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PERCEIVED RISK, FEAR OF COVID-19, AND RESILIENCE ON MENTAL HEALTH
AMONG MALAYSIAN EMERGING ADULTS DURING THE COVID-19 PANDEMIC

ERIKA LIEW WYE KEET

ESTHER LOW MEI JEN

GLORY HO LEE LIN

A RESEARCH PROJECT
SUBMITTED IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
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Perceived Risk, Fear of COVID-19, and Resilience on Mental Health
Among Malaysian Emerging Adults During the COVID-19 Pandemic

Erika Liew Wye Keet, Esther Low Mei Jen, and Glory Ho Lee Lin

Universiti Tunku Abdul Rahman

This research project is submitted in partial fulfilment of the requirements for
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Universiti Tunku Abdul Rahman. Submitted on March 2021.

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Erika Liew Wye Keet

Esther Low Mei Jen

Glory Ho Lee Lin

APPROVAL FORM

This research paper attached here to, entitled “Perceived risk, fear of Covid-19, and resilience on mental health among Malaysian emerging adults during the COVID-19 pandemic”, prepared and submitted by Erika Liew Wye Keet, Esther Low Mei Jen, and Glory Ho Lee Lin in partial fulfilment of requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.

Supervisor

(Ms. T'ng Soo Ting)

Date: _____

Abstract

The coronavirus (COVID-19) is identified as a respiratory illness and has affected many countries around the world in terms of various aspects including mental health. However, there are limited studies that emphasise on the (1) predictive effects of perceived risk of COVID-19 on mental health, and (2) the mediating effects of fear of COVID-19 and resilience in the relationship between perceived risk of COVID-19 and mental health among emerging adults in Malaysia. Hence, the current study aimed to investigate (1) the predictive effect of perceived risk of COVID-19 on mental health, and (2) the mediating effects of fear of COVID-19 and resilience in the relationship between perceived risk of COVID-19 and mental health among Malaysian emerging adults during the pandemic. Overall, there were 196 respondents recruited to participate in the cross-sectional study through online survey by using purposive sampling method. However, only 182 respondents were selected to proceed to data analyses. The selected participants were Malaysian emerging adults with age range between 18 and 29 years old. The results demonstrated that only resilience positively predicted mental health, while perceived risk and fear of COVID-19 were not significant predictors of mental health. Fear of COVID-19 and resilience have no mediating effect in the relationship between perceived risk and mental health. In conclusion, these findings have provided an opportunity for the Malaysian community to have a deeper understanding about the role of resilience on mental health during the pandemic, which helps in developing intervention programmes.

Keywords: COVID-19, perceived risk, mental health, emerging adults, Malaysia

DECLARATION

We declare that the material 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.

Name : ERIKA LIEW WYE KEET


Student ID : 17AAB02227

Signed : 

Date : 29th March 2021

Name : ESTHER LOW MEI JEN

Student ID : 17AAB02755

Signed : 

Date : 29th March 2021

Name : GLORY HO LEE LIN

Student ID : 17AAB05206

Signed : 

Date : 29th March 2021

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List of Abbreviations

Abbreviations

APA	American Psychological Association
CD-RISC	Connor Davidson Resilience Scale
CD-RISC-10	10-item Connor Davidson Resilience Scale
COVID-19	Coronavirus Disease 2019
CPRS	COVID-19 Perceived Risk Scale
FCV-19S	Fear of COVID-19 Scale
GHS	Global Health Security
MCO	Movement Control Order
CMCO	Conditional Movement Control Order
MERS	Middle East Respiratory Syndrome
MHC-LF	Mental Health Continuum Long Form
MHC-SF	Mental Health Continuum Short Form
MoH	Ministry of Health
SOR	Stimulus-Organism-Response
SARS	Severe Acute Respiratory Syndrome
WHO	World Health Organization
PTS	Posttraumatic Stress Symptoms
SPSS	Statistical Package of Social Science
SNS	Social Networking Sites
SERC	Scientific and Ethical Review Committee

