level, an individual can be efficient in problem solving and innovation in idea generating. Hence, this study will study the relationship of sleep quality, perceived stress and creativity among undergraduates in Malaysia to explore more factors that will affect creativity.

1.2 Problem Statement

Creativity is the capacity to make or bring to existence a new thing, regardless of whether another answer for an issue, another technique or gadget or a new creative article or structure. In addition, it is a special human attribute that mirrors our capability to adapt to evolving environments, and our cognitive capability to consolidate and refine thought to which we are uncovered (Narayanan, 2017). In this era, the market demands workers that are educated, creative, inventive, outspeak, adaptable, and capable of critical thinking. It brings pressure to the higher education institutions as they play a significant role in educating the future workforce (Nordin & Malik, 2015). However, the education structure of Malaysia seems to have not met the standards of fostering creativity. They overly rely on standardized exams, especially Science and Mathematics subjects, which are common in Malaysia's education system. It blocks the students from finding knowledge with the help of creative subjects such as art and music (Abdullah, 2019). In contrast, countries like Russia (Matraeva et al., 2019), Hong Kong (Ho, 2020), and

Ireland (Bray et al., 2020), had become aware of the importance of creativity and implemented them into their education system.

Previous researches cite multiple factors affecting creativity no matter in workplace (Cai et al., 2020; Walter, 2012; Szobiová, 2015, De Clercq & Pereira, 2020) or in education context (Azeem et al., 2019; Park et al., 2017; Narayanan, 2017; Matraeva et al., 2019). For example, co-worker support (Paramitha & Indarti, 2014), academic performance (Narayanan, 2017), or atmosphere (Chan & Yuen, 2014). However, there is less attention on how sleep quality will affect the creativity level among the undergraduates. Previous research on sleep quality are focus on how it will affect academic performance (Rathakrishnan et al., 2021; Siraj et al., 2014; Siah et al., 2018), perceived stress or alcohol misuse (Du et al., 2021), mental and physical health (Muzni et al., 2020). This study focuses on the relationship of sleep quality and creativity among undergraduates.

In addition, previous research done about the perceived stress in Malaysia focus on student health (Fauzi et al., 2021), academic performance (Omar et al., 2019; Ramli et al., 2018), prevalence and determinants of stress (Jia & Loo, 2018), age and gender (Par et al., 2015), and coping strategy (Ganesan et al., 2018). Moreover, the research on stress and creativity are more in Western context (Byron et al., 2010; Tritsaroli & Miraka, 2019). Hence, there is a need to conduct the research on perceived stress and creativity among undergraduates in Malaysia.

Therefore, this study investigates the relationship of sleep quality, perceived stress, and creativity among undergraduates in Malaysia. The purpose of this study is to know whether sleep quality of undergraduates have a positive or negative relationship

towards their creativity. In addition, this study also investigates whether the perceived stress of the undergraduates will have a positive or negative relationship with their creativity.

1.3 Research Questions

1) Is there any significant relationship between sleep quality and creativity?

2) Is there any significant relationship between perceived stress and creativity?

1.4 Hypotheses

H^1: There is a significant relationship between sleep quality and creativity.

H^2: There is a significant relationship between perceived stress and creativity.

1.5 Research Objectives

By the statement above, the following research objectives are be proposed:

1) To explore the relationship of the quality of sleep and creativity among the undergraduate students in UTAR.

2) To determine the relationship between perceived stress and the creativity among the undergraduate students in UTAR.

3) To explore the creativity level among the undergraduate students in UTAR.

1.6 Significance of Study

In this modern era, creativity has become the first domain in various fields such as innovation, economics and entrepreneurship (Egan et al., 2017). In Malaysia, higher education plays an important role to foster the creativity among the academy students as to catch up to the plan of transforming Malaysia from an industrial-based country into a knowledge-based society (Hashim et al., 2017). By practicing the culture of creativity among the university students, the students in Malaysia will be able to perform better in

problem-solving and the innovation in the academic and in the future career. To understand the creativity of the undergraduate students in UTAR, the data of the creativity level of the students will be obtained throughout this study as to indicate a better idea to the higher educators about the standard of the creativity of the university students in UTAR. It also helps them to promote or plan the suitable education structure to promote creativity to our students in the future.

The university students often reported to have the sleep quality that is poor because of the sleep interruption includes restlessness, awaken in the early morning and the difficulty to fall asleep (Nurismadiana & Lee, 2018). The insufficient sleep or the bad sleep quality will influence the cognitive skills of a person and may result in a negative effect on creativity. To fill the knowledge gap, this study will test whether the quality of sleep and creativity is having an interconnection among the university students in UTAR. It will also raise the awareness to our educators, psychologists and the university students to be aware of the negative effects which will be caused by the poor sleep quality.

Major of the creative work was performed under a stress condition, especially in this modern world which surrounded by different stressors (Wang et al., 2019). Unfortunately, the results of the study about the relationship of the stress towards the creativity were found inconsistency. It shows a positive or a negative relationship among these two variables (Akinola et al., 2019). In addition, most of the studies in Malaysia were carried out in the working environment or in the organization. As to examine the correlation of the perceived stress and the creativity and to fulfill the lack of the knowledge in the different setting, this study will be carried out among the undergraduate students in UTAR. This study will also give an opportunity to the instructors and

psychologists to have a better picture about the level of the perceived stress among the university students in UTAR through the quantitative data collection and to implicate the prevention program to reduce the negative effects of the stress includes the depression and the anxiety.

In conclusion, this study will help to collect the data of the undergraduates' creativity and allows the teacher or organization to create better solutions and teaching ways to enhance the creative thinking and innovation of the university students. It also helps to examine the relationship of the factors, sleep quality and the perceived stress towards creativity in the educational settings. It also promotes the awareness of the negative effects of the poor quality of sleep and the high perceived stress among the adolescence in UTAR.

1.7 Conceptual definition

1.7.1 *Sleep Quality*

Sleep quality can be defined as the sleep's satisfaction of a person with the combination of the duration of sleep, inauguration of sleep, maintenance of sleep and the restoration of a person when awakening (Rathakrishnan et al., 2021). Generally, the sleep quality can be described as the feeling of the pleasure during the sleeping experience. According to Libman et al. (2016), good sleep quality can be referred to the absences of the symptoms found in the poor sleep quality and results in not having the difficulty to fall asleep, stay awake after the sleep and good efficiency of sleep. In contrast, the person who having the poor sleep quality may experiences the struggle of falling asleep, feel sleepy often and a low efficiency of sleep. The quality of sleep that is good also can be refers as the person to fall asleep easily within 30 minutes, sleeping whole night without

awakening and sleep back no more than 20 minutes if wake from the sleep (National Sleep Foundation, 2017).

1.7.2 *Stress*

The word "stress" was used by Selye (1956) to identify the effects of anything which substantially disturbs equilibrium. The "stressor" is the real or perceived threat to an organism, and the "stress response" is the organism's response to the source of stress. Selye recognised that strong, sustained stress reactions might lead to tissue damage and illness, despite the fact that stressful events developed as adaptive mechanisms.

Individual variances in stress reactions to the same scenario exist, despite the fact that different conditions tend to evoke diverse patterns of stress responses. "Response stereotypy" refers to the tendency to demonstrate a consistent pattern of stress reactions across a wide range of stimuli. Some people exhibit stress responses linked with active coping in a range of contexts, whereas others exhibit response to stress associated with unwanted attentiveness.

Stress may be defined based on the type of the stressor (physiological, psychological), its impact on the subject (positive eustress, negative distress), and the length of time the source of stress is exposed to the person (acute or short-term, chronic or long-term) (Shahsavarani et al., 2015).

1.7.3 *Creativity*

Creativity has been a hot topic studied by researchers. When talk about the definition of creativity, many scholars have different definitions and conceptualizations (Grohman et al., 2017). According to Said-metwaly et al. (2017), creativity is defined as a mental process of communication or developing a novel idea in the psychology context.

In addition, from the scholars Zhu et al. (2019), creativity is defined as the moderator of divergent and convergent thinking. In biological perspectives, creativity is the multilevel activity that requires a neuro-biological base (Javaid & Pandarakalam, 2021). Other than that, when does creativity occur? Creativity occurs when an individual think about jumping out of their box and it could happen to every individual. When an individual is exposed to different opinions and behaviors, these will trigger them to think in new perspectives (Soda et al., 2021). According to Cherry (2021), the signs of high creativity people such as energetic, focused, smart, imaginative, passionate, and open.

1.8 Operational definition

1.8.1 *Sleep Quality*

Sleep quality is measured by using the instrument, Sleep Quality Scale. The Sleep Quality Scale consists of 28-items and evaluating the six categories of the six qualities including the satisfaction of the sleep, difficult to wake, the symptoms during the waking hours, recovery after sleep, sleep maintenance and the initiating of the problems. The score which score higher indicates the greater problems in sleep (Yi et al., 2006).

1.8.2 *Stress*

Perceived Stress level will be measured using the Perceived Stress Scale by Cohen et al. (1994). The Perceived Stress Scale (PSS) consist of 10-items and these items were chosen to reflect how unexpected, unmanageable, and overburdened respondents' lives are. A number of direct questions concerning current levels of experienced stress are also included on the scale. The higher the total score, the greater the extent toward which stressful occurrences in one's life are seen as such.

1.8.3 *Creativity*

Creativity is measured by the Self-Rated Creativity Scale (SRCS). It is a 12-item scale that has been modified from the original 13-item scale. It measures an individual creativity level. A higher mean score means more creativity (Tan & Ong, 2019).

1.9 Conclusion

In conclusion, this chapter had discussed about the background of study, problem statement, research questions, hypotheses, research objectives, significance of study, conceptual definition, and operational definition.

Chapter II

Literature Review

2.0 Introduction

In this chapter, it will cover the theoretical framework, conceptual framework, literature review of each variables (sleep quality, perceived stress, and creativity), and relationship of sleep quality and creativity as well as perceived stress and creativity.

2.1 Theoretical Framework

2.1.1 *Consolidation Theory*

Consolidation is one of the three prime sub-process in the memory functions. The multiple short memories are equilibrated during the consolidation process and converted into a long-term memory, strengthen and combine the information into a useful knowledge (Rasch & Born, 2013). By the theory of the consolidation, it suggests that through the behavior of the sleep, the learning and the consciousness process occur, enhancing the creative thinking. In addition, during the sleeping process, it also reactive the representations of the memory and create the new information that are stronger and vigorous which can be stored in the brain for a long period time (Marrone et al., 2008; Oudiette et al., 2011).

During the sleeping process, it reduces the entering of the environmental information into the brain and provide an optimal period for the brain to active the consolidation process. Instead of rapid movement sleep (REM), the consolidation process will be active during the slow-wave sleep (SWS). During the consolidation process, it will only process the memory those are selected and not every information that are being inserted into the brain. It also converted the memories into the long-term memory which

is qualitative and they are the memories relevant for the future plan (Born & Wilhelm, 2012). Hence, through the consolidation process, the good sleep quality is hypothesized to have a greater creativity as it will filter the unnecessary information and produces the solution that is creative.

2.1.2 *Lazarus Theory of Stress*

The Lazarus stress theory has undergone numerous important adjustments since its original presentation as a complete theory (Lazarus, 1966; Lazarus, 1991; Lazarus & Folkman, 1986; Lazarus & Launier, 1978). Stress is now considered a relational notion in the most recent form (Lazarus, 1991). Stress isn't characterized by a certain type of environmental stimulus or a set of physiological, behavioral, or perceptual responses. People and their surroundings are seen to be in a connection when it comes to stress. Psychological stress is defined as the interaction with the environment that a person considers to be important to his or her well-being, but also that the demands drain or surpass available coping capabilities.

Appraisal is an important idea to grasp while dealing with stressful situations. This notion is founded on the assumption that emotion responses (including stress) are influenced by people's genuine expectations about the relevance and result of a particular encounter. Individual variances in the clarity, strength, and persistence of an evoked emotion in situations that are essentially equal for various persons need this idea.

"Am I in difficulty or am I being benefitted, now or in the future, and in what ways?" is a primary evaluation question. People classify the scenario as a threat, a challenge, or a loss if the response to this question is yes. Secondary evaluation involves a review of coping skills and responses to the question, "Can I deal with this?" It

expresses assurance in one's capacity to handle the problem since one possesses the necessary resources. Physical, social, cognitive, and material resources are all possible.

2.1.3 *Triangular Theory of Creativity*

Triangular theory of creativity is a theory that explains creativity in a defying way. It contains three types of defiance which are, defying the crowd, oneself, and the zeitgeist. First of all, defying the crowd means challenging the crowd's ideas. It proposed that the creative person would defy the crowd's ideas based on their own ideas and opinions. However, it is not an easy path as the crowds, or the original creators do not welcome their ideas being challenged or replaced. Although this is not an easy path, the creative person will still defy the crowd due to the fame that might be the consequence from their creative ideas (Sternberg, 2017).

Secondly, defying oneself means challenging one's own set of beliefs. It is much more difficult than challenging others' viewpoints as you are denying your own belief that you might follow for many years. Your belief has been entrenched, and usually you will judge others rather than yourself as a creativity problem (Sternberg, 2017).

Last category is defying the zeitgeist. Zeitgeist is defined as the common assumptions, culture in various fields, and common sense in our world. It is entrenched as the baseline of the world, even though the creative persons are not conscious about it. It is much more difficult to defy zeitgeist as they are not even conscious and aware about it. When the creativity person is challenging the zeitgeist, it is against the whole cultural way of thinking. However, zeitgeist-defying can be found inside the children. It is because they are still less involved in the society and yet have been transformed to obey the instructions or society. They will ask questions like why we greet people we do not

like, which is challenging the cultural way of thinking in society. Once the children grow older, the society will transform them to follow the “proper actions” and their creativity level will not be as strong as initially (Sternberg, 2018).

Triangular theory of creativity is more suitable in this research because it emphasizes on defying. This paper studies sleep quality, perceived stress, and creativity among undergraduates in Malaysia, which its setting is on education. In an education setting, when a student defies their ideas, they will be recognized and valued. However, when the student challenges the education system or the school, it will bring unwelcome noise as they are challenging their belief (Sternberg, 2018). Hence, this theory is more relevant to this paper.

2.2 Conceptual framework

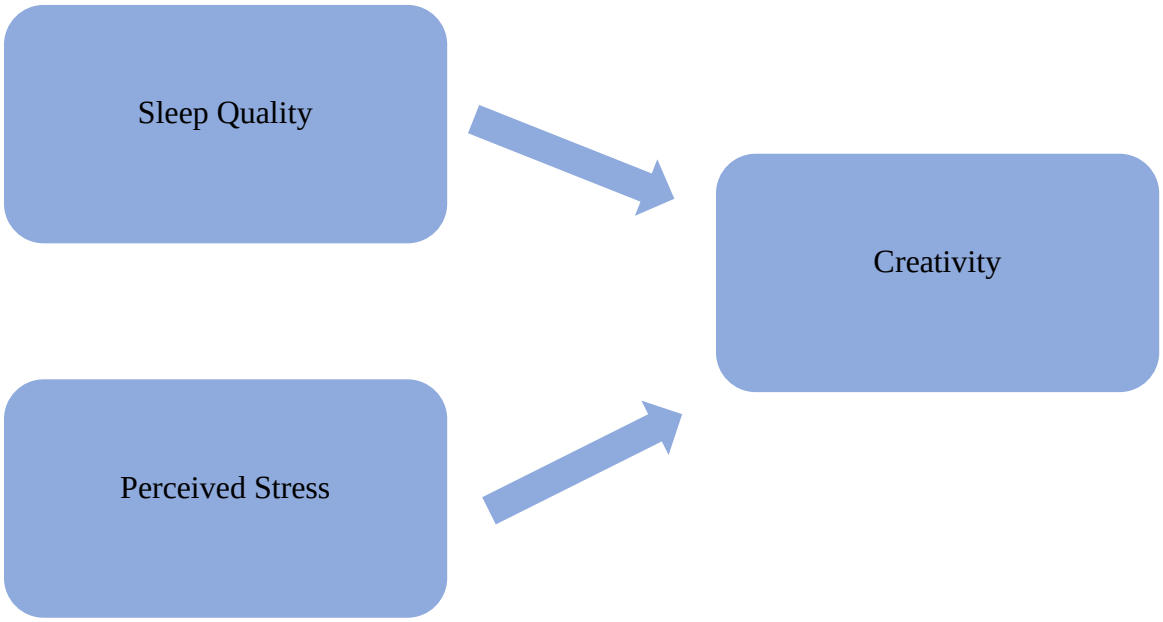


Figure 1. Conceptual framework model

Based on the past studies, the conceptual framework is formed and proposed accordingly in Figure 1. There are total three variables which are sleep quality, perceived stress and creativity. In this framework, sleep quality and perceived stress are the independent variables while creativity is the dependent variable. The main motive of this research is to find out the relationships of sleep quality, perceived stress, and creativity among undergraduates in Malaysia.

2.3 Literature Review

2.3.1 *Sleep Quality*

Sleep quality can be defined as the conception of the measurement includes several components such as the delay of the sleep, the effectiveness of sleep, disturbance of sleep, duration of sleep and the sleeping medication used among others (Clement et al., 2021). Sleep is an essential behavior that can be found in all type of the species (King et al., 2017). In general, sleep can be explained as the state of the behavior characterized by the inactivity, closing of eyes, unresponsiveness to the external stimulation, disengagement of the perception and the altering of the physiology of the brain (Saletin et al., 2017). In our daily lives, we spend about one over three of our lives sleeping as it is a radical bio function in humans. As a result, the good quality of sleep is important in our lives as the changing of the duration or the quality of sleep are having a direct relationship with the physical and the mental well-being permanently (Marguilho et al., 2014).

According to the El Hangouche et al. (2018), 58.2% of the undergraduate medical students were having the deficiency of the quality of sleep. The previous studies by Al Shammari et al. (2020), 80.60% undergraduate students from the 180 undergraduate students also experienced poor quality of sleep. The quality of sleep that is poor can be a serious problem as it will result in low quality of life, depression, car accidents and the poor job performance as the quality of sleep has a direct relationship with the cognitive and physical ability. It may also affect the academic results and reduce the marks in the tutorial of the undergraduate students (Rathakrishnan et al., 2021). In addition, the poor quality of sleep also has been found to have a correlation with the risk of burnout, anxiety

and depression (El Hangouche et al., 2018). By the research of Medic et al. (2017), the findings show that teenagers who attempt suicide had experience the sleep disturbance or the lack of sleep frequently.

There are a lot of factors affecting the quality of the sleep or reducing the timing of the sleep. The conditional and the psychological factors are the pressure or stress, unhappiness and the overload of work tasks and the intake of substances such as the alcoholic drinks or the caffeine and nicotine. The factors such as age, sex, health condition, insufficient of the exercise and the family violence also producing the reduction of the quality of sleep (Teker & Yakşi, 2021). Other than that, the use of the media before sleep and the sports will also have a direct effect on the sleep quality (Al Shammari et al., 2020). The previous study by Yang et al. in the year of 2020 shows that a person with greater perceived stress enhances the greater opportunity to have poor sleep quality. Besides that, the insufficient sleep quality is also caused by the expansion of the perceiving of stress which is categorized as the environmental factor (Johnson et al., 2018).

2.3.2 *Perceived Stress*

In a study done by Schneiderman et al. (2005), utilized the expression "stress" to address the impacts of whatever genuinely compromises homeostasis. Homeostasis, from the Greek words for "same" and "consistent," alludes to any cycle that residing things use to effectively keep up with genuinely stable conditions important for endurance. The genuine or saw danger to a living being is alluded to as the "stressor" and the reaction to the stressor is known as the "stress reaction" (Schneiderman et al., 2005).

Stress has an alternate significance for various individuals under various conditions. For example, in a study done by Fink (2010), stated that in the context of behavioral sciences, stress is viewed as the "impression of danger, with coming about uneasiness distress, passionate strain, and trouble in change." In the gathering circumstance, absence of construction or loss of anchor "makes it troublesome or unthinkable for the gathering to adapt to the prerequisites of the circumstance, and the issue of initiative and relational conduct becomes one of advancing or providing a design or anchor and of providing the expertness for adapting to the requests of the circumstance." Stress can likewise be characterized as far as unadulterated neuroendocrinology. According to Fink (2010), for instance, characterized pressure as any improvement that will incite the arrival of ACTH (Adrenocorticotropic hormone controls the development of another chemical called cortisol. Cortisol assumes a significant part in assisting you with reacting to pressure) and adrenal glucocorticoids (Glucocorticoids (GCs) are steroid chemicals overwhelmingly delivered in the adrenal organs because of physiological signals and stress).

According to Yaribeygi et al. (2017), stated that in light of the sort, timing and seriousness of the applied boost, stress can apply different activities on the body going from adjustments in homeostasis to hazardous impacts and passing. For example, a study done by Yaribeygi et al. (2017), persistent pressure can prompt decay of the cerebrum mass and lessening its weight. These underlying changes achieve contrasts in the reaction to stress, cognizance and memory. Different examinations have shown that pressure can cause practical and underlying changes in the hippocampus part of the mind constant

pressure and, therefore, an increment in plasma cortisol, prompts a decrease in the quantity of dendritic branches and number of neurons (Ghodrat et al., 2014).

2.3.3 *Creativity*

Creativity is the capability to create something different, it could be a novel solution to an obstacle, a new approach or a creative item (Narayanan, 2017). According to Matraeva et al. (2019), creativity has been defined as multifunction cognitive creative skill, which focuses on fluency, resilience, efficiency, and originality. There are many different definitions of creativity but most of them emphasize novel ideas and concepts (Javaid & Pandarakalam, 2021). Creativity has been emphasized no matter in education or workplace setting (Nordin & Malik, 2015; Matraeva et al., 2019; Cai et al., 2020, & Azeem et al., 2019). Studies on creativity had found the directions for the future generation to provide more opportunities, space, and different management for the workers or students to enhance their creativity level (Ho, 2020; Szobiová, 2015).

Even though the educators conceptually know how to enhance the student's creativity, it is still a big knowledge to implement it practically. A study done by Ho (2020), indicates that although Hong Kong has the passion to increase the students' creativity level by modifying the education systems and emphasizing creativity as the genetic skill that needs to be developed by students, their students are still criticized for their lack of creativity. According to Ng (2017), Hong Kong's education system was ranked below Taiwan, Singapore and South Korea due to the education system that encourages students not to be a risk taker. This proved that although the educators or government has the conceptual awareness to increase the students' creativity, it is still a big gap to practice it.

Furthermore, students' creativity might be affected by other factors. For example, the creativity level of teachers or professors are different from the students. The creativity level of the teacher decides how they view the students and relate the students' behaviors to creativity (Matraeva et al., 2019). This could avoid any creativity students being underestimated and buried. Moreover, the differences between the students and teachers' perception and concept of creativity might miss out some of the talented people. In teachers' perspective, creativity is expressed through student self-reflections, independent decisions, curiosity and motivation, developing something new, multi perspectives, and novel ideas (Jahnke et al., 2015); while in students' perspective, creativity is a branch of imagination, and special products producers (Stone & Hess, 2020). This has created a gap between teacher and student's understanding of creativity.

In local studies, creativity has been discussed by several researchers from different perspectives. For example, Kasmaienezhadfard et al. (2015) had studied students' creativity through teachers' perspectives. They conclude that most of the teachers are able to view creativity more than how they implemented creativity in their teaching due to the education system and policy. This shows that teachers are able to grab all the potential students while their creativity still has room for development. The scholar, Narayanan (2017) also agreed that the creativity level of a teacher stands a huge part in a student's creativity level. While the scholars, Chua et al. (2020) think that creativity level of students can be trained as their research using Creative Thinking Skills Module (CTSM) successfully improves the students' creativity in Fluency, Originality, Elaboration and Resistance to Premature Closure.

2.3.4 *Sleep Quality and Creativity*

Although the direct correlation of sleep and creativity is infrequently studied, the relationship of sleep and the cognitive capacity including the memory and motivation have been studied. The interrelationship of sleep towards education and the new conception, ideas or ways of solutions suggest that sleep will lead to the optimal effect on creativity (Marguilho et al., 2014). A duration of the sleep preserves the memories, enhancing the performance and restructures the traces of the memory which improves the creativity and remembering. This is because sleeping can reactivate the brain networks, including the limbic structure and the integrating of the neocortical networks (El Hangouche et al., 2018). Instead, the lack of the duration of sleep and poor quality of sleep affect the concentration, memory, innovation and education (Tumakaka et al., 2019).

Besides that, during the sleeping process, incubation, a cognitive process will occur to have the processing of the creative idea. During the incubation process, the issues faced during the work are gone temporarily and the person is not putting effort on those problems but the unconscious process has occurred. Through this incubation process, it allows the reorganization and the restructuring of the facts and creates a new possibility (Weinberger et al., 2018). In addition, sleep also provides the explicit knowledge and maintaining the positive behavior which encourages the increasing of creativity (Han et al., 2017).

The studies from the polysomnography show that the Rapid eye movement (REM) sleep enhances the development of the creative. Through REM sleep, it allows the brain to produce new information and the information is consciously activated eventually

(Carlsson et al., 2019). In addition, the REM sleep provides a chance for brain to block any inappropriate information and able to perform the new solution or possibilities when awaken (Lacaux et al., 2019). Hence from the study of REM sleep, we indicate that the good quality of sleep has a positive impact on creativity. Although polysomnography is not used to measure REM sleep in the study, we hypothesized that the undergraduate students who experience the poor quality of sleep will having the lower creativity in UTAR.

2.3.5 *Perceived Stress and Creativity*

Creativity is a multidimensional area that could be executed in human expression, science, show, the business undertaking and business advancement. Following in Khalil et al. (2019), who characterized the underlying foundations of imaginative insight in human expression and sciences, inventiveness isn't only a social or social build. All things considered, it is a fundamental mental and cognitive cycle too. And previous studies have shown that stress has an impact on cognitive skills. Actuation of stress brings about the creation and arrival of glucocorticosteroids. As a result of the lipophilic properties of glucocorticosteroids, they can diffuse through the blood-mind boundary and apply long haul consequences for handling and perception. Openness to stress can likewise cause problems in hippocampus-related discernment; explicitly, spatial memory (Yaribeygi et al., 2017).

According to research done by Yeh et al. (2015), Proper difficulties or stressors that assist with expanding the cortisol fixation to an attentional level without inciting a solid feeling of advancement centered negative feelings ought to be viewed as when planning games pointed toward educating imagination. Stress impacts imagination during

gaming through two courses. Working memory is a middle person of cortisol reaction and game-based inventiveness. Cortisol reactions impact working memory during gaming. Exceptionally initiated and advancement centered negative feelings decline innovativeness.

According to Kassymova et al. (2019), from one perspective, stress smothers innovative capacities, just as any remaining scholarly capacities of an individual. Then again, stress urges individuals to look for new types of reaction, that is, to innovativeness. The idea of imagination in a distressing circumstance is to a great extent identified with the sort of pressure. The broader pressure an individual encounter, than higher and bigger his imaginative accomplishments. On the third hand, the imaginative capacities of the singular assist her with going through pressure effectively, now and again not seeing them. On the fourth hand, the innovative capacities of an individual "lead" him to explicit unpleasant circumstances related with the requirement for its acknowledgment, just as with the resistance of inventive and regenerative (cliché) social examples of life action.

2.4 Conclusion

In conclusion, this chapter had discussed theoretical framework, conceptual framework, literature review of each variables (sleep quality, perceived stress, and creativity), and relationship of sleep quality and creativity as well as perceived stress and creativity.

Chapter III

Methodology

3.0 Introduction

In this chapter, it will cover information such as research design, sampling technique, research location, research procedure, instruments, and data analysis.

3.1 Research Design

This study used the quantitative method for data collection to evaluate the relationship of the quality of sleep, stress perceiving and the level of creativity among the undergraduate students in Universiti Tunku Abdul Rahman (UTAR). The researchers are able to gather the data in the numerical way and transfer the data by using the computer and establish the hypothesis by analyzing the relationship of the variables in this quantitative study (Choy, 2014). The present study used Qualtrics to create survey and distribute to the undergraduate students in UTAR through the WhatsApp's, Microsoft Teams, and QR code. Besides that, the cross-sectional design was applied in this study. The reason for choosing the method of cross-sectional design is because it enables the data collection of the selected group from the large population in the given moment and having a direct record of the variables of the participant. The cross-sectional study also allows the researchers to investigate the relationship of the variables as it establishes the possible risk factor and the outcome in the sample (Omair, 2015). It is also a low-cost method compared to other research designs and accelerates the process of the collection of data within the period of time (Zangirolami-Raimundo et al., 2018).

3.2 Sampling Procedures

3.2.1 *Sampling method*

The present study required 132 participants from the results of G*Power. (refer Appendix A). A total of 148 responses were obtained through the online survey. Next, 140 responses were maintained after 4 missing data excluded, 2 missing values excluded and the remove of the outliers (refer to appendix). A non-probability sampling method, which is convenience sampling, was used to collect the data. Convenience Sampling (in any case called Haphazard Sampling or Accidental Sampling) is a kind of non-probability or non-arbitrary inspecting where people from the genuine people that meet specific sensible models, similar to straightforward transparency, geological closeness, openness at a given time, or the capacity to participate are fused with the ultimate objective of the audit (Etikan et al., 2016).

3.2.2 *Research location*

This study was conducted at UTAR Kampar Campus, Perak. It is a non-profit private university located in Malaysia. The students come from different states of Malaysia and some are overseas students. All the undergraduate students were the target of this study. Since, the undergraduates need to face with a certain amount of assignments, projects, or events, they may contribute their information in this study of the correlation of sleep quality, perceived stress, and creativity among undergraduate students.

3.2.3 *Ethical clearance*

The ethical clearance was sent to UTAR Scientific and Ethical Review Committee to get approval. The reference number of the approval letter is

"U/SERC/290/2021" and approved by Professor Ts Dr. Faidz bin Abd Rahman. It was approved under Expedited Review on 17 December 2021 (Refer to Appendix G).

3.3 Sample size

3.3.1 *Sample size*

The sample size was calculated using G*Power version 3.1 and the effect size, f^2=0.12, statistical power level of 0.95 and error probability level of 0.05. There are two independent variables involved, sleep quality and perceived stress. The results of G*Power showed that this study required 132 participants (refer Appendix A), while the actual number of participants recruited are 148 and several data are excluded due to missing data.

3.3.2 *Participants*

A total number of 148 responses were collected in this study, and only 140 responses remained after the data cleaning. In the present study, it recruited 65 male (46.4%) and 75 females (53.6%). Besides, this study recruited respondents from 19 to 24 years old. The ethnicity of the respondents was gathered, and the majority of them were Chinese 122 (87.1%), followed by Indians 14 (10.0%), Malays 1 (0.7%), and others which was Punjabi 3 (2.1%).

Next, the majority of the respondents came from the Faculty of Arts and Social Science (FAS) which was 78 (55.7%), followed by Faculty of Business and Finance (FBF) which was 30 (21.4%), Faculty of Information and Communication Technology (FICT) which was 13 (9.3%), Faculty of Engineering and Green Technology (FEGT) which was 12 (8.6%), Faculty of Science (FS) which was 6 (4.3%), and the Institute of Chinese studies which was 1 (0.7%). Furthermore, 88 participants (62.9%) were Year 3,

24 participants (17.1%) for Year 2 and 23 participants (16.4%) for Year 1 and 5 participants (3.6%) were Year 4.

3.3.3 *Data cleaning*

A total of 148 responses were collected in present study. At first, 4 cases were excluded due to incomplete answer (missing data). Then, Mahalanobis distance, the cook's distance, and centered leverage value was conducted to identify the outliers. At first, 2 data were identified as missing value from the case processing summary where case number 92 and 94 were identified and removed. Then, from the data of the casewise diagnostic table, case number 9 and 93 were excluded due to violation of Mahalanobis' Distance and Centered Leverage Value. After excluding the missing data and outliers, a total of 140 responses remained for further data analysis.

3.4 Pilot study

A pilot study was undertaken in advance of the actual study in this research. The purpose of the pilot study was to determine the instrument's reliability in this study. There are 34 responses included in this pilot study and 3 missing data are excluded. Hence, there are 31 responses remaining for the further analysis.

3.5 Research Procedure

An online questionnaire was developed using Qualtrics and delivered to the UTAR undergraduates via the Qualtrics link and QR code. The participants must fulfill the criteria of age range from 18-24 years old and must be undergraduate students studying in UTAR Kampar Campus. The survey was distributed to the participants that fulfill the criteria in the physical UTAR campus. Besides, the data was collected through 'WhatsApp' and 'Microsoft Teams'. The participants were requested to share this survey

to their friends that fulfill the criteria after they completed the survey. When the participants start to do the survey, they will be informed about consent, voluntary participation, and confidentiality in this survey. After that, they will need to select the option that they understand and agree that their data will be used and exposed confidentially. In this survey, it consisted of four sections which are the demographic section, sleep quality scale, perceived stress scale, and self-rated creativity scale. The survey will take approximately 10 minutes to complete. The data was then analyzed and the results were presented using the Statistical Package for Social Science (SPSS) version 23.

3.6 Instruments

Three instruments were used to find the relationship between sleep quality, perceived stress, and creativity level among undergraduates. These instruments worked to evaluate the creativity level followed by the sleep quality and perceived stress.

3.6.1 *Demographic Information*

In the first component, the respondents will be asked open-ended questions about their age, sleep length, and close-ended questions about their gender, ethnicity, faculty, and year of study. The first thing the participants will be asked is their age, followed by questions on gender, ethnicity, faculty, year of study, and sleep length in a day. For open-ended questions, the participants must fill in the box, whereas they must tick the answer for closed-ended questions.

3.6.2 *Sleep Quality Scale (SQS)*

Yi (2006), had developed the scale for the purpose of measuring the quality of the sleep. It consists 28-items in the scale and six facets of the sleep quality. The first facet is

daytime symptoms, second, the restoration after sleep, third, the problems initiating, fourth, the maintaining sleep, and following by difficulty walking and sleep satisfaction. The Likert scale with 4-point range is used for the measurement, ‘few’ as 0, sometimes as ‘1’, often as ‘2’ and almost always as ‘3’. The two facets, restoration after sleep (items 13, 14, 15, 16) and sleep satisfaction (items 24, 25, 26) are reversed items. The total score of all items is computed after calculating the two reversed facets and the higher the score shows the poorer quality of sleep. The maximum total score of the scale is 84 and the minimum total score is 0. The instrument shows high consistency with Cronbach’s alpha value, 0.84 and 0.81 for the test-retest reliability. The scale also shows a high validity with the concurrent validity, (r=0.72) to the Pittsburgh Sleep Quality Index.

3.6.3 ***Perceived Stress Scale (PSS)***

Cohen et al. (1983) made this instrument to quantify the impression of stress. It is an extent of how much conditions in one's everyday presence are surveyed as disturbing. It comprises of 10-things, to the extent of how much conditions in one's everyday presence are evaluated as stress. Things were planned to tap how whimsical, wild, and over-trouble respondents track down their lives. The items in the PSS present with regards to feelings and insights during the last month. For every circumstance, respondents are asked how consistently they felt a particular way. A 5-point Likert scale utilized in this instrument where '0' can be deciphered as 'Never', '1' as 'almost never', '2' as 'sometimes', '3' as 'fairly often' and '4 as 'very often'. PSS scores are acquired by switching reactions (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 and 4 = 0) to the four decidedly expressed (things 4, 5, 7, and 8) and afterward adding across all scale things. A short 4 thing scale can be produced using questions 2, 4, 5 and 10 of the PSS 10 thing scales. The

unwavering quality of the scale was tried with inside dependability (r=0.78), and test-retest unwavering quality (r=0.85) (Cohen & Williamson, 1988).

3.6.4 *Self-rated Creativity Scale (SRCS)*

This scale is modified by Tan and Ong (2019) into a 12-item SRCS used to measure self-report creativity among university students. This version of SRCS removed item 9 from the original 13-item SRCS by Zhou and George (2001) due to low factor loading. All the items are measured using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). All the scores will be calculated to mean scores, ranging from 1 to 5. The person with a higher mean score was assumed to be more creative. The SRCS was found to have high reliability which is the general factor of the Omega hierarchical is higher than .70 (0.79) and a good convergent validity (Tan & Ong, 2019).