Chapter I

Introduction

Background of Study

The coronavirus (COVID-19) outbreak started from China, specifically Wuhan which was first documented at the end of 2019 (Khan et al., 2020). Due to the high transmissibility of COVID-19 around the world, the World Health Organization (WHO) announced the COVID-19 epidemic as a pandemic on the 11th March 2020 (Durcharme, 2020). By 9th November 2020, COVID-19 has spread to over 216 countries with 49,578,590 confirmed cases and 1,245,717 deaths globally (World Health Organization, 2020a). To date, Malaysia has 45,095 confirmed cases, 11,822 active cases, and 304 deaths (Kementerian Kesihatan Malaysia, 2020). The first case was identified on the 24th January 2020 (World Health Organization, 2020d) while the first COVID-19 death was identified on the 17th March 2020 which was linked to a massive religious assembly in Kuala Lumpur (“Malaysia Records First Two Covid-19 Deaths”, 2020), leading to a drastic rise in the number of COVID-19 cases. The quick rise in the number of cases is alarming especially when there is presently no vaccine approved for public use (World Health Organization, 2020b).

Consequently, the Movement Control Order (MCO) has been implemented by the Malaysian government on the 18th March 2020 to “break the chain of infection of the virus” as mentioned by the Prime Minister (Yassin, 2020). On top of the implementation of MCO, restrictive measures are also being imposed which include the prohibition of mass gatherings, interstate and international travels, the closing of non-essential businesses, the practice of social distancing, and the wearing of masks in public areas (Kaur, 2020). The COVID-19 outbreak was managed by the Ministry of Health (MoH) which is currently headed by the Director General of Health who was nominated as one of the best medical doctors in the

world in managing the COVID-19 calamity (Swee, 2020; Wissgott, 2020). In addition, Malaysia has been listed on the Global Health Security (GHS) Index as amongst the top 30 nations with the best level of readiness for an emergency pandemic (McAleer, 2020).

Despite the successes against COVID-19, there are negative impacts brought to the citizens. Negative impacts include global economic and social disruption (World Health Organization, 2020c). For example, inadequate supplies, unemployment, disruption in everyday life, sense of loneliness, risk of infection, fear, and anxiety (Ahorsu et al., 2020; Arslan et al., 2020). Evidently, the pandemic does not only pose a threat to physical health, but it also affects the public's mental health (Ribeiro et al., 2020), as a result of psychological disturbance, specifically in terms of anxiety and stress levels (Cao et al., 2020; Li et al., 2020; Tabri et al., 2020). In addition, evidence from several nations and studies show an increasing level of anxiety disorder, dejection, posttraumatic stress, and symptoms of panic disorder during the pandemic (Lei et al., 2020; McBride et al., 2020; Qiu et al., 2020; Shevlin et al., 2020), particularly among emerging adults.

Emerging adulthood, one of the stages across life-span, is defined as the period from the ages 18 to 29. In other words, starting from the end of the adolescence stage to the beginning of adulthood (Arnett et al., 2014). This specific age group has been majorly affected by the negative impacts of the pandemic such as the disruption of education, occupational opportunities (Kujawa et al., 2020), unemployment, and job scarcity (International Labor Organization, 2020). Thus, emerging adults were identified to be at high risk to develop a wide range of psychological issues. A few recent COVID-19 studies have pointed out that they depicted higher levels of anxiety, distress, and depression compared to other populations (Cao et al., 2020; Huang & Zhao, 2020a; Qiu et al., 2020), putting them at higher risk for internalizing the symptoms, leading to the target participant in the present study.

Typically, mental health has been identified as the absence of psychological illness (Perugini et al., 2017) and studies have been assessing mental health with the existence of a disorder such as eating disorder and panic disorder (Nooney, 2005; Thomas & Barbato, 2020; Weinberger-Litman et al., 2020) However, WHO has defined mental health as “a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community” (World Health Organization, 2018). In other words, mental health is not measured merely by the non-appearance of mental illness.

The pandemic continues to create uncertainties, gives rise to anxiety, worry, and prompts people to perceive themselves to be at risk of being infected by the coronavirus disease. Therefore, empirical studies (Kim et al., 2020a; Malesza & Kaczmarek, 2020; Yildirim et al., 2020a) have reported perceived risk as one of the significant predictors in determining one’s mental health. Perceived risk indicates the individual’s psychological assessments of the likelihood and consequences of an undesirable result. Thus, perceived risk influences one’s decision to participate in any health-related behaviours (Paek & Hove, 2017). For example, an individual’s perception of risk such as the high probability that they are at risk of infection can prompt them to adopt preventive behaviours such as practicing social distancing, staying home, and ensuring one’s personal hygiene (Yildirim et al., 2020b).

Li et al. (2020) revealed that one’s negative appraisals of an event such as perceived risk is correlated to their mental health. This can be seen in past studies where significant associations between perceived risks with anxiety, worry, and disruption of everyday life were shown. In addition, a study that was done for Severe acute respiratory syndrome (SARS) and Ebola virus disease reported that higher perceived risk was linked to greater mental health issues (Cheng et al., 2006; Yang & Chu, 2018). Thus, it can be hypothesized that perceived risk correlates to one’s mental health.

Additionally, it is inevitable that COVID-19 and its consequences trigger fear among the public. Fear is defined as negative emotions followed by excessive levels of emotive avoidance towards a particular stimulus (Perin et al., 2015). Even though fear could be beneficial in prompting people to take measures against COVID-19, a few studies (Garfin et al., 2020; Sloan et al., 2020) have found that extreme levels of fear could contribute to harming physical and mental health. Within the context of COVID-19, high levels of fear might give rise to numerous mental health issues such as mental health disorders (e.g., anxiety, depression, and post-traumatic stress disorder), distress reactions (e.g., insomnia, anger, worries), and poor well-being perception (Shigemura et al., 2020). Thus, fear of COVID-19 is hypothesized as a significant predictor of mental health.

Furthermore, resilience is described as the ability to experience hardship and adapt positively (Luthar & Cicchetti, 2000). In other words, resilience is the ability to “bounce back” from adversity swiftly, adapt easily, and depict growth even in difficult times (Bonanno, 2004; Smith et al., 2008). Based on previous studies, resilience was found to be a solid predictor of subjective and psychological well-being (Yildirim, 2019); and mental health concerns (Burns et al., 2011; Rudwan & Alhashimia, 2018). In the context of the COVID-19 pandemic, some researchers found that resilience was associated with lower worries, anxiety, and depression (Barzilay et al., 2020; Ran et al., 2020).

Moreover, given the profound negative effects of the perceived risk of COVID-19 on emerging adults' mental health, it is essential to study and understand the underlying mechanism between the two variables. By exploring the role of mediators, it can help to provide a more accurate understanding of how perceived risk leads to mental health. In this present study, fear of COVID-19 is suggested as one of two mediators between perceived risk and mental health as past researchers revealed the correlation between fear of COVID-19

with perceived risk of catching the virus (Harper et al., 2020) and mental health (Ahorsu et al., 2020; Garfin et al., 2020; Sloan et al., 2020).

Additionally, resilience has also been identified in a past study (Yildirim & Arslan, 2020) as a mediator between a psychological variable (dispositional hope) and subjective and psychological well-being during the pandemic. Therefore, it is hypothesized that fear of COVID-19 plays a mediating role in the relationship. Similarly, it is plausible to assume that resilience can be a psychological resource strength that people can use to cope with the pandemic and act as a mediator between perceived risk and mental health (Catabay et al., 2019). Hence, there is an urgent need to examine the role of resilience in the relationship between perceived risk and mental health.