3.7 Data Analysis

After the data collection, it was analyzed through the SPSS. The analysis process includes the descriptive data of the demographic of the participants such as gender, age and ethnicity of the participants. The mean, standard deviation, frequency and the percentage of the variables of the demographic were computed in this study. The score of the instruments, Perceived Stress Scale (PSS), Sleep Quality Scale (SQS) and the Self-rated Creativity Scale (SRCS) were analyzed and calculated through the SPSS. The screening process of demographic data and the score of the instruments was conducted to remove the outliers of the data set.

The Person correlation coefficient had been performed to figure out the correlation of the variables, perceived stress, quality of sleep and the creativity level. As a principle, the zero of r value shows that there is no relationship among the variables and

the value from 0 to +1 indicates a positive correlation, value from 0 to -1 indicates a negative correlation (Akoglu, 2018). The Person correlation coefficient has been applied to answer the first and second research questions in our research study. In addition, the compute of the Cronbach's alpha value been carried out as to test the scales' reliability in this study. According to Nurul et al. (2015), the reliability of the Cronbach's alpha is shown in Table 3.1.

Table 3.1

Rules of thumb of Cronbach's Alpha coefficient size (Nurul et al., 2015)

Cronbach's Alpha	
$\alpha < 0.5$	Unacceptable
$0.5 \leq \alpha \geq 0.6$	Poor
$0.6 \leq \alpha \geq 0.7$	Questionable
$0.7 \leq \alpha \geq 0.8$	Acceptable
$0.8 \leq \alpha \geq 0.9$	Good
$\alpha \geq 0.9$	Excellent

Besides that, the skewness and the kurtosis value of the variables were tested to analyze the normality's assumption of the distribution. The purpose of the skewness is to figure out the symmetry of the variable distribution and identify the direction of the skewness, whether it is positive or negative. The kurtosis was used to examine the peakedness of the distribution (Kim, 2013). The normal range values of skewness and kurtosis are within -2 and +2 (George & Mallery, 2010) and as the display for the univariate normal distribution. In addition, the Kolmogorov-Smirnov (K-S) test and Shapiro-Wilk (S-W) test were the most common method used in normality test. The data of ($p > 0.05$) means a normal distribution, and no violation (Ghasemi & Zahediasi, 2012).

Besides, there are two visualization methods in testing the normality which are Quantile-Quantile plot (Q-Q plot) and histogram. The Q-Q plot can be used to check the normality of the study (Razali & Wah, 2011). The plotting of the Q-Q plot will allow the researcher to make the direct comparison of one distribution with the other and to check whether the values is following the assumed distribution through visualization (Oldford, 2016). The data are normally distributed when the pattern is closely followed the ascending line (Garson, 2016). Another visual method can be used to test normality is histogram. The frequency distribution that the observed values are plotted against their frequency, shows whether the distribution is bell shaped or not. The bell-shaped curve is considered a normal distribution while it provides the concepts of skewness at the same time (Das & Imon, 2016).

Furthermore, the reliability test has been done in the pilot study and actual study. The reliability results of pilot study showed that PSS ($\alpha = .75$) have an acceptable reliability value and SRCS ($\alpha = .86$) have a good reliability value. In contrast, SQS showed an unacceptable reliability which was ($\alpha = .42$), so three items (items 15, 24, 26) were removed to increase the reliability of the scale. After removing the three items, the reliability of SQS increased to ($\alpha = .63$) which was considered a questionable reliability.

Besides, the reliability of the actual study showed that the PSS ($\alpha = .74$) have an acceptable reliability, followed by the SRCS ($\alpha = .92$) which is an excellent reliability. The reliability of the SQS was reported with the alpha Cronbach's coefficient ($\alpha = .58$) which is a poor reliability. The reliability results were shown in Table 3.1.

Table 3.2

Reliability of the Instruments

Variable	No. of Items	Cronbach Alpha		
		Past study	Pilot study	Actual study
Sleep Quality Scale	25	0.81 (28-item)	0.63	0.58
Perceived Stress Scale	10	0.78	0.75	0.74
Self-rated Creativity Scale	12	0.79	0.86	0.92

3.8 Conclusion

In conclusion, this chapter had covered the research design, sampling technique, sample size, pilot study, research procedure, instruments, and data analysis.

Chapter IV

Result

4.0 Introduction

In this chapter, it will cover information such as univariate outliers, normality tests, descriptive and frequency distribution, regression model summary, ANOVA, coefficients, casewise diagnostic, and casewise summaries.

4.1 Univariate Outliers

The normality assumptions were confirmed using the P-P plot, Q-Q plot, histogram, skewness, kurtosis, Kolmogrov Smirnov and Shapiro Wilk in the preliminary analysis for the real study.

4.1.1 *Kurtosis and Skewness*

In this study, skewness and kurtosis were used to analyze the normality distribution. For a total of 140 samples, Table 4.1 demonstrates that the skewness and kurtosis assumptions were not violated, with values falling within the allowed range of -2 to +2. (George & Mallery 2010)

Table 4.1

Skewness and Kurtosis Table

	Skewness	Kurtosis
Total score of SQS	0.301	0.181
Total score of PSS	0.648	1.773
Total mean of SRCS	-0.204	0.370

Note. SQS = Sleep Quality Scale, PSS = Perceived Stress Scale, SRCS = Self-rated Creativity Scale

4.1.2 *Histogram*

The scales' normality was determined using a histogram, which revealed that sleep quality and self-rated creativity were negatively skewed, meanwhile perceived stress was positively skewed.

4.1.3 *Normal Q-Q plot*

A test of normality indication is the Q-Q plot. The Q-Q plot shows that the data for sleep quality, perceived stress, and self-rated creativity was regularly distributed, with data points close to the diagonal line.

4.2 Normality Test

The Kolmogrov Smirnov and Shapiro Wilk tests were used to determine the study's normality. According to Ghasemi and Zahediasl (2012), a *p*-value larger than 0.05 indicates that the normal distribution is present (Ghasemi et al., 2012). Table 4.2 shows the Kolmogrov Smirnov and Shapiro Wilk results for the actual study, which shows that the sleep quality and self-rated creativity indicates normal distribution and no violation

and the perceived stress has violation. It is because for the sleep quality and self-rated creativity, the *p*-value is greater than 0.05 meanwhile the *p*-value for perceived stress scale is lesser than 0.05

Table 4.2

Kolmogorov-Smirnov and Shapiro-Wilk Table

	Kolmogorov-Smirnov	Shapiro-Wilk
Total score of SQS	0.074	0.167
Total score of PSS	0.003	0.001
Total mean of SRCS	0.200	0.072

Note. SQS = Sleep Quality Scale, PSS = Perceived Stress Scale, SRCS = Self-rated Creativity Scale

4.3 Descriptive

4.3.1 *Background of Respondents*

The demographic profile of the respondents was shown in Table 4.3. There was a total of 140 undergraduate students from the age of 19 to 24, participated in this research. In this study, the majority of the participants were from the age group of 22 (42.9%, *n* = 60). Following that, 18.6 percent of respondents were 21 years old (*n* = 26), 15.7 percent were 20 years old (*n* = 22), 13.6 percent were respondents age 23 years old (*n* = 19), 6.4 percent were 24 years old (*n* = 9) and the remaining 19 year old participants (2.9 percent, *n* = 4) were the lowest age group that participated in the research. As for the gender of participants, more than half of the respondents in which 53.6 % were female (*n* = 75) and 46.4 % of the remaining participants were male (*n* = 65). The most undergraduate students, 87.1%, that participated in this research were Chinese (*n* = 122), followed by 10% were Indian (*n* = 14), 2.1% were Punjabi (*n* = 3) and 0.7% which is equivalent to 1

respondent was Malay. All the undergraduate students that participated in this research are from Universiti Tunku Abdul Rahman. The most respondents participated were from Faculty of Arts and Social Science (55.7%, *n* = 78), 21.4% from Faculty of Business and Finance (*n* =30), 9.3% of respondents from Faculty of Information and Communication (*n* = 13), 8.6% of respondents from Faculty of Engineering and Green Technology (*n* = 12) and 4.3 % undergraduates from Faculty of Science (*n* = 6). And only one respondent from the Institute of Chinese Studies. At last, the highest percentage, 62.9%, of respondents were Year 3 undergraduates (*n* = 88), while 24 respondents (17.1 %) from Year 2 and 16.4 % of respondents from Year 1 (*n* = 23) and only 3.6 % undergraduates (*n* = 5) from Year 4 participated in this research

Table 4.3

Descriptive of Respondents

Demographic profile		Frequencies (n)	Percentage (%)
Age			
	19	4	2.9
	20	22	15.7
	21	26	18.6
	22	60	42.9
	23	19	13.6
	24	9	6.4
Gender			
	Male	65	46.4
	Female	75	53.6
Ethnicity			

	Malay	1	0.7
	Chinese	122	87.1
	Indian	14	10.0
	Others (Punjabi)	3	2.1
University			
	Universiti Tunku Abdul Rahman (UTAR)	140	100
Faculty			
	Faculty of Business and Finance	30	21.4
	Faculty of Arts and Social Science	78	55.7
	Faculty of Information and Communication Technology	13	9.3
	Faculty of Engineering and Green Technology	12	8.6
	Institute of Chinese Studies	1	0.7
	Faculty of Science	6	4.3
Year of Study			
	Year 1	23	16.4
	Year 2	24	17.1
	Year 3	88	62.9

	Year 4	5	3.6

RO3: To explore the level of creativity of the undergraduate students among UTAR.

4.4 Frequency Distribution

The mean score for all variables, sleep quality, perceived stress and creativity is shown in Table 4.4. The mean total scores of the Sleep Quality Scale are 34.01 (*SD* = 6.76), the minimum score is 14 and maximum score is 52. Followed by the mean total scores of the Perceived Stress Scale are 19.64 (*SD* = 5.13), minimum score is 7 and maximum score is 39. The result also shows a total mean score of the Self Rated Creativity Scale which are 3.49 (*SD* = 0.74), minimum score is 1 and maximum score is 5. It also explores the average mean of the creativity level among the UTAR undergraduate students which is 3.49.

Table 4.4

Frequencies distribution of SQS, PSS and SRCS (N=140)

Variable	*M*	*SD*	Min	Max
Sleep Quality Scale	34.01	6.76	14	52
Perceived Stress Scale	19.64	5.13	7	39
Self-rated Creativity Scale	3.49	0.74	1	5

4.5 Pearson Correlation Coefficient

RQ1: Is there any significant relationship between sleep quality and creativity?

H1: There is a significant relationship between sleep quality and creativity.

The Pearson Coefficient value of the Sleep Quality Scale, Perceived Self Scale and the Self-rated Creativity scale is shown in Table 4.5. The Pearson's Correlation Coefficients value of sleep quality scale towards the Self-Rated Creativity scale shows r (140) =.011, p =.898. It shows that the sleep quality scale is having a positive correlation with the self-rated creativity scale but it is not significant. It indicates not significant of the poorer sleep quality will have a better creativity in the result. As the result, the null hypothesis is being accepted.

RQ2: Is there any significant relationship between perceived stress and creativity?

H2: There is a significant relationship between perceived stress and creativity.

The result of Table 4.5 shows that the Pearson Coefficient value of the Perceived Stress Scale towards the Self-Rated Creativity scale is r (140) = -.18, p=.034. The result shows that there is a negative correlation of the Perceived Stress Scale towards the Self-Rated Creativity Scale. It shows that there is a significant relationship of the perceived stress level towards creativity. However, it also shows a low relationship among them. Hence, there is a rejection of the null hypothesis.

Table 4.5

Pearson Correlation of Sleep Quality, Perceived Stress and Creativity

Variables		1
1. Self-rated Creativity Scale	Pearson Correlation	-
	Sig. (2 tailed)	-
	N	140
2. Sleep Quality Scale	Pearson Correlation	.011
	Sig. (2 tailed)	.898
	N	140
3. Perceived Stress Scale	Pearson Correlation	-.180
	Sig. (2 tailed)	.034
	N	140

4.6 Durbin-Watson of Regression Model

The Durbin-Watson value that is less than 3 or range from 1.5 to 2.5 shows that it is following the rule of thumb with no auto-correlation (Wabwile et al., 2014; Ho, 2013). As to assess the error of independence, the Durbin-Watson of Regression Model was interpreted in this study. The result is shown in Table 4.6 and it is under the acceptable range with the value of 2.126.

Table 4.6

Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.198[a]	.039	.025	.728	2.126

Note. a= Predictors: (Constant), Perceived Stress Scale, Sleep Quality Scale

b= Dependent variable: Self-rated Creativity Scale

4.7 Multiple Linear Regression

The application of the multiple linear regression is to test whether the significant statistic of the independent variable towards the dependent variable (Uyanık & Güler, 2013). In this study, the multiple linear regression had been interpreted as to examine whether the sleep quality, perceived stress is significantly predicting creativity. The result shown in Table 4.7, with F (2, 137) =2.804, p=.064, R^2 =.039. It shows that the result is not significantly prediction of the sleep quality, perceived stress to the creativity.

Table 4.7

ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	2.971	2	1.486	2.804	.064[b]
Residual	72.597	137	.530		
Total	75.569	139			

Note. a= Dependent variable: Self-rated Creativity Scale,
b= Predictors: (Constant), Perceived Stress Scale, Sleep Quality Scale

4.8 Unstandardized and Standardized Regression Coefficients

The two coefficients of unstandardized and standardized are shown in Table 4.8. For the unstandardized coefficients, the sleep quality scale shows a positive coefficient with the value of .010 while as the perceived stress scale shows a negative coefficient with -.031. The standardized coefficients value in sleep quality scale shows positive coefficients with .090 and perceived stress scale shows negative coefficients with -.213. However, the sleep quality scale shows no significance with the value .319 while as perceived stress scale shows significance with the value .019.

Table 4.8 also shows the value of the Variance Inflation Factor (VIF) for the variables of sleep quality scale and the perceived stress scale. The use of the VIF is to test whether the variables are having the collinearity problem. As the rule of thumb, the VIF value that stays between 5 and 10 is violent and problematic (Akinwande et al., 2015). The VIF values of the sleep quality scale and the perceived stress scale is within the acceptable value which are 1.160 and 1.160.

Table 4.8

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistic	
	B	Std. Error	Beta (β)			Tolerance	VIF
(Constant)	3.753	.343		10.955	.000		
Sleep Quality Scale	.010	.010	.090	1.000	.319	.862	1.160
Perceived Stress Scale	-.031	.013	-.213	-2.364	.019	.862	1.160

Note. a= Dependent variable: Self-rated Creativity Scale

4.9 Casewise Diagnostics

In the casewise analysis, the diagnostic of casewise and summaries of the case will be used to evaluate the influential data and the multivariate outliers (Leung et al., 2016). To recognize the outliers, the value of the Mahalanobis Distance, the centered Leverage value and the cook's distance from Table 4.10 were used. According to Penny, (1996), the suitable critical value for 100 samples is 14.22 and 500 samples is 18.12 in the Mahalanobis distance. In the cases of number 9, the critical value for Mahalanobis distance has shown a value there is violence the rule which is 21.57. As the result, cases

for number 9 was identified as the potential outlier and removed from the analysis of the data. The value of cook's distance that is more or greater than one is a possible outlier in the data (Cook & Weisberg, 1982). From computed value in Table 4.10, all the value for the cook's distance did not show the value greater than 1 and the greater value was 0.502. According to Cohen et al., (2014), the cutoff value for the outlier of the leverage value is 3(number of the predictors + 1)/number of sample size. The centered leverage value for the case 93 is excess the value of .0608 which is .0633. As a result, we remove cases 9, 93 as they violate the rule of numb in the Casewise diagnostic. After removing the 2 outliers, our Q-Q plot graph (in Graph 1) shows a fit straight line and it is following the distributed assumption.

Table 4.9

Casewise Diagnostics[a]

Case number	Std. Residual	Total_SRCS	Predicted Value	Residual
9	2.576	5	3.01	1.986
70	-2.092	2	3.61	-1.612
86	-2.917	1	3.58	-2.248
88	-2.724	1	3.52	-2.099
92	-2.338	2	3.64	-1.802
93	-3.012	1	3.32	-2.322

Note. a= Dependent variable: Total_SRCS

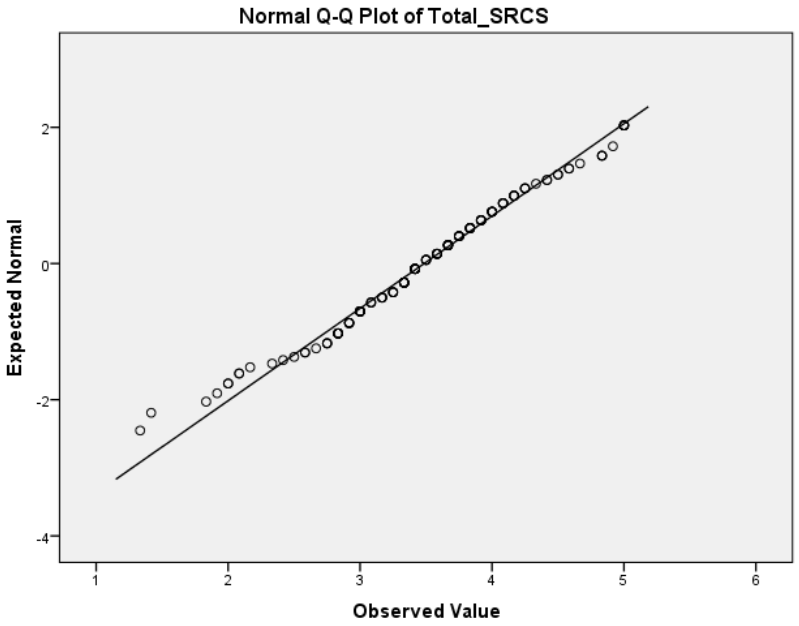
Table 4.10

Case Summaries[a]

Case number	Mahalanobis Distance	Cook's Distance	Centered Leverage Value
9	21.56918	.50159	.15297
70	1.85040	.03063	.01312
86	6.82601	.17628	.04841
88	.16393	.02062	.00116
92	4.77136	.08100	.03384
93	8.92290	.24608	.06328

Note. a= Limit to first 200 cases

Graph 1: Q-Q plot



4.10 Conclusion

In conclusion, this chapter had covered univariate outliers, normality tests, descriptive and frequency distribution, regression model summary, ANOVA, coefficients, casewise diagnostic, and casewise summaries.