Overall, COVID-19 continues to pose threat to the mental health of the general public as cases are still present. Therefore, this is an ongoing concern regarding mental health, and it is crucial to carry out the present study as there are limited studies investigating the process underlying the relationship between perceived risk and mental health issues during the pandemic. Hence, the present study aims to focus on the mediating effects of fear of COVID-19 and resilience in the relationship between perceived risk and mental health among emerging adults in Malaysia during the pandemic.

Problem Statement

The Edge Markets is the bestselling weekly newspaper in Singapore which involves news from Malaysia and Singapore. An article published in the Edge Markets (2020, October 10) revealed that there are 465 attempted suicide cases recorded by the Ministry of Health (MoH) in the first half of the year (January to June). Another article revealed that the

Befrienders Kuala Lumpur reported an increased number of calls from those in distress and with suicidal ideation since the implementation of the Movement Control Order (MCO). In the first week of MCO, the number of calls received increase by 9%, followed by 14% for the second week, and 38% for the third week of MCO. Many callers reported feelings of being trapped, helplessness, and hopelessness, leading to suicidal ideation (Chandiran, 2020). Similar findings were obtained in the United States, in which there is a significant increase (75%) in the received phone calls to suicide prevention hotlines during the pandemic (Dunmore, 2020). The huge increase in phone calls might be due to depression, anxiety, and fear experienced during the pandemic. This is supported by several researchers who found that there is an increase in psychological distress and the number of people who are experiencing poorer mental health (Ahmed et al., 2020; Li et al., 2020; Panchal et al., 2020). In addition, past researchers revealed that around 90% of the global suicidal cases are due to poor mental health, such as depression. These articles reflect that mental health issue during the pandemic is a growing concern and should be taken care of (Mamun & Griffiths, 2020a).

Mental health problems among emerging adults are on the rise over the years and they are one of the vulnerable groups for mental health during the pandemic. This is because emerging adulthood is a stage of instability due to the transition from adolescence to adulthood (Arnett, 2000a; Arnett & Taber, 1994). Hence, emerging adulthood is a crucial development stage accompanied by situational factors that can give rise to the subjective well-being of emerging adults (Arnett, 1998, 2004, 2007).

In the context of the COVID-19 pandemic, studies have revealed that 75.9% of the young adults (age 18 to 24) were experiencing at least one negative mental or behavioural health symptom, and they are the riskiest age group compared to other age groups (Czeisler et al., 2020; McGinty et al., 2020). The increased experience of adverse mental symptoms can be due to stressors such as adapting to a new mode of study (online study; Kecojevic et al.,

2020), difficulties in looking for a job, and afraid of losing a job (International Labour Organization, 2020).

Additionally, emerging adults were reported to have less experience, narrow perspective, lower emotional maturity, and experience compared to older adults (Vahia et al., 2020). Thus, there is an urgent need to determine how perceived risk, fear of COVID-19, and resilience can further affect their mental health. Nevertheless, there is a lack of study focusing on emerging adults. This can be seen where most of the research studies with perceived risk as the predictors focused on a different population, such as adolescents (Commodari & Rosa, 2020), adults (Dai et al., 2020; Kim et al., 2020a; Yildirim & Guiler, 2020a) and older adults (Bruin, 2020), as well as health care or frontline workers (Cai et al., 2020; Yildirim et al., 2020a). Therefore, the current study wishes to examine this relationship among Malaysian emerging adults.

There are some research gaps that need to be emphasised. Firstly, there are limited studies that examined the predictive effect of perceived risk on mental health among emerging adults. Most studies focused on how the pandemic affects their studies, which in turn impacts their psychological health (Ketogenic et al., 2020); how lockdown or social isolation affects their mental health (Kaparpunaki et al., 2020; Rossi et al., 2020). Little is known about the effect of perceived risk on the mental health of emerging adults.

Furthermore, there is insufficient study in the Malaysian context, a multicultural and collectivistic culture. Germani et al. (2020) found that differences in cultural contexts will influence people's perceived risk and affect their well-being. It was reported that people with collectivistic orientation have a greater perceived vulnerability, indicating that the perceived risk of infection will significantly affect their mental well-being.

Moreover, most of the studies look into the association between perceived risk and mental health (e.g., Ahorsu et al., 2020; Germani et al., 2020; Kim et al., 2020a; Li et al., 2020; Malesza & Kaczmarek, 2020; Son et al., 2020). Nevertheless, little is known about the underlying mechanisms between perceived risk and mental health. It is essential to study the potential mediators of this relationship as it can help to provide a more accurate understanding of how perceived risk deteriorates and improve one's mental health. Thus, it is important to fill these research gaps on how perceived risk affects the mental health of emerging adults in Malaysia.

In short, the current study claimed that (1) perceived risk, fear of COVID-19, and resilience predict mental health; (2) fear of COVID-19 and resilience mediate the relationship between perceived risk and mental health.

Significance of Study

Firstly, this study helps to fill in the knowledge gap of our society about how the pandemic (perceived risk) affects the mental health of emerging adults during the COVID-19 pandemic. Most people tend to think that adults, especially working adults are the ones being affected the most by the pandemic. By carrying out the current study, the Malaysian community can have a clearer understanding of how perceived risk is affecting emerging adults' well-being and how this relationship is mediated by fear of coronavirus and resilience.

Moreover, this study serves as an additional resource on how cultural context (collectivistic and multicultural) influences the predictive effect of perceived risk on mental health, particularly in Malaysia as there are limited studies on the pandemic in a Malaysian context. Additionally, by conducting the present study, other researchers can have a deeper

understanding of the potential underlying mechanisms (fear of COVID-19 and resilience) in the relationship between perceived risk and mental health. This study will help to explain how fear of COVID-19 deteriorates one's mental health and how resilience helps to maintain one's mental health.

Furthermore, the current study contributes theoretically to the existing field by examining the Stimulus-Organism-Response (SOR) model in the psychological field. SOR model is a cognitive theory used to examine how the environmental factors (stimulus) affect an individual's emotional response (response) through the organismic factors (organism) (Mehrabian & Russell, 1977). This model has been extensively used and supported in the research on consumer behaviour (Islam et al., 2018; Liu et al., 2016) while its applicability in the psychological field remains unclear. Additionally, most of the studies carried out during the COVID-19 pandemic did not highlight the theory or model (e.g., Ahuja et al., 2020; Bakioğlu et al., 2020; Fitzpatrick et al., 2020; Germani et al., 2020; Li et al., 2020; Mamun & Griffiths, 2020b; Mertens et al., 2020; Shigemura et al., 2020; Son et al., 2020; Yildirim et al., 2020a) used, and SOR model is not adequately applied in psychological research during the pandemic. Thus, this study contributes theoretically to the understanding of the applicability of the SOR model between perceived risk, fear of COVID-19, and resilience on mental health among Malaysian emerging adults.

In addition, this study has practical contributions to the society. Numerous empirical studies (e.g., Ahorsu et al., 2020; Germani et al., 2020; Kim et al., 2020a; Li et al., 2020; Malesza & Kaczmarek, 2020; Son et al., 2020) have shown the impact of perceived risk on one's mental health. Understanding the potential mechanisms of this relationship helps the government, media, mental health professions, public health workers, as well as university administrators to identify how the underlying factors (fear of coronavirus and resilience) affect one's mental health. Hence, providing intervention programs to help emerging adults

reduce their fear of coronavirus and increase their resilience. Intervention programs such as reducing the fear of COVID-19 through controlling the quality of the information (reducing fake news) on media as past researchers found that fake news has a predictive effect on psychological states (Song et al., 2020). This may help to improve the mental health of emerging adults, which in turn would help to reduce the number of suicide cases and improve their quality of life.

On top of that, conducting this study helps to validate the predictive effects and raise awareness on how the mental health of emerging adults is affected by providing the latest statistics of the mental health condition of emerging adults. Subsequently, the emerging adults will pay more attention to their mental health and involve themselves in the intervention programs, which can help to improve their psychological well-being.