Chapter V

Discussion

5.0 Introduction

For this research, there are three hypotheses has been proposed. The first hypothesis suggested that there is a significant relationship between quality of sleep and creativity level of the undergraduate students of Universiti Tunku Abdul Rahman. The results of this study indicate that there is no significant relationship between sleep quality and level of creativity of the undergraduates of Universiti Tunku Abdul Rahman. The second hypothesis proposed for this study was that there is a significant relationship between perceived stress and creativity and the result of this study indicates that there is indeed a significant relationship between perceived stress and level of creativity of undergraduates in UTAR.

5.1 Discussion

5.1.1 *H1: There is a significant relationship between sleep quality and creativity.*

The first proposed hypothesis is not support in the present study. The present's results indicate the no significant relationship of the sleep quality and level of creativity among the higher education students in the setting of UTAR.

The previous studies by Schönauer et al. (2018), Landmann et al. (2016), and Brodt et al. (2018), show a similar result that the quality of sleep and creativity is not significant related. The result from Schönauer et al. (2018), shows that there is no improvement in the creative problem-solving performance regards to the napping, period of waking and the specific stages of sleep. It suggests that the stage of rapid eye movement sleep increases the opportunity to enhance creativity only when the

appropriate idea or information had been recruited before the sleeping process (Cai et al., 2009). The findings by Landmann et al. (2016), shows a result that the sleeping process does not raise or restructure the knowledge of the possible creativity pathway to solve the problem but only activates the buildup of the available information. This idea is also support by the research by Brodt et al. (2018), result displayed that the process of incubation occurring in the sleeping improves the outcomes of the classical solution, however, it does not have extra benefit.

The optimal effects of the sleep mostly occurred during the rapid eye movement (REM) sleep and the slow-wave sleep. In the previous study, the non-rapid eye movement sleep shows a decline of the memory' reorganizing compare to the REM sleep (Sterpenich et al., 2014) and slow-wave sleep is assumed to have the influence of the conveying of the remembering information (Beijamini et al., 2014). Even though the findings had provided evidence of the certain stage of sleep in the fostering of creativity, there is a lack findings of the influences to the creativity from different stages (Ritter & Dijksterhuis, 2014). In the present study, the quality of sleep was measured through the Sleep Quality Scale (SQS), however the stage of the sleep was not obtained. It may explain the reason for the no significant result in this study as the improvement on creativity or the performance may only happen in certain stages of the sleep (Cai et al., 2009). Moreover, according to Landmann et al. (2016), the disintegration of the scheme and the reorganizing of the information during the sleep may only develop under certain specific conditions. The result by Ritter et al. (2012), also shows that the creativity is only enhanced under the reactivation of the odor-induced during sleep but not effect shows

without the odor-induced reactivation. Hence, the effect of sleep on creativity may only happen in specific conditions or stages.

5.1.2 *H2: There is a significant relationship between perceived stress and creativity.*

The present study supported the second proposed hypothesis, where the results stated that there is a significant negative relationship between perceived stress and creativity. It can be concluded that the lower the perceived stress, the higher the creativity.

The result of this finding can be explained using distraction-conflict theory, which focuses on the presence of others will affect the individual performance (Goel et al., 2013). In this study, the presence of stress decreases the individual's creative outcomes. It is due to each individual having limited mental resources and when they meet the stressors, they need to distribute some of their resources to face the stressors, and leaving lesser cognitive resources for other tasks (Byron et al., 2010). Especially in high time stress, the individual will feel less intrinsically motivated and lead to low creativity (Khedhaouria et al., 2017). Next, some hindrance stress might cause the individual to feel internal stress and be unmotivated to perform work, hence it will affect their creativity (Fay et al., 2019). Hence, the hindrance stress experienced by an individual will demotivate them from performing tasks and decrease their creativity (Sacramento et al., 2013).

Besides, the present study is similar to the result of the previous study. According to Wang et al. (2017), under low stress situations, creativity is the highest and unique, especially under low time stress. When an individual stay in a low stress situation, they could focus more to do the task and no need to worry about any restrictions such as time

limit to foster more solutions. This explanation could be further explained by Triangular Theory of Creativity (Sternberg, 2017). When an individual is dealing with stress such as peer pressure, especially in an educational context, most of them will conform to agree or follow others (Cakirpaloglu et al., 2016; Ramasamy et al., 2020; Beran, 2015). When they are following others, they are violating the nature of creativity which is about challenging and disruptive (Magni & Manzoni, 2020). This kind of stress will make the individual follow the norm and not defying oneself to be more creative. According to Triangular Theory of Creativity (Sternberg, 2017), an individual need to defy crowd, oneself, and zeitgeist in order to be creative. However, in this case, the higher the stress perceived, the more probability the individual will conform and lead to lower creativity level.

5.2 Implication

5.2.1 *Theoretical Implication*

In other countries, there is sufficient research about the relationship of the sleep quality, perceived stress and creativity in the context and the study in Malaysia is limited. This study has able to provide a study specific information that focuses on the undergraduate students located in UTAR, Malaysia. The result of this study indicates that sleep quality is not significant to the creativity and the perceived stress is played as the negative significant predictor towards creativity among the undergraduate students in UTAR. The findings provide a confirmation to the theory of distraction-conflict theory and the Triangular Theory of Creativity which explain that stress may decrease the level of creativity. However, the consolidation theory may not be supported in the present study as the result shows no significant relationship among the sleep quality and

creativity. The present study may play a role to contribute the knowledge that is substantial for the further research.

5.2.2 *Practical Implication*

Many researches done in the creativity area focused on Western countries, and our findings form a basis for data in non-Western countries. Due to the different cultures, undergraduates in Western countries might have different perspectives, perceived stress, sleep quality patterns compared with non-Western countries. Current results provide data on the creativity level of undergraduates in Malaysia. Besides, this present study provides a better insight into the correlation between sleep quality, perceived stress, and creativity among undergraduate students. The insignificant results of sleep quality and creativity provide a value for researchers such as psychologists, teachers, or education institutions to examine and develop why there is no relationship on it. Next, this study provides a finding that perceived stress has a negative relationship with creativity. This creates support for the stress management trainer or program to be aware of it and include some stress reduction strategies in order to increase creativity for the participants. Furthermore, clinical psychologists, counselors, or any mental health experts could implement mental health aid to reduce the stress level of undergraduate students in order to improve their creativity.

5.3 Limitations

For this research, there are few limitations that need to be taken under consideration. First of all, the demographic of the participants for this research. To be precise, the race of the undergraduate students participated in this research. Even though this study focused on undergraduate students, the majority of the participants were

Chinese students. This shows that there are less representations of other ethnicities and the findings might not represent all the undergraduate students. Moreover, this study initially focused on undergraduate students in University Tunku Abdul Rahman, this also leads to the fact that this doesn't represent the entire undergraduate population in Malaysia.

Another limitation that needs to be addressed is the inconveniences that the undergraduates might have faced while participating in the study. All the participants in our research are undergraduates and as an undergraduate, most of them prefer to be efficient and manage their time as well. The issue was that the length of the questionnaire was relatively long. This could’ve affected the behaviour of the respondents, where their focus will be to complete the questionnaire quickly as possible rather than completing the questionnaire accurately. This can cause inconsistent results as well. According to Sahlqvist et al. (2011), participants who got the short version of the questionnaire and resided in relatively wealthy electoral districts were roughly 50% more likely to respond than those who received the longer version of the questionnaire and lived in relatively poor wards. Which concludes that the shorter the questionnaire, the better the responses.

Last but not least, even though conducting quantitative research is convenient and researchers are able to analyse the findings descriptively, it's a fact that quantitative research only provides general outcomes but doesn't provide detailed information of the questions asked. The more persons in the sample, the more statistically correct the results. Because quantitative research requires numeric findings, free text comments are not permitted, which means contextual information may be omitted.

5.4 Recommendations

Regards to the limitations that have been mentioned, the first recommendation is that future researchers are encouraged to conduct the research using mixed methods. According to Shorten and Smith (2017), mixed methods study is one in which analysts collect and analyse both quantitative and qualitative data. Mixed methods research combines the advantages of both qualitative and quantitative methodologies, allowing researchers to examine topics from several perspectives and identify connections across the layers of our various study problems.

Furthermore, as for the future upcoming research, researchers are encouraged to use simpler forms of questionnaires or tests in order to get more response. If the scale has more questions, the probability of getting more response is low. So, by shortening the length of the questionnaire, we can expect that it plays a role in participants' response behaviour and we can gather more and almost accurate results.

For the future study, the researchers also can diversify the participation in terms of gender, race, universities and more demographic in order to sustain equal representation from all the targeted groups. Furthermore, rather than focusing on the same or one particular field, programme, faculty, or department, future researchers should consider and contact additional respondents from a different field, programme, faculty, or department. This is due to the possibility of avoiding biased reactions.

5.5 Conclusion

This chapter had covered the discussion, implications, limitations, and recommendations.

References

Abdullah, T. I. A. A. S., (2019, March 13). Creativity, a priority in national agenda. *New Straits Times*. https://www.nst.com.my/opinion/columnists/2019/03/468598/creativity-priority-national-agenda

Afshari, M., Siraj, S., A. Ghani, M. F., Razak, A. Z. A. (2012). Enhancing students' creativity at research universities in Malaysia. *Archives Des Sciences, 65*(6). http://eprints.um.edu.my/9796/1/00005891_86205.pdf

Ahmadi, N. T., Mustaffa, S., & Ahmadi, A. (2014). The barriers of enhancing creativity developed by parents in developing countries. *Procedia- Social and Behavioral Sciences, 114,* 257-261. https://doi.org/10.1016/j.sbspro.2013.12.694

Akinola, M., Kapadia, C., Lu, J. G., & Mason, M. F. (2019). Incorporating physiology into creativity research and practice: The effects of bodily stress responses on creativity in organizations. *Academy of Management Perspectives, 33*(2), 163-184. https://doi.org/10.5465/amp.2017.0094

Akinwande, M. O., Dikko, H. G., & Samson, A. (2015). Variance inflation factor: as a condition for the inclusion of suppressor variable (s) in regression analysis. *Open Journal of Statistics, 5*(07), 754-767. http://dx.doi.org/10.4236/ojs.2015.57075

Akoglu, H. (2018). User's guide to correlation coefficients. *Turkish Journal of Emergency Medicine, 18*(3), 91-93. https://doi.org/10.1016/j.tjem.2018.08.001

Al Shammari, M. A., Al Amer, N. A., Al Mulhim, S. N., Al Mohammedsaleh, H. N., & AlOmar, R. S. (2020). The quality of sleep and daytime sleepiness and their association with academic achievement of medical students in the eastern province of Saudi Arabia. *Journal of Family & Community Medicine, 27(2), 97-102.* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7415273/pdf/JFCM-27-97.pdf

Alghafri, A. S. R., & Ismail, H. N. B. (2014). The effects of integrating creative and critical thinking on schools students' thinking. *International Journal of Social Science and Humanity*, *4*(6), 518-525. https://doi.org/10.7763/IJSSH.2014.V4.410

Ariffin, S. R., Daud, F., Ariffin, R., Rashid, N. A., & Badib, A. (2011). Profile of creativity and innovation among higher learning institution students in Malaysia. *World Applied Sciences Journal 15 (Innovation and Pedagogy for Lifelong Learning),* 36-41. https://www.semanticscholar.org/paper/Profile-of-Creativity-and-Innovation-Among-Higher-Ariffin-Daud/7ece039a90ee3e73f4f99656cebd715efb2891cf

Arumugam, T. (2016, March 13). Innovation, creativity key drivers make students more employable in 21st century. *New Straits Times.* https://www.nst.com.my/news/2016/03/132486/innovation-creativity-key-drivers-make-students-more-employable-21st-century

Azeem, M., Mataruna-Dos-Santos, L. J., Moalla, R, B. A., & Kaleem, M. M. (2019). Confirmatory model of the workplace creativity in higher education. *International Journal of Recent Technology and Engineering, 8*(2). https://doi.org/10.35940/ijrte.B1507.078219

Bajpai, S., & Bajpai, R. (2014). Goodness of measurement: Reliability and validity. *International Journal of Medical Science and Public Health, 3*(2), 112-115. https://www.researchgate.net/publication/271186978

Beijamini, F., Pereira, S. I. R., Cini, F. A., & Louzada, F. M. (2014). After being challenged by a video game problem, sleep increases the chance to solve it. *Plos one*, *9*(1), 1-5. https://doi.org/10.1371/journal.pone.0084342

Beran, T. (2015). Research advances in conformity to peer pressure: A negative side effect of medical education. *Health Professions Education, 1*(1), 19-23. https://doi.org/10.1016/j.hpe.2015.11.004

Berjot, S., & Gillet, N. (2011). Stress and coping with discrimination and stigmatization. *Frontiers in Psychology*, *2*, 33. https://doi.org/10.3389/fpsyg.2011.00033

Bolandifar, S. Noordin, N. (2013). Investigating the relationship between creativity and academic achievement of Malaysian undergraduates. *Jurnal Teknologi, 65*(2). https://journals.utm.my/jurnalteknologi/article/view/2355

Born, J., & Wilhelm, I. (2012). System consolidation of memory during sleep. *Psychological research, 76*(2), 192-203. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3278619/

Brodt, S., Pöhlchen, D., Täumer, E., Gais, S., & Schönauer, M. (2018) Incubation, not sleep, aids problem-solving, *Sleep, 41*(10), 1-11. https://doi.org/10.1093/sleep/zsy155

Browne, K. (2005). Snowball sampling: using social networks to research non‐heterosexual women. *International journal of social research methodology*, *8*(1), 47-60. https://doi.org/10.1080/1364557032000081663

Bryne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed.). Routledge. https://doi.org/10.4324/9780203805534

Bryon, K., Khazanchi, S., & Nazarian, D. (2010). The relationship between stressors and creativity: A meta-analysis examining competing theoretical models. *Journal of Applied Psychology*, *95*(1), 201-212. https://doi.org/10.1037/a0017868

Byron, K., & Khazanchi, S., & Nazarian, D. (2010). The relationship between stressors and creativity: A meta-analysis examining competing theoretical models. *Journal of Applied Psychology*, *95*(1), 201-212. https://doi.org/10.1037/a0017868

Cai, D. J., Mednick, S. A., Harrison, E. M., Kanady, J. C., & Mednick, S. C. (2009). REM, not incubation, improves creativity by priming associative networks. *Proceedings of the National Academy of Sciences*, *106*(25), 10130-10134. https://doi.org/10.1073/pnas.0900271106

Cai, W. J., Khapova, S., Bossink, B., Lysova, E. & Yuan, J. (2020). Optimizing employee creativity in the digital era: Uncovering the interactional effects of abilities, motivations, and opportunities. *International Journal of Environmental Research and Public Health*, *17*(3). https://doi.org/10.3390/ijerph17031038

Cakirpaloglu, S., Lemrova, S., Kvintova, J., & Vévodová, S. (2016). Conformity, peer pressure, popularity and risk behavior among adolescents. *Proceedings of ICERI 2016 Conference*. https://doi.org/10.21125/iceri.2016.0196

Carlsson, I., Davidson, P., & Ors, M. (2019). Effects of a daytime nap on primed and repeated remote associates tests and relations with divergent creativity. *Creativity Research Journal, 31*(2), 207-214. https://doi.org/10.1080/10400419.2019.1606619

Chan, S., & Yuen, M. (2014). Personal and environmental factors affecting teachers' creativity-fostering practices in Hong Kong. *Thinking Skills and Creativity, 12*, 69-77. https://doi.org/10.1016/J.TSC.2014.02.003

Cheng, V. M. Y. (2019). Developing individual creativity for environmental sustainability: Using an everyday theme in higher education. *Thinking Skills and Creativity, 33*. https://doi.org/10.1016/j.tsc.2019.05.001

Cherry, K. (2021, April 25). 10 signs of a creative mind. *Very Well Mind*. https://www.verywellmind.com/characteristics-of-creative-people-2795488

Choy, L. T. (2014). The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches. *IOSR Journal of Humanities and Social Science, 19*(4), 99-104. https://iosrjournals.org

Chua, Y. L., Balakrishnan, B., Choong, P. Y., & Koh, Y. Y. (2020). Improving creativity of product designed by engineering undergraduates in Malaysia by creative thinking skills for conceptual engineering design module. *International Journal of Instruction, Technology, and Social Sciences (IJITSS), 1*(2), 16-23. https://www.researchgate.net/publication/343136397_Improving_Creativity_of_Product_Designed_by_Engineering_Undergraduates_in_Malaysia_by_Creative_Thinking_Skills_Module

Chua, Y. L., Balakrishnan, B., Choong, P. Y., & Koh, Y. Y. (2020). Effectiveness of creative thinking module on figural creativity of engineering undergraduate in Malaysia. *International Journal of Higher Education*, *9*(4), 233-243. https://doi.org/10.5430/ijhe.v9n4p233

Clement-Carbonell, V., Portilla-Tamarit, I., Rubio-Aparicio, M., & Madrid-Valero, J. J. (2021). Sleep quality, mental and physical health: A differential relationship. *International Journal of Environmental Research and Public Health, 18*(2), 460. https://doi.org/10.3390/ijerph18020460

Cohen, Patricia, Stephen G. West, & Leona S. Aiken. (2014). Applied multiple regression/correlation analysis for the behavioral sciences. *Psychology press*, 2014. https://doi.org/10.4324/9781410606266

Cohen, S., & G. Williamson. 1988. "Perceived Stress in a Probability Sample of the U.S." *In the social psychology of health,* edited by S. Spacapan and S. Oskamp, 31–67. Thousand Oaks, CA: Sage.

Cohen, S., Kamarck, T., & Mermelstein, R. (1994). Perceived stress scale. *Measuring stress: A guide for health and social scientists*, *10*(2), 1-2. https://www.northottawawellnessfoundation.org/wp-content/uploads/2018/04/PerceivedStressScale.pdf

Cook, R. D., & Weisberg, S. (1982). Criticism and influence analysis in regression. *Sociological methodology*, *13*, 313-361. https://www.jstor.org/stable/270724

Das, K. R., & Imon, A. H. M. R. (2016). A brief review of tests of normality. American *Journal of Theoritical and Applied Statistics, 5*(1), 5-12. https://doi.org/10.11648/j.ajtas.20160501.12

De Clercq, D., & Pereira, R. (2020). Sleepy but creative? How affective commitment, knowledge sharing and organizational forgiveness mitigate the dysfunctional effect of insomnia on creative behaviors. *Personnel Review, 50*(1), 108-128. https://doi.org/10.1108/PR-12-2018-0484

Du, C., Zan, M. C. H., Cho, M. J., Fenton, J. I., Hsiao, P. Y., Hsiao, R., Keaver, L., Lai, C-C., Lee, H. S., Ludy, M-J., Shen, W., Swee, W. C. S., Thrivikraman, J., Tseng, K-W., Tseng, W-C., Doak, S., Folk, S. Y. L., & Tucker, R. M. (2021). The effects of sleep quality and resilience on perceived stress, dietary behaviors, and alcohol misuse: A mediation-moderation analysis of higher education students from Asia, Europe, and north America during the COVID-19 pandemic. *Nutrients*, *13*(2), 442. https://doi.org/10.3390/nu13020442

Egan, A., Maguire, R., Christophers, L., & Rooney, B. (2017). Developing creativity in higher education for 21st century learners: A protocol for a scoping review. *International Journal of Education Research, 82*, 21-27. https://doi.org/10.1016/j.ijer.2016.12.004

El Hangouche, A. J., Jniene, A., Aboudrar, S., Errguig, L., Rkain, H., Cherti, M., & Dakka, T. (2018). Relationship between poor quality sleep, excessive daytime sleepiness and low academic performance in medical students. *Advances in Medical Education and Practice, 9*, 631-638. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6135210/pdf/amep-9-631.pdf

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1-4. https://doi.org/10.11648/j.ajtas.20160501.11

Fauzi, M. F., Anuar, T. S., Teh, L. K., Lim, W. F., James, R. J., Ahmad, R., Mohamed, M., Bakar, S. H. A., Yusof, F. Z. M., & Salleh, M. S. (2021). Stress, anxiety and depression among a cohort of health sciences undergraduate students: The prevalence and risk factors. *International Journal of Environmental Research and Public Health*, *18*(6). https://doi.org/10.3390/ijerph18063269

Fay, D., Bagotyriute, R., Urbach, T., West, M. A., & Dawson, J. (2019). Differential effects of workplace stressors on innovation: An integrated perspective of cybernetics and coping. *International Journal of Stress Management*, *26* (1), 11-24. https://doi.org/10.1037/str0000081

Fink, G. (2010). Stress: definition and history. *Reference Module in Neuroscience and Biobehavioral Psychology*. https://doi.org/10.1016/B978-0-12-809324-5.02208-2

Fitzpatrick, L. (2014). The cycle of creativity: Gestalt coaching and the creative process. *Gestalt Review*, *18*(2), 161-171. https://doi.org/10.5325/gestaltreview.18.2.0161

Ganesan, Y., Talwar, P., Fauzan, N., & Oon, Y. B. (2018). A study on stress level and coping strategies among undergraduate students. *Journal of Cognitive Sciences and Human Development*, *3*(2), 37-47. https://doi.org/10.33736/jcshd.787.2018

Garson, G. D. (2016). *Partial least squares: Regression & structural equation models* (2016 ed.). Statistical Associates. http://www.statisticalassociates.com/pls-sem_p.pdf

George, D., & Mallery, P. (2010). SPSS for Windows step by step. A simple study guide and reference fourth edition (11.0 update). *GEN, Boston, MA: Pearson Education, Inc*. https://wps.ablongman.com/wps/media/objects/385/394732/george4answers.pdf

Ghasemi, A., & Zahediasi, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism, 10*(2), 486-489. https://doi.org/10.5812%2Fijem.3505

Ghodrat, M., Sahraei, H., Razjouyan, J., & Meftahi, G. H. (2014). Effects of a saffron alcoholic extract on visual short-term memory in humans: A psychophysical study. *Neurophysiology, 46*(3), 247-253. https://doi.org/10.1007/s11062-014-9436-3

Goel, L., Prokopec, S., & Junglas, I. (2013). Coram populo- In the presence of people: The effect of others in virtual worlds. *Journal of Computer-Mediated Communication, 18*(3), 265-282. https://doi.org/10.1111/jcc4.12007

Grohman, M. G., Ivcevic, Z., Silvia, P., & Kaufman, S. B. (2017). The role of passion and persistence in creativity. *Psychology of Aesthetics, Creativity, and the Arts, 11*(4), 376-385. https://doi.org/10.1037/aca0000121

Han, G. H., Harms, P. D., & Bai, Y. (2017). Nightmare bosses: The impact of abusive supervision on employees' sleep, emotions, and creativity. *Journal of Business Ethics, 145(1), 21-31.* https://doi.org/10.1007/s10551-015-2859-y

Hashim, F., Aziz, J., & Ahmad, A. L. (2017). Transformation in Malaysian higher education: Students' understanding of creativity in social sciences. *Journal of Social Sciences and Humanities, 12*(3). https://ejournal.ukm.my/ebangi/article/view/22420

Hilal, H. M. H., Husin, W. N. I. W., Zayed, T. M. (2013). Barriers to creativity among students of selected universities in Malaysia. *International Journal of Applied Science and Technology*, *3*(6), 51-60. https://www.researchgate.net/publication/276294869_Barriers_to_Creativity_among_Students_of_Selected_Universities_in_Malaysia

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., Hazen, N., Herman, J., Hillard, P. J. A., Katz, E. S., Kheirandish-Gozal, L., Neubauer, D. N., O'Donnell, A. E., Ohayon, M., Peever, J., Rawding, R., Sachdeva, R. C., Setters, B., Vitiello, M. V., & Ware, J. C. (2015). National Sleep Foundation's updated sleep duration recommendations: Final report. *Sleep Health, 1*(4), 233-243. https://doi.org/10.1016/j.sleh.2015.10.004

Ho, R. (2013). *Handbook of univariate and multivariate data analysis with IBM SPSS*. CRC press.

Ho, W. C. (2020). Students' perceptions of creativity education: A perspective from Hong Kong, China. *International Journal of Humanities, Arts and Social Sciences*, *6*(6), 244-257. https://doi.org/10.20469/ijhss.6.20003-6

Jahnke, I., Haertel, T., & Wildt, J. (2015). Teachers' conceptions of student creativity in higher education. *Innovations in Education and Teaching International*, *54*(1), 87-95. https://doi.org/10.1080/14703297.2015.1088396

Javaid, S. F., & Pandarakalam, J. P. (2021). The association of creativity with divergent and convergent thinking. *Psychiatria Danubina, 33*(2), 133-139. https://doi.org/10.24869/psyd.2021.133

Jia, Y. F., & Loo, Y. T. (2018). Prevalence and determinants of perceived stress among undergraduate students in a Malaysian university. *Journal of Health and Translational Medicine, 21*(1). https://www.researchgate.net/publication/323747313_PREVALENCE_AND_DETERMINANTS_OF_PERCEIVED_STRESS_AMONG_UNDERGRADUATE_STUDENTS_IN_A_MALAYSIAN_UNIVERSITY

Johnson, D. A., Billings, M. E., & Hale, L. (2018). Environmental determinants of insufficient sleep and sleep disorders: Implications for population health. *Current Epidemiology Reports, 5(2), 61-69.* https://doi.org/10.1007/s40471-018-0139-y

Kasmaienezhadfard, S., Talebloo, B., Roustae, R., Pourrajab, M. (2015). Students' learning through teaching creativity: Teachers' perception. *Journal of Education, Health and Community Psychology, 4*(1). https://media.neliti.com/media/publications/24806-EN-students-learning-through-teaching-creativity-teachers-perception.pdf

Kassymova, G. K., Tokar, O. V., Tashcheva, A. I., Slepukhina, G. V., Gridneva, S. V., Bazhenova, N. G., ... & Arpentieva, M. R. (2019). Impact of stress on creative human resources and psychological counseling in crises. *International Journal of Education and Information Technologies, 13*(1), 26-32. https://www.researchgate.net/publication/331645870_Impact_of_stress_on_creative_human_resources_and_psychological_counseling_in_crises

Khalil, R., Godde, B., & Karim, A. A. (2019). The link between creativity, cognition, and creative drives and underlying neural mechanisms. *Frontiers in Neural Circuits*, *13*(18). https://doi.org/10.3389/fncir.2019.00018

Khedhaouria, A., Montani, F., & Thurik, R. (2017). Time pressure and team member creativity within R&D projects: The role of learning orientation and knowledge sourcing. *International Journal of Project Management*, *35*(6), 942-954. https://doi.org/10.1016/j.ijproman.2017.04.002

Kim, H. Y. (2013). Statistical notes for clinical researchers: Assessing normal distribution (2) using skewness and kurtosis. *Restorative dentistry & endodontics*, *38*(1), 52-54. https://doi.org/10.5395/rde.2013.38.1.52

King, E., Daunis, M., Tami, C., & Scullin, M. K. (2017). Sleep in studio based courses: Outcomes for creativity task performance. *Journal of Interior Design, 42(4), 5-27.* https://doi.org/10.1111/joid.12104

Lacaux, C., Izabelle, C., Santantonio, G., De Villèle, L., Frain, J., Lubart, T., Pizza, F., Plazzi, G., Arnulf, I., & Oudiette, D. (2019). Increased creative thinking in narcolepsy. *Brain*, *142*(7), 1988-1999. https://doi.org/10.1093/brain/awz137

Lafraxo, M. A., Ouadoud, M., Madhi, Y. E., & Soulaymani, A. (2021). Perceived stress and coping strategies among healthcare professionals: A cross-sectional observational study. *International Journal of Online & Biomedical Engineering*, *17*(9). https://doi.org/10.3991/ijoe.v17i09.23653

Landmann, N., Kuhn, M., Maier, J. G., Feige, B., Spiegelhalder, K., Riemann, D., & Nissen, C. (2016). Sleep strengthens but does not reorganize memory traces in a verbal creativity task. *Sleep*, *39*(3), 705-713. https://doi.org/10.5665/sleep.5556

Lazarus, R. S. (1966). *Psychological stress and the coping process.* McGraw-Hill.

Lazarus, R. S. (1974). Psychological stress and coping in adaptation and illness. *The International Journal of Psychiatry in Medicine*, *5*(4), 321-333. https://doi.org/10.2190/T43T-84P3-QDUR-7RTP

Lazarus, R. S. (1991). *Emotion and adaptatio*n. Oxford University Press.

Lazarus, R. S., & Folkman, S. (1986). Cognitive theories of stress and the issue of circularity. In M. H. Appley & R. Trumbull (Eds.), *Dynamics of stress: Physiological, psychological, and social perspectives* (pp. 63–80). Plenum Press. https://doi.org/10.1007/978-1-4684-5122-1_4

Lazarus, R. S., & Launier, R. (1978). Stress-related transactions between person and environment. In *Perspectives in interactional psychology* (pp. 287-327). Springer, Boston, MA. http://dx.doi.org/10.1007/978-1-4613-3997-7_12

Leung, A., Zhang, H., & Zamar, R. (2016). Robust regression estimation and inference in the presence of cellwise and casewise contamination. *Computational Statistics & Data Analysis*, *99*, 1-11. https://doi.org/10.1016/j.csda.2016.01.004

Libman, E., Fichten, C., Creti, L., Conrod, K., Tran, D. L., Grad, R., Jogensen, M., Amsel, R., Baltzan M., Pavilanis, A. & Bailes, S. (2016). Refreshing sleep and sleep continuity determine perceived sleep quality. *Sleep Disorders, 2016*, 1-11. https://doi.org/10.1155/2016/7170610

Magni, F., & Manzoni, B. (2020). When thinking inside the box is good: The nuanced relationship between conformity and creativity. *European Management Review*, *17*(4), 961-975. https://doi.org/10.1111/emre.12414

Marguilho, R., Jesus, S. N., Viseu, J. O. Ã. O., & Rus, C. (2014). Sleep and creativity: A quantitative review. *Prospecting Interdisciplinarity in Health, Education and Social Sciences,* 117-126. https://www.researchgate.net/profile/Rui-Marguilho/publication/270214265_Sleep_and_creativity_a_quantitative_review/links/5660c43008ae4931cd599ef7/Sleep-and-creativity-a-quantitative-review.pdf

Marrone, D. F., Schaner, M. J., McNaughton, B. L., Worley, P. F., & Barnes, C. A. (2008). Immediate-early gene expression at rest recapitulates recent experience. *Journal of Neuroscience, 28*(5), 1030-1033. https://doi.org/10.1523/JNEUROSCI.4235-07.2008

Matraeva, A. D., Rybakova, M. V., Vinichenko, M. V., Oseev, A. A., & Ljapunova, N. V. (2019). Development of creativity of students in higher educational institutions: Assessment of students and experts. *Universal Journal of Educational Research, 8*(1), 8-16. https://doi.org/10.13189/ujer.2020.080102

Medic, G., Wille, M., & Hemels, M. E. (2017). Short-and long-term health consequences of sleep disruption. *Nature and Science of Sleep, 9,* 151-161. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5449130/pdf/nss-9-151.pdf

Muzni, K., Groeger, J. A., Dijk, D. J., & Lazar, A. S. (2020). Self-reported sleep quality is more closely associated with mental and physical health than chronotype and sleep duration in young adults: A multi-instrument analysis. *Journal of Sleep Research, 30*(1). https://doi.org/10.1111/jsr.13152

Narayanan, S. (2017). A study on the relationship between creativity and innovation in teaching and learning methods towards students academic performance at private education institution, Malaysia. *International Journal of Academic Research in Business and Social Sciences, 7*(4). https://doi.org/10.6007/IJARBSS/v7-i14/3647

National Sleep Foundation (NSF). (2017, January 23). What is good quality sleep? National Sleep Foundation provides guidance. *Science Daily*. https://www.sciencedaily.com/releases/2017/01/170123094549.htm

Ng, Y. (2017). Hong Kong lags behind Taiwan, Singapore and South Korea, in 'promoting innovation'. *South China Morning Post*. https://www.scmp.com/news/hong-kong/education-community/article/2113373/hong-kong-lags-behind-taiwan-singapore-and-south?module=perpetual_scroll&pgtype=article&campaign=2113373

Nordin, N., & Malik, M. (2015). Undergraduates' barriers to creative thought and innovative in a new millennial era. *Procedia-Social and Behavioral Sciences (2015), 201*, 93-101. https://doi.org/10.1016/j.sbspro.2015.08.136

Nurismadiana, I., & Lee, K. (2018). Factors associated with sleep quality among undergraduate students at a Malaysian public university. *International Journal of Public Health and Clinical Sciences, 5*(6), 373-391. https://doi.org/10.32827/ijphcs.5.6.373

Nurul, F. H., Anis, F. M. Z., Nursyazwani, M. F., Nor, A. M. L., & Azman, M. N. A. (2015). Sustainable performance measures for Malaysian automotive industry. *World Applied Sciences Journal*, *33*(6), 1017-1024. https://www.researchgate.net/publication/281852946_Sustainable_Performance_Measures_for_Malaysian_Automotive_Industry

Oldford, R. W. (2016). Self-calibrating quantile–quantile plots. *The American Statistician*, *70*(1), 74-90. https://doi.org/10.1080/00031305.2015.1090338

Omair, A. (2015). Selecting the appropriate study design for your research: Descriptive study designs. *Journal of Health Specialties*, *3*(3), 153-156. https://www.researchgate.net/publication/281223251_Selecting_the_appropriate_study_design_for_your_research_Descriptive_study_designs

Omar, M., Bahaman, A. H., Lubis, F. A., Ahmad, S. A. S., Ibrahim, F., Aziz, S. N. A., Ismail, F. D., & Abd Rahman. (2019). Perceived academic stress among students in Universiti Teknologi Malaysia. Advances in Social Science, Education and Humanities Research, 479. https://doi.org/10.2991/assehr.k.200921.021

Oudiette, D., Constantinescu, I., Leclair-Visonneau, L., Vidailhet, M., Schwartz, S., & Arnulf, I. (2011). Evidence for the re-enactment of a recently learned behavior during sleepwalking. *PloS One*, *6*(3), 1-8. https://doi.org/10.1371/journal.pone.0018056

Par, M., Hassan, S. A., Uba, I., & Baba, M. (2015). Perceived stress among international postgraduate students in Malaysia. *International Journal of Psychological Studies*, *7*(4). https://doi.org/10.5539/ijps.v7n4p1

Paramitha, A., & Indarti, N. (2014). Impact of the environment support on creativity: Assessing the mediating role of intrinsic motivation. *Social and Behavioral Sciences 115(2014)*, 102-114. https://doi.org/10.1016/j.sbspro.2014.02.419

Park, J., Kim, M., & Jang, S. (2017). Analysis of factors influencing creative personality of elementary school students. *International Education Studies*, *10*(5). https://doi.org/10.5539/ies.v10n5p167

Penny, K. I. (1996). Appropriate critical values when testing for a single multivariate outlier by using the Mahalanobis distance. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, *45*(1), 73-81. https://doi.org/10.2307/2986224

Puccio, G. J. (2017). From the dawn of humanity to the 21st century; creativity as an enduring survival skill. *The Journal of Creative Behavior*, *51*(4), 330-334. https://doi.org/10.1002/jocb.203

Ramasamy, P., Krishnan, S., & Lai, T. Y. (2020). General relationship between conformity and peers pressure among form 3 students of secondary school in Johor Bahru. *Mualim Journal of Social Science and Humanities*, *4*(1), 16-28. https://doi.org/10.33306/mjssh/51

Ramli, N. H. H., Alavi, M., Mehrinezhad, S. A., & Ahmadi, A. (2018). Academic stress and self-regulation among university students in Malaysia: Mediator role of mindfulness. *Behavioral Sciences*, *8*(1). https://doi.org/10.3390/bs8010012

Rasch, B., & Born, J. (2013). About sleep's role in memory. *Physiological Reviews. 93*(2), 681-766. https://doi.org/10.1152/physrev.00032.2012

Rathakrishnan, B., Bikar Singh, S. S., Kamaluddin, M. R., Yahaya, A., Mohd Nasir, M. A., Ibrahim, F., & Ab Rahman, Z. (2021). Smartphone addiction and sleep quality on academic performance of university students: An exploratory research. *International Journal of Environmental Research and Public Health, 18*(16), 8291. https://doi.org/10.3390/ijerph18168291

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of shapiro-wilk, kolmogorov-smirnov, lilliefors and anderson-darling tests. *Journal of Statistical Modeling and Analytics*, *2*(1), 21-33. https://www.researchgate.net/publication/267205556

Ritter, S. M., & Dijksterhuis, A. (2014). Creativity—the unconscious foundations of the incubation period. *Frontiers in human neuroscience*, *8*(215). 1-10. https://doi.org/10.3389/fnhum.2014.00215

Ritter, S. M., Strick, M., Bos, M. W., Van Baaren, R. B., & Dijksterhuis, A. P. (2012). Good morning creativity: Task reactivation during sleep enhances beneficial effect of sleep on creative performance. *Journal of sleep research*, *21*(6), 643-647. https://doi.org/10.1111/j.1365-2869.2012.01006.x

Sacramento, C. A., Fay, D., & West, M. A. (2013). Workplace duties or opportunities? Challenge stressors, regulatory focus, and creativity. *Organizational Behavior and Human Decision Processes*, *121*(2), 141-157. https://doi.org/10.1016/j.obhdp.2013.01.008

Sahlqvist, S., Song, Y., Bull, F., Adams, E., Preston, J., Ogilvie, D., & iConnect consortium (2011). Effect of questionnaire length, personalisation and reminder type on response rate to a complex postal survey: Randomised controlled trial. *BMC medical research methodology, 11*(62). https://doi.org/10.1186/1471-2288-11-62

Said-Metwaly, S., Noortgate, W. V. D., & Kyndt, E. (2017). Approaches to measuring creativity: A systematic literature review. *Creativity. Theories-Research-Applications, 4*(2), 238-275. https://doi.org/10.1515/ctra-2017-0013

Saletin, J. M., Hilditch, C. J., Dement, W. C., & Carskadon, M. A. (2017). Short daytime naps briefly attenuate objectively measured sleepiness under chronic sleep restriction. *Sleep, 40*(9). https://doi.org/10.1093/sleep/zsx118

Schneiderman, N., Ironson, G., & Siegel, S. D. (2005). Stress and health: Psychological, behavioral, and biological determinants. *Annual Review of Clinical Psychology, 1*, 607–628. https://doi.org/10.1146/annurev.clinpsy.1.102803.144141

Schönauer, M., Brodt, S., Pöhlchen, D., Breßmer, A., Danek, A. H., & Gais, S. (2018). Sleep does not promote solving classical insight problems and magic tricks. *Frontiers in Human Neuroscience, 12*(72), 1-11 https://doi.org/10.3389/fnhum.2018.00072

Selye, H. (1956). *The stress of life*. New York: McGraw-Hill.

Shahsavarani, A. M., Azad Marz Abadi, E., & Hakimi Kalkhoran, M. (2015). Stress: Facts and theories through literature review. *International Journal of Medical Reviews*, *2*(2), 230-241. http://www.ijmedrev.com/article_68654_37adc02e9432adfa017b8d6095cb6760.pdf

Shorten, A., & Smith, J. (2017). Mixed methods research: expanding the evidence base. *Evidence-based nursing, 20*(3), 74-75. http://dx.doi.org/10.1136/eb-2017-102699

Siah, P. C., Ong, P. J. M., Ngiam, S. J., & Tan, J. T. A. (2018). The mediating effect of grit on sleep quality and academic performance among undergraduates in Malaysia. *Journal of Institutional Research South East Asia*, *16*(1), 112-125. https://www.researchgate.net/publication/326235991_The_mediating_effect_of_grit_on_sleep_quality_and_academic_performance_among_undergraduates_in_Malaysia

Siraj, H. H., Salam, A., Roslan, R., Hasan, N. A., Tan, H. J., Othman, M. N. (2014). Sleep pattern and academic performance of undergraduate medical students at Universiti Kebangsaan Malaysia. *Journal of Applied Pharmaceutical Science*, *4*(12), 52-55. https://doi.org/10.7324/JAPS.2014.41209

Smith, C. A., & Lazarus, R. S. (1990). Emotion and adaptation. *Handbook of personality: Theory and research*, 609-637. https://doi.org/10.2307/2075902

Smith, D., & Lilly, L. (2016). Understanding student perceptions of stress in creativity-based higher education programs: A case study in interior architecture. *Journal of Interior Design*, *41*(2), 39-55. https://doi.org/10.1111/joid.12072

Soda, G., Mannucci, P. V., & Burt, R. S. (2021). Networks, creativity, and time: Staying creative through brokerage and network rejuvenation. *Academy of Management Journal*, *64*(4), 1164-1190. https://doi.org/10.5465/amj.2019.1209

Sternberg, R. J. (2017). Whence creativity? *The Journal of Creative Behavior*, *51*(4), 289-292. https://doi.org/10.1002/jocb.199

Sternberg, R. J. (2018). Creative giftedness is not just what creativity tests test: Implications of a triangular theory of creativity for understanding creative giftedness. *Roeper Review*, *40*(3), 158-165. https://doi.org/10.1080/02783193.2018.1467248

Sterpenich, V., Schmidt, C., Albouy, G., Matarazzo, L., Vanhaudenhuyse, A., Boveroux, P., Degueldre, C. Leclercq, Y. Balteau, E. Collettee, F., Luxen, A., Phillips, C. & Maquet, P. (2014). Memory reactivation during rapid eye movement sleep promotes its generalization and integration in cortical stores. *Sleep*, *37*(6), 1061-1075. https://doi.org/10.5665/sleep.3762

Stone, D. L., & Hess, J. (2020). School students' implicit theories of creativity and their self perceptions as artists. *Creativity Research Journal*, *32*(4), 369-377. https://doi.org/10.1080/10400419.2020.1821555

Sulaiman, F. (2013). The effectiveness of pbl online on physics students' creativity and critical thinking: A case study at Universiti Malaysia Sabah. *International Journal of Education and Research*, *1*(3). https://ijern.com/images/March-2013/14.pdf

Szobiová, E. (2015). Creativity in organizational environment. *Acta Technologica Dubnicae*, *5*(2), 69-79. https://doi.org/10.1515/atd-2015-0065

Tan, C. S., & Ong, A. W. H. (2019). Psychometric qualities and measurement invariance of the modified self-rated creativity scale. *Journal of Creative Behavior, 53*(4), 593-599. https://doi.org/10.1002/jocb.222

Tan, C. S., & Ong, A. W. H. (2019). Psychometric qualities and measurement invariance of the modified self-rated creativity scale. *Journal of Creative Behavior, 53*(4), 593-599. https://doi.org/10.1002/jocb.222

Tan, C., & Ng, C. (2020). Cultivating creativity in a high-performing education system: The example of Singapore. *Journal of Curriculum and Pedagogy, 18*(3), 253-272. https://doi.org/10.1080/15505170.2020.1808126

Teker, A. G., & Yakşi, N. (2021). Factors affecting sleep quality in high school students and its relationship with nomophobia. *Journal of Turkish Sleep Medicine, 3*, 216-221. http://cms.galenos.com.tr/Uploads/Article_48611/JTSM-8-216.pdf

Tritsaroli, V., & Miraka, O. (2019). Stress and creativity: The mediating role of Anxiety and Depression. *Linnaeus University*. https://www.diva-portal.org/smash/get/diva2:1350008/FULLTEXT01.pdf

Tumakaka, G. Y. S., Agustini, N., Nurhaeni, N., & Rustina, Y. (2019). The effect of sleep hygiene education on sleep quality in children with type 1 diabetes mellitus: A preliminary study. *Comprehensive child and adolescent nursing, 42*(1), 189-196. https://doi.org/10.1080/24694193.2019.1578440

Uyanık, G. K., & Güler, N. (2013). A study on multiple linear regression analysis. *Procedia-Social and Behavioral Sciences, 106*, 234-240. https://doi.org/10.1016/j.sbspro.2013.12.027

Wabwile, E. S., Chitiavi, M. S., Alala, O. B., Douglas, M., Khoo, V., Obeid, M., & Islam, M. (2014). Financial Leverage and performance variance among banks: evidence of tier 1 commercial banks listed on Nairobi Security Exchange Kenya. *International Journal of Business and Management Invention, 3*(4), 1-13. https://www.academia.edu/7638115/Financial_Leverage_and_Performance_Variance_A_Mong_Banks_Evidence_of_Tier_1_Commercial_Banks_Listed_On_Nairobi_Security_Exchange_Kenya?bulkDownload=thisPaper-topRelated-sameAuthor-citingThis-citedByThis-secondOrderCitations&from=cover_page

Walter, C. (2012). Work environment barriers prohibiting creativity. *Social and Behavioral Sciences 40(2012),* 642-648. https://doi.org/10.1016/j.sbspro.2012.03.243

Wang, X., Duan, H., Kan, Y., Wang, B., Qi, S., & Hu, W. (2019). The creative thinking cognitive process influenced by acute stress in humans: An electroencephalography study. *Stress*, *22*(4), 472-481. https://doi.org/10.1080/10253890.2019.1604665

Wang, Y. J., Qiao, Y. M., Yu, Q. Y., Wang, L. F., & Zhao, K. Y. (2017). Research of the impacts of time- Anticipatory stress on creativity. 3rd International Conference on Social Science and Management (ICSSM 2017). *Social Science, Education and Human Science*. https://doi.org/10.12783/dtssehs/icssm2017/10343

Weinberger, E., Wach, D., Stephan, U., & Wegge, J. (2018). Having a creative day: Understanding entrepreneurs' daily idea generation through a recovery lens. *Journal of Business Venturing, 33*(1), 1-19. https://doi.org/10.1016/j.jbusvent.2017.09.001

Yang, L., Ho, J. Y., Wong, F. K., Chang, K. K., Chan, K. L., Wong, M. S., Ho, H. K., Yeun., J. W. M. Huang, J. X. & Siu, J. Y. (2020). Neighbourhood green space, perceived stress and sleep quality in an urban population. *Urban Forestry & Urban Greening, 54,* 126763. https://doi.org/10.1016/j.ufug.2020.126763

Yaribeygi, H., Panahi, Y., Sahraei, H., Johnston, T. P., & Sahebkar, A. (2017). The impact of stress on body function: A review. *EXCLI Journal, 16*, 1057–1072. https://doi.org/10.17179/excli2017-480

Yeh, Y. C., Lai, G. J., Lin, C. F., Lin, C. W., & Sun, H. C. (2015). How stress influences creativity in game-based situations: Analysis of stress hormones, negative emotions, and working memory. *Computers & Education, 81*, 143-153. https://doi.org/10.1016/j.compedu.2014.09.011

Yi, H., Shin, K., & Shin, C. (2006). Development of the sleep quality scale. *Journal of Sleep Research*, *15*(3), 309-316. https://doi.org/10.1111/j.1365-2869.2006.00565.x

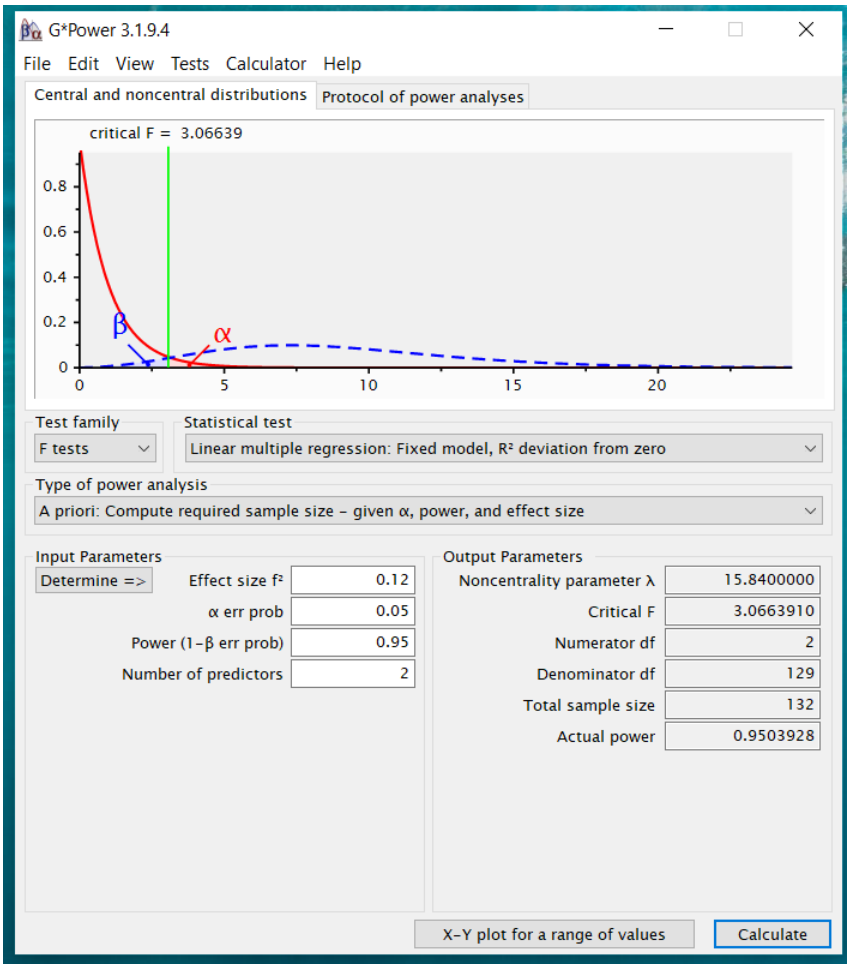
Zangirolami-Raimundo, J., Echeimberg, J. D. O., & Leone, C. (2018). Research methodology topics: Cross-sectional studies. *Journal of Human Growth and Development*, *28*(3), 356-360. http://dx.doi.org/10.7322/jhgd.152198

Zhou, J., & George, J. M. (2001). When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, *44*(4), 682-696. https://doi.org/10.5465/3069410

Zhu, W., Shang, S., Jiang, W., Pei, M., & Su, Y. (2019). Convergent thinking moderates the relationship between divergent thinking and scientific creativity. *Creativity Research Journal*, *31*(3), 320-328. https://doi.org/10.1080/10400419.2019.1641685

Appendix A

G*Power



Appendix B

Sample Questionnaires

Figure B1

Demographic questions

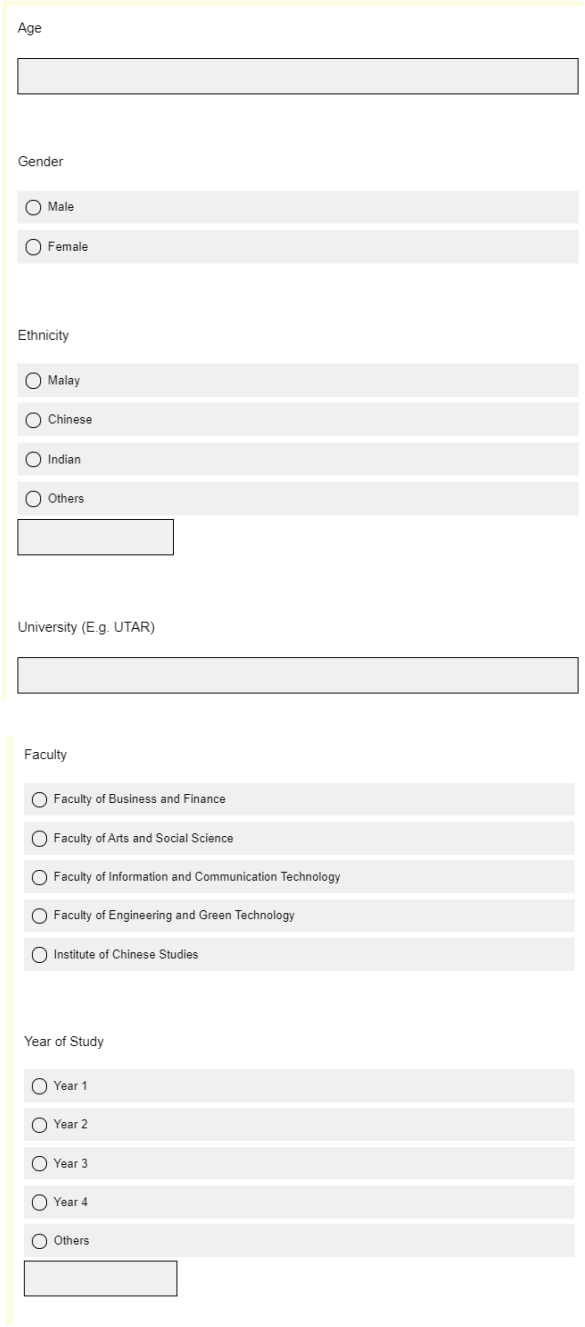


Figure B2

Sleep Quality Scale

Instructions: The following scale is to know the quality of sleep you had for the last month. Read the questions and choose the closest answer. (Rarely: None or 1-3 times a month; Sometimes: 1-2 times a week; Often: 3-5 times a week; Almost always: 6-7 times a week)

	Rarely	Sometimes	Often	Almost always
I have difficulty falling asleep.	○	○	○	○
I fall into a deep sleep.	○	○	○	○
I wake up while sleeping.	○	○	○	○
I have difficulty getting back to sleep once I wake up middle of the night.	○	○	○	○
I wake up easily because of noise.	○	○	○	○
I toss and turn.	○	○	○	○
I never go back to sleep after awakening during sleep.	○	○	○	○
I feel refreshed after sleep.	○	○	○	○
I feel unlikely to sleep after sleep.	○	○	○	○
Poor sleep gives me headaches.	○	○	○	○
Poor sleep makes me irritated.	○	○	○	○
I would like to sleep more after waking up.	○	○	○	○
My sleep hours are enough.	○	○	○	○
Poor sleep makes me lose my appetite.	○	○	○	○
Poor sleep makes hard for me to think.	○	○	○	○

I feel vigorous after sleep.	○	○	○	○
Poor sleep makes me lose interest in work or others.	○	○	○	○
My fatigue is relieved after sleep.	○	○	○	○
Poor sleep causes me to make mistakes at work.	○	○	○	○
I am satisfied with my sleep.	○	○	○	○
Poor sleep makes me forget things more easily.	○	○	○	○
Poor sleep makes it hard to concentrate at work.	○	○	○	○
Sleepiness interferes with my daily life.	○	○	○	○
Poor sleep makes me lose desire in all things.	○	○	○	○

I have difficulty getting out of bed.	○	○	○	○
Poor sleep makes me easily tired at work.	○	○	○	○
I have a clear head after sleep.	○	○	○	○
Poor sleep makes my life painful.	○	○	○	○

Figure B3

Perceived Stress Scale

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month.

	Never	Almost never	Sometimes	Fairly often	Very often
In the last month, how often have you been upset because of something that happened unexpectedly?	○	○	○	○	○
In the last month, how often have you felt that you were unable to control the important things in your life?	○	○	○	○	○
In the last month, how often have you felt nervous and "stressed"?	○	○	○	○	○
In the last month, how often have you felt confident about your ability to handle your personal problems?	○	○	○	○	○
In the last month, how often have you felt that things were going your way?	○	○	○	○	○
In the last month, how often have you found that you could not cope with all the things that you had to do?	○	○	○	○	○
In the last month, how often have you been able to control irritations in your life?	○	○	○	○	○
In the last month, how often have you felt that you were on top of things?	○	○	○	○	○
In the last month, how often have you been angered because of things that were outside your control?	○	○	○	○	○
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	○	○	○	○	○

Figure B4

Self-rated Creativity Scale

Instructions: Please select a number from 1 (Strongly disagree) to 5 (Strongly agree) for each statement below to indicate the extent to which you agree or disagree with that statement.

	Strongly disagree	Disagree a little	Neither disagree nor agree	Agree a little	Strongly agree
I suggest new ways to achieve goals or objectives.	○	○	○	○	○
I come up with new and practical ideas to improve performance.	○	○	○	○	○
I search out new technologies, processes, techniques, and/or product ideas.	○	○	○	○	○
I suggest new ways to increase quality of work.	○	○	○	○	○
I am a good source of creative ideas.	○	○	○	○	○
I am not afraid to take risks.	○	○	○	○	○
I promote and champion ideas to others.	○	○	○	○	○
I exhibit creativity on the work when given the opportunity to.	○	○	○	○	○
I often have new and innovative ideas.	○	○	○	○	○
I come up with creative solutions to problems.	○	○	○	○	○
I often have a fresh approach to problems.	○	○	○	○	○
I suggest new ways of performing work tasks.	○	○	○	○	○

Appendix C

Normality Assumption

Figure C1

Histogram

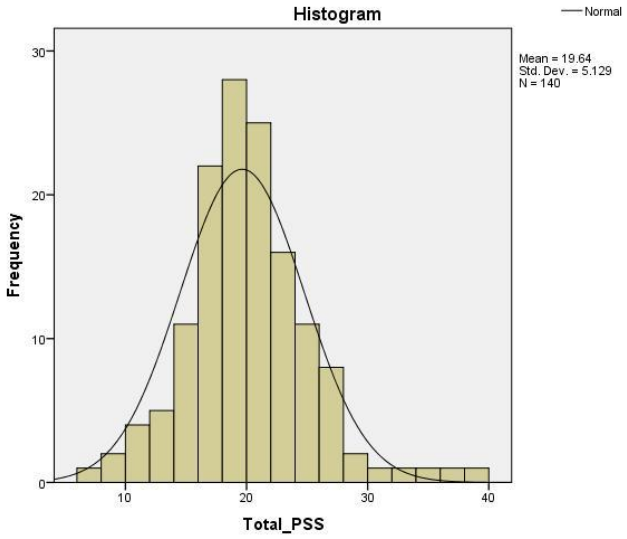


Figure C2

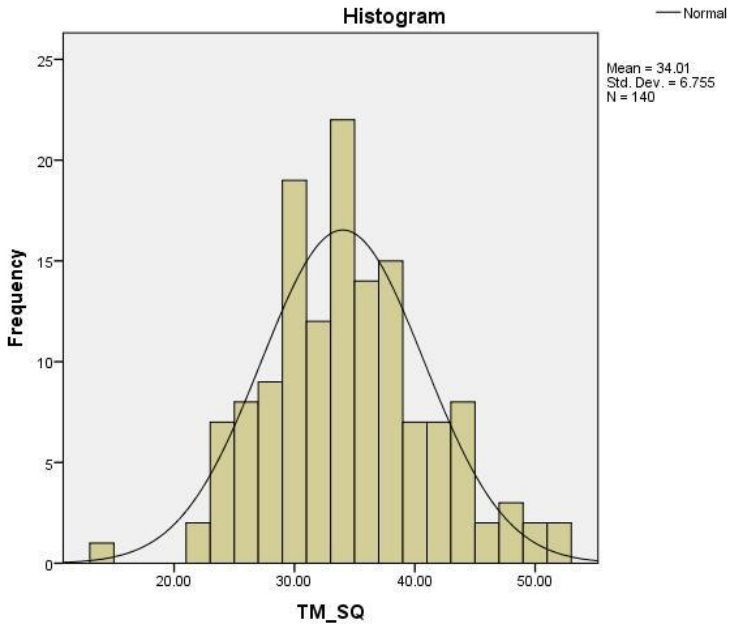


Figure C3

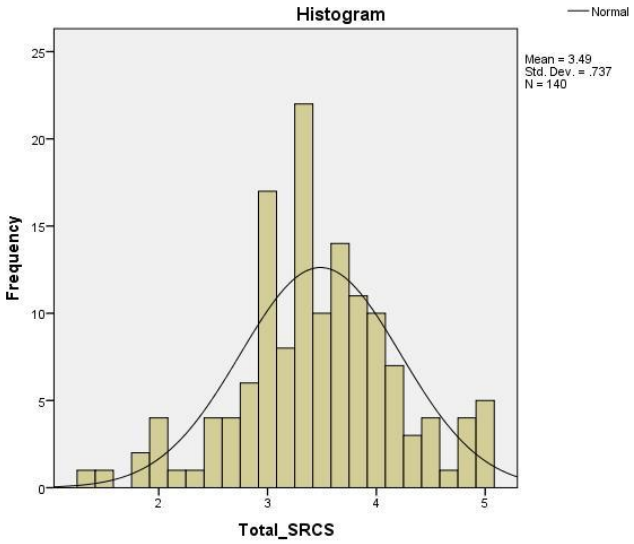

Histogram
Normal
Mean = 3.49
Std. Dev. = .737
N = 140
Frequency
25
20
15
10
5
0
2
3
4
5
Total_SRCS

Figure C4

Q-Q Plot

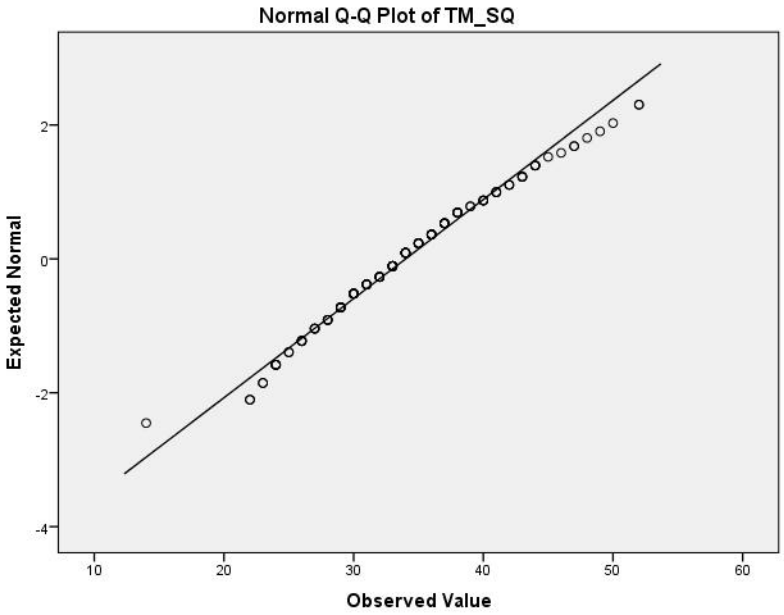


Figure C5

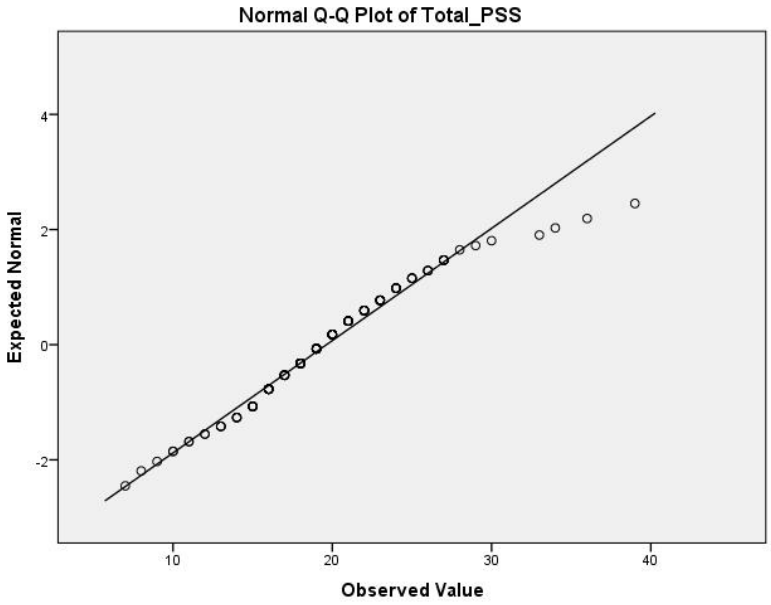


Figure C6

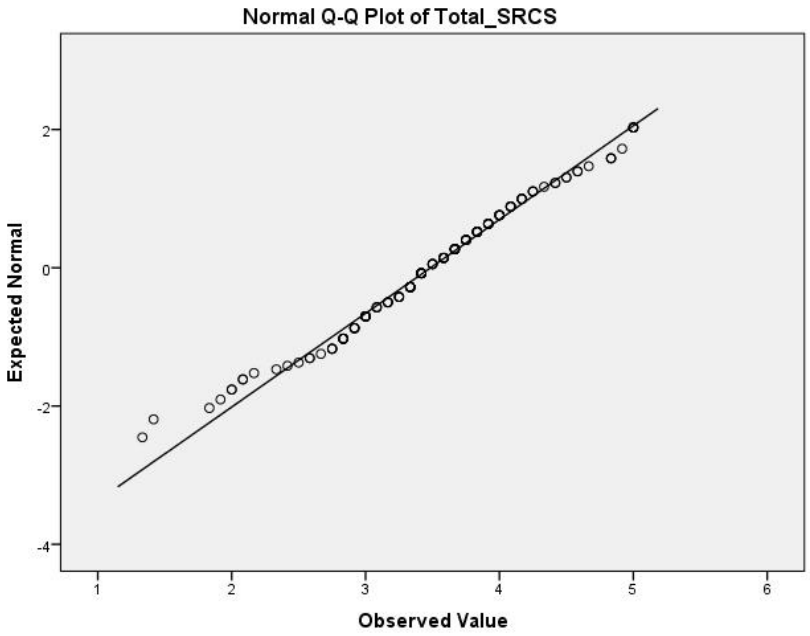

Normal Q-Q Plot of Total_SRCS
Expected Normal
Observed Value
2
0
-2
-4
1
2
3
4
5
6

Figure C7

P-P plot

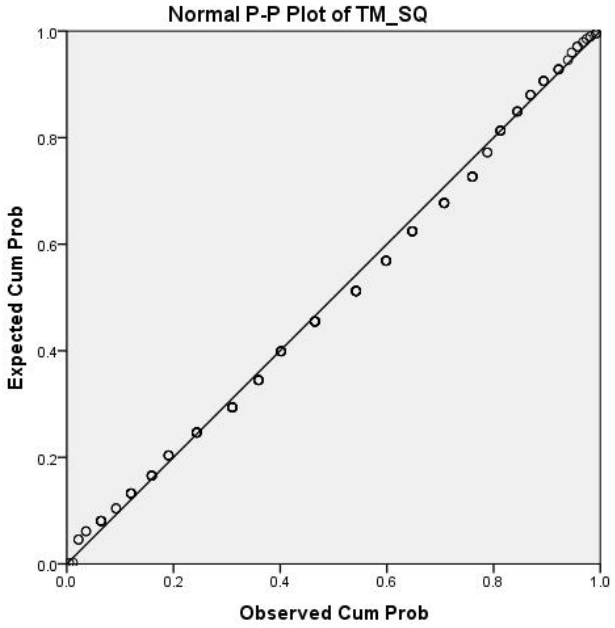


Figure C8

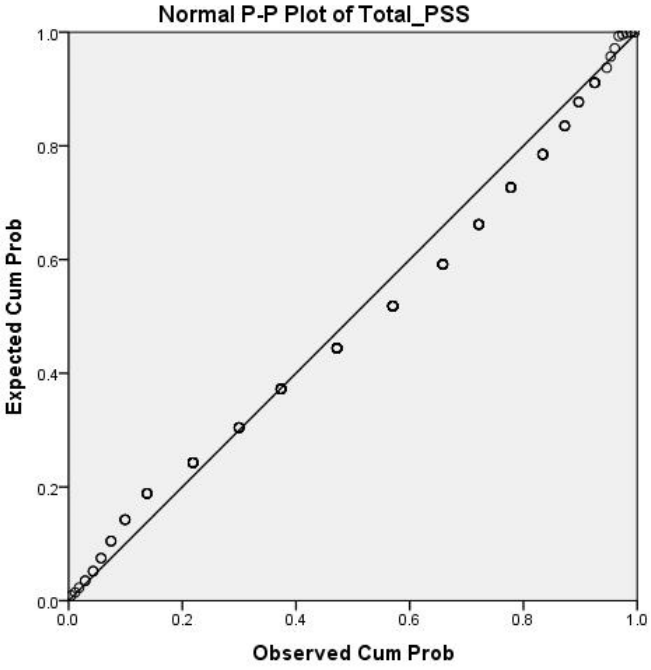


Figure C9

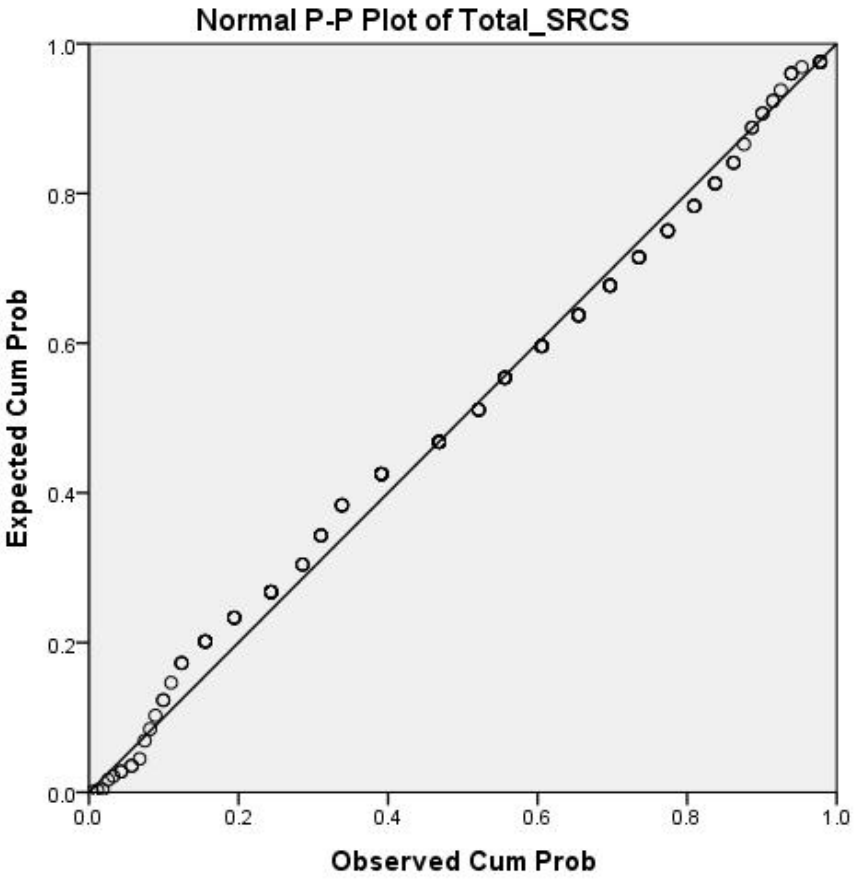

Normal P-P Plot of Total_SRCS
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

Table C10

Kolmogorov-Smirnov (KS) and Sharpiro-Wilk (SW) test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total_SRCS	.068	140	.200*	.983	140	.072
TM_SQ	.072	140	.074	.986	140	.167
Total_PSS	.095	140	.003	.965	140	.001

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table C11

Skewness and Kurtosis

Descriptives

			Statistic	Std. Error
Total_SRCS	Mean		3.49	.062
	95% Confidence Interval for Mean	Lower Bound	3.36	
		Upper Bound	3.61	
	5% Trimmed Mean		3.50	
	Median		3.42	
	Variance		.544	
	Std. Deviation		.737	
	Minimum		1	
	Maximum		5	
	Range		4	
	Interquartile Range		1	
	Skewness		-.204	.205
	Kurtosis		.370	.407
TM_SQ	Mean		34.0071	.57092
	95% Confidence Interval for Mean	Lower Bound	32.8783	
		Upper Bound	35.1360	
	5% Trimmed Mean		33.8413	
	Median		33.5000	
	Variance		45.633	
	Std. Deviation		6.75522	
	Minimum		14.00	

	Maximum		52.00	
	Range		38.00	
	Interquartile Range		9.00	
	Skewness		.301	.205
	Kurtosis		.181	.407
Total_PSS	Mean		19.64	.433
	95% Confidence Interval for Mean	Lower Bound	18.78	
		Upper Bound	20.49	
	5% Trimmed Mean		19.48	
	Median		19.00	
	Variance		26.305	
	Std. Deviation		5.129	
	Minimum		7	
	Maximum		39	
	Range		32	
	Interquartile Range		7	
	Skewness		.648	.205
	Kurtosis		1.773	.407

Appendix D

Reliability

Table D1

Sleep Quality Scale (SQS)

Reliability Statistics

Cronbach's Alpha	N of Items
.580	25

Table D2

Perceived Stress Scale (PSS)

Reliability Statistics

Cronbach's Alpha	N of Items
.741	10

Table D3

Self-rated Creativity Scale (SRCS)

Reliability Statistics

Cronbach's Alpha	N of Items
.920	12

Appendix E

Descriptive Statistics

Table E1

Age

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19	4	2.9	2.9	2.9
	20	22	15.7	15.7	18.6
	21	26	18.6	18.6	37.1
	22	60	42.9	42.9	80.0
	23	19	13.6	13.6	93.6
	24	9	6.4	6.4	100.0
	Total	140	100.0	100.0	

Table E2

Gender

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	65	46.4	46.4	46.4
	Female	75	53.6	53.6	100.0
	Total	140	100.0	100.0	

Table E3

Ethnicity

Ethnicity - Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	1	.7	.7	.7
	Chinese	122	87.1	87.1	87.9
	Indian	14	10.0	10.0	97.9
	Others	3	2.1	2.1	100.0
	Total	140	100.0	100.0	

Ethnicity - Others - Text

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		137	97.9	97.9	97.9
	Punjabi	3	2.1	2.1	100.0
	Total	140	100.0	100.0	

Table E4

University

University (E.g. UTAR)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	utar	12	8.6	8.6	8.6
	Utar	9	6.4	6.4	15.0
	UTAR	118	84.3	84.3	99.3
	Utar Kampar	1	.7	.7	100.0
	Total	140	100.0	100.0	

Table E5

Faculty

Faculty

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Faculty of Business and Finance	30	21.4	21.4	21.4
	Faculty of Arts and Social Science	78	55.7	55.7	77.1
	Faculty of Information and Communication Technology	13	9.3	9.3	86.4
	Faculty of Engineering and Green Technology	12	8.6	8.6	95.0
	Institute of Chinese Studies	1	.7	.7	95.7
	Faculty of Science	6	4.3	4.3	100.0
	Total	140	100.0	100.0	

Table E6

Year of Study

Year of Study - Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Year 1	23	16.4	16.4	16.4
	Year 2	24	17.1	17.1	33.6
	Year 3	88	62.9	62.9	96.4
	Year 4	5	3.6	3.6	100.0
	Total	140	100.0	100.0	

Appendix F

Regression

Table F1

Correlation

Correlations

		TM_SQ	Total_PSS	Total_SRCS
TM_SQ	Pearson Correlation	1	.372**	.011
	Sig. (2-tailed)		.000	.898
	N	140	140	140
Total_PSS	Pearson Correlation	.372**	1	-.180*
	Sig. (2-tailed)	.000		.034
	N	140	140	140
Total_SRCS	Pearson Correlation	.011	-.180*	1
	Sig. (2-tailed)	.898	.034	
	N	140	140	140

Table F2

Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.198[a]	.039	.025	.728

Table F3

ANOVA

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.971	2	1.486	2.804	.064[b]
	Residual	72.597	137	.530		
	Total	75.569	139			

Table F4

Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.753	.343		10.955	.000
	TM_SQ	.010	.010	.090	1.000	.319
	Total_PSS	-.031	.013	-.213	-2.364	.019

Appendix G

Ethical Approval Letter

UNIVERSITI TUNKU ABDUL RAHMAN
Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/290/2021

17 December 2021

Dr Pung Pit Wan
Head, Department of Psychology and Counselling
Faculty of Arts and Social Science
Universiti Tunku Abdul Rahman
Jalan Universiti, Bandar Baru Barat
31900 Kampar, Perak.

Dear Dr Pung,

Ethical Approval For Research Project/Protocol

We refer to the application for ethical approval for your students' research projects from Bachelor of Social Science (Hons) Psychology programme enrolled in course UAPZ3013/UAPZ3023. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	The Mediation Role of Academic Achievement in the Relationship between Religiosity and Pornography Addictiveness Among Undergraduate Students in Malaysia	1. Chan Wei Hung 2. Lee Jane 3. Lim Zhen Chin	Ms Natasha Amira binti Hushairi	17 December 2021 - 16 December 2022
2.	The Mediating Role of Self-Efficacy Between Parent-Child Attachment and Romantic Relationship Among Undergraduate Students in Malaysia	1. Beh Zye Han 2. Hiew Yi Xin 3. Olivia Koh Shu Qi		
3.	The Relationship Between Self-esteem and Psychological Well-being on Stress Among Undergraduate Students in Malaysia	1. Foo Zyon Khang 2. Loh Zhi Yuan 3. Yugambegai Vijaya Kumaran	Ms Pavithra a/p Muniandy	
4.	Relationship of Sleep Quality, Perceived Stress, and Creativity Among Undergraduates in Malaysia	1. Chiew Yong Nuo 2. Logish a/l Baskaran 3. Tan Wei Hou		
5.	The Relationship Between Self-efficacy, Perceived Social Support, and Subjective Wellbeing Among Undergraduate Students	1. Chiew Wei Chen 2. Deneshwaran Raj a/l Seeralan		
6.	The Study of Relationships Between Job Satisfaction, Co-worker's Relationships and Malaysian Worker's Psychological Wellbeing	1. Tan jia Jun 2. Tan Qi Xian	Ms Sarvarubini a/p Nainee	
7.	The Relationship Between Online Impulsive Buying Behaviour, Materialism, and Subjective Wellbeing Among Malaysian Young Adults	1. Foong Kai Jie 2. Chong Ka Yee 3. Lee Shun Yi		

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia
Tel: (605) 468 8888 **Fax**: (605) 466 1313
Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia
Tel: (603) 9086 0288 **Fax**: (603) 9019 8868
Website: www.utar.edu.my

UNIVERSITI TUNKU ABDUL RAHMAN
FACULTY OF ARTS AND SOCIAL SCIENCE
DEPARTMENT OF PSYCHOLOGY AND COUNSELLING

UAPZ 3023 Final Year Project II

Quantitative Research Project Evaluation Form

TURNITIN: ***'In assessing this work you are agreeing that it has been submitted to the University-recognised originality checking service which is Turnitin. The report generated by Turnitin is used as evidence to show that the students' final report contains the similarity level below 20%.'***

Project Title: Relationship of Sleep Quality, Perceived Stress, and Creativity among Undergraduates in Malaysia	
Supervisor: Ms. Pavithra A/P Muniandy	
Student's Name: 1. Chiew Yong Nuo 2. Logish A/L Baskaran 3. Tan Wei Hou	Student's ID 1. 1804278 2. 1901927 3. 1802403

INSTRUCTIONS:
Please score each descriptor based on the scale provided below:

1. Please award 0 mark for no attempt.
2. For criteria **7**:
   Please retrieve the marks from "**Oral Presentation Evaluation Form**".

1. ABSTRACT (5%)	**Max Score**	**Score**
a. State the main hypotheses/research objectives.	5%	
b. Describe the methodology: • Research design • Sampling method • Sample size • Location of study • Instruments/apparatus/outcome measures • Data gathering procedures	5%	
c. Describe the characteristics of participants.	5%	
d. Highlight the outcomes of the study.	5%	
e. Conclusions, implications, and applications.	5%	
Sum	25%	/25%
Subtotal (Sum/5)	5%	/5%
Remark:		

2. METHODOLOGY (25%)	**Max Score**	**Score**
a. Research design/framework: • For experiment, report experimental manipulation, participant flow, treatment fidelity, baseline data, adverse events and side effects, assignment method and implementation, masking. (*if applicable with the study design) • For non-experiment, describe the design of the study and data used.	5%	
b. Sampling procedures: • Justification of sampling method/technique used. • Description of location of study. • Procedures of ethical clearance approval. (Provide reference number of approval letter)	5%	
c. Sample size, power, and precision: • Justification of sample size. • Achieved actual sample size and response rate. • Power analysis or other methods (if applicable).	5%	
d. Clear explanation of data collection procedures: • Inclusion and exclusion criteria • Procedures of obtaining consent • Description of data collection procedures	5%	

• Provide dates/duration of recruitment repeated measures or follow-up. • Agreement and payment (if any)		
e. Explanation of instruments/questionnaire used: • Description of instruments • Scoring system • Meaning of scores • Reliability and validity	5%	
Subtotal	25%	/25%
Remark:		
3. RESULTS (20%)	**Max Score**	**Score**
a. Descriptive statistics: • Demographic characteristics • Topic-specific characteristics	5%	
b. Data diagnostic and missing data: • Frequency and percentages of missing data. (if applicable) • Methods employed for addressing missing data. (if applicable) • Criteria for post data-collection exclusion of participants. • Criteria for imputation of missing data. • Defining and processing of statistical outliers. • Analyses of data distributions. • Data transformation (if applicable).	5%	
c. Appropriate data analysis for each hypothesis or research objective.	5%	
d. Accurate interpretation of statistical analyses: • Accurate report and interpretation of confidence intervals or statistical significance. • Report of *p* values and minimally sufficient sets of statistics (e.g., *dfs, MS, MS error*). • Accurate report and interpretation of effect sizes. • Report any problems with statistical assumptions.	5%	
Subtotal	20%	/20%
Remark:		

4. DISCUSSION AND CONCLUSION (20%)	**Max Score**	**Score**
a. Constructive discussion of findings: • Provide statement of support or nonsupport for all hypotheses. • Analyze similar and/or dissimilar results. • Rational justifications for statistical results.	8%	
b. Implication of the study: • Theoretical implication for future research. • Practical implication for programs and policies.	4%	
c. Relevant limitations of the study.	4%	
d. Recommendations for future research.	4%	
Subtotal	20%	/20%
Remark:		
5. LANGUAGE AND ORGANIZATION (5%)	**Max Score**	**Score**
a. Language proficiency	3%	
b. Content organization	1%	
c. Complete documentation (e.g., action plan, originality report)	1%	
Subtotal	5%	/5%
Remark:		
6. APA STYLE AND REFERENCING (5%)	**Max Score**	**Score**
a. 7th Edition APA Style	5%	/5%
Remark:		
***ORAL PRESENTATION (20%)**	**Score**	
	Student 1	Student 2	Student 3
Subtotal	/20%	/20%	/20%
Remark:		
PENALTY	**Max Score**	**Score**

Maximum of 10 marks for LATE SUBMISSION (within 24hours), or POOR CONSULTATION ATTENDANCE with supervisor. *Late submission after 24hours will not be graded	10%		
	Student 1	Student 2	Student 3
****FINAL MARK/TOTAL**	/100%	/100%	/100%

*****Overall Comments:**

_____

_____

_____

_____

_____

Signature: _____ **Date: _____**

Notes:

1. **Subtotal**: The sum of scores for each assessment criterion
2. **FINAL MARK/TOTAL**: The summation of all subtotal score
3. Plagiarism is **NOT ACCEPTABLE**. Parameters of originality required and limits approved by UTAR are as follows:
   (i) **Overall similarity index is 20% or below**, and
   (ii) **Matching of individual sources listed must be less than 3%** each, and
   (iii) Matching texts in continuous block must **not exceed 8 words**

   Note: Parameters (i) – (ii) shall exclude quotes, references and text matches which are less than 8 words.

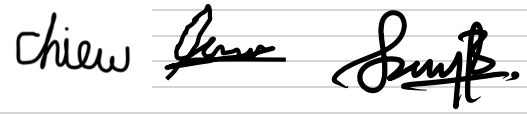
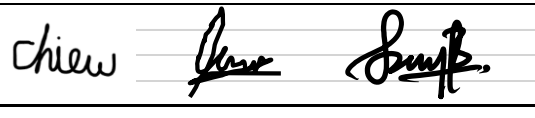
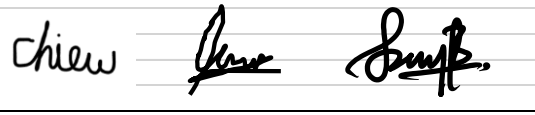
   Any works violate the above originality requirements will NOT be accepted. Students have to redo the report and meet the requirements in **SEVEN (7)** days.

*The marks of "Oral Presentation" are to be retrieved from **"Oral Presentation Evaluation Form".**
**It is compulsory for the supervisor/examiner to give the overall comments for the research projects with A- and above or F grading.

Action Plan of UAPZ 3023 (group-based)Final Year Project II for Jan & May trimester

Supervisee's Name: Chiew Yong Nuo (1804278), Logish Baskaran (1901927), Tan Wei Hou (1802403)

Supervisor's Name: Ms. Pavithra A/P Muniandy

Task Description	Duration	Date/Time	Supervisee's Signature	Supervisor's Signature	Supervisor's Remarks	Next Appointment Date/Time
Methodology, Data Collection & Data Analysis	W1-W2	20/1/22 (1pm) 21/1/22 (3pm) 24/1/22 (2pm)			Refer to the comments given in document.	2/19/2022
Finding & Analysis	W3-W6					
Discuss Findings & Analysis with Supervisor		19/2/22 (3pm) 21/2/22(3pm)			Refer to the comments given in document.	2/27/2022
Amending Findings & Analysis		27/2/22 (11am)			Refer to the comments given in document.	2/28/2022
Discussion & Conclusion	W7-W9					
Discuss Discussion & Conclusion with Supervisor		28/2/22 (2pm) 7/3/2022 (2pm) 14/3/22 (2pm)			Refer to the comments given in document.	3/7/2022
Amending Discussion & Conclusion		4/4/2022 (2pm) 17/3/22 (5pm) 18/3/22 (2pm)			Refer to the comments given in document.	4/4/2022
Submission of first draft*	Monday of Week 10	submit the first draft to Turnitin.com to check similarity rate				
Amendment	W10	Done with amendment				
Submission of final FYP (FYP I + FYP II)*	Monday of W11	final submission to supervisor				
Oral Presentation		Oral Presentation Schedule will be released and your supervisor will inform you				

Notes:

1. The listed duration is for reference only, supervisors can adjust the period according to the topics and content of the projects.

2. *Deadline for submission can not be changed, one mark will be deducted per day for late submission.

3. Supervisees are to take the active role to make appointments with their supervisors.

4. Both supervisors and supervisees should keep a copy of this record. 5. This record is to be submitted together with the submission of the FYP II.

FACULTY/INSTITUTE OF ARTS AND SOCIAL SCIENCE
UNIVERSITI TUNKU ABDUL RAHMAN

Date: 28 March 2022

SUBMISSION OF FINAL YEAR PROJECT / DISSERTATION / THESIS

It is hereby certified that CHIEW YONG NUO (ID No: 1804278) has completed this final year project / dissertation / thesis *entitled "Relationship of Sleep Quality, Perceived Stress, and Creativity among Undergraduates in Malaysia" under the supervision of Ms. Pavithra A/P Muniandy (Supervisor) from the Department of Psychology, Faculty/Institute* of Arts and Social Science.

I understand that University will upload softcopy of my final year project / dissertation / thesis* in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.

Yours truly,

Name: Chiew Yong Nuo

**Delete whichever not applicable*

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It is hereby certified that TAN WEI HOU (ID No: 1802403) has completed this final year project / dissertation / thesis *entitled "Relationship of Sleep Quality, Perceived Stress, and Creativity among Undergraduates in Malaysia" under the supervision of Ms. Pavithra A/P Muniandy (Supervisor) from the Department of Psychology, Faculty/Institute* of Arts and Social Science.

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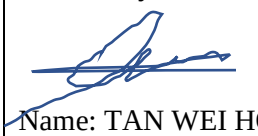
Yours truly,



Name: TAN WEI HOU

**Delete whichever not applicable*

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Date: 28 March 2022

SUBMISSION OF FINAL YEAR PROJECT / DISSERTATION / THESIS

It is hereby certified that LOGISH A/L BASKARAN (ID No: 1901927) has completed this final year project / dissertation / thesis *entitled "Relationship of Sleep Quality, Perceived Stress, and Creativity among Undergraduates in Malaysia" under the supervision of Ms. Pavithra A/P Muniandy (Supervisor) from the Department of Psychology, Faculty/Institute* of Arts and Social Science.

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Yours truly,

Name: LOGISH A/L BASKARAN

**Delete whichever not applicable*

Universiti Tunku Abdul Rahman			
Form Title : Supervisor's Comments on Originality Report Generated by Turnitin for Submission of Final Year Project Report (for Undergraduate Programmes)			
Form Number: FM-IAD-005	Rev No.: 0	Effective Date: 01/10/2013	Page No.: 1of 1

FACULTY OF ARTS AND SOCIAL SCIENCE

Full Name(s) ofCandidate(s)	CHIEW YONG NUO, LOGISH A/L BASKARAN, TAN WEI HOU
ID Number(s)	1804278, 1802403, 1901927
Programme / Course	BACHELOR OF SOCIAL SCIENCE (HONOURS) PSYCHOLOGY
Title of Final Year Project	RELATIONSHIP OF SLEEP QUALITY, PERCEIVED STRESS, AND CREATIVITY AMONG UNDERGRADUATES IN MALAYSIA

Similarity	**Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)**
Overall similarity index: 13 **%** **Similarity by source** Internet Sources: 9 % Publications: 3 % Student Papers: 7 %	
Number of individual sources listed of more than 3% similarity: 0	

Parameters of originality required and limits approved by UTAR are as follows:

(i) Overall similarity index is 20% and below, and

(ii) Matching of individual sources listed must be less than 3% each, and

(iii) Matching texts in continuous block must not exceed 8 words

Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Signature of Supervisor

Name: Ms Pavithra Muniandy

Date: 29 March 2022

Signature of Co-Supervisor

Name: _____

Date: _____