Research Questions

1. Do perceived risk, fear of COVID-19, and resilience negatively and significantly predict mental health among Malaysian emerging adults during COVID-19 pandemic?
2. Do fear of COVID-19 and resilience mediate the relationship between perceived risk and mental health among Malaysian emerging adults during COVID-19 pandemic?

Research Objectives

1. To examine the predictive effects of perceived risk, fear of COVID-19, and resilience on mental health among Malaysian emerging adults in the context of COVID-19 pandemic.

2. To examine the mediating effects of fear of COVID-19 and resilience on the relationship between perceived risk and mental health among Malaysian emerging adults in the context of COVID-19 pandemic.

Hypotheses

H₁: Perceived risk negatively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.

H₂: Fear of COVID-19 negatively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.

H₃: Resilience positively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.

H₄: Perceived risk positively and significantly predicts fear of COVID-19 among Malaysian emerging adults during COVID-19 pandemic.

H₅: Perceived risk negatively and significantly predicts resilience among Malaysian emerging adults during COVID-19 pandemic.

H₆: The negative relationship between perceived risk and mental health among Malaysian emerging adults is mediated by fear of COVID-19 during COVID-19 pandemic.

H₇: The negative relationship between perceived risk and mental health among Malaysian emerging adults is mediated by resilience during COVID-19 pandemic.

Conceptual Definitions

Perceived Risk

It can be defined as the subjective judgement people make in respect of the possible negative occurrences of an event such as illness, injury, and death (Paek & Hove, 2017). In the context of COVID-19, perceived risk is associated with worry, anxiety, disruption of daily routines (Kwok et al., 2020).

Fear of COVID-19

Fear is defined by an individual's subjective and adaptive emotion which serves in dealing with a potential threat. It includes four aspects of fear which are (1) fear of the body/fear for the body, (2) fear of significant others/fear for significant others, (3) fear of not knowing/fear of knowing, (4) fear of inaction/fear of taking action which represents bodily, interpersonal, cognitive, and behavioural features of fear (Schimmenti et al., 2020).

Resilience

Psychologists define resilience as a process of adapting well in the face of adverse life experiences, trauma, tragedy, or threats such as health problems, relationship problems, and workplace stressors. With the presence of resilience, the person will have the ability to cope with crises and bounce back despite facing life adversities (American Psychological Association, 2012).

Mental Health

It is defined as a dynamic state of internal equilibrium where a person can use his or her ability in harmony with the universal values of society (e.g., respect and care for oneself and others). The important components of mental health which are the keys contributing to the state of internal equilibrium, include basic cognitive and social skills; ability and flexibility to cope with adversities and function in social roles; ability to recognize, express and regulate one's emotion as well as empathize with others; and the harmonious relationship between mind and body (Galderisi et al., 2015).

Operational Definitions

Perceived Risk

It is measured by the COVID-19 Perceived Risk Scale with two dimensions, cognitive and emotional dimensions. CPRS is an eight-item scale adapted from SARS Risk Perception Scale (Brug et al., 2004), rated on a five-point Likert scale, ranging between 1 (*negligible*) and 5 (*very large*). Higher score indicates higher levels of personal risk associated to COVID-19 pandemic (Yildirim & Güler, 2020a).

Fear of COVID-19

It refers to the level of fear of COVID-19 which is measured using the Fear of Coronavirus-19 Scale (FCV-19S; Ahorsu et al., 2020). It is a unidimensional scale consisting of seven items, rated on a five-point Likert scale, ranging from 1 (*strongly disagree*) to 5

(*strongly agree*), which measures an individual's level of fear. The higher the score, the more intense one's fear of coronavirus-19.

Resilience

It refers to how well a person functions after experiencing adversity and is measured by 10-item Connor Davidson Resilience Scale (CD-RISC-10; Gonzalez et al., 2016). CD-RISC-10 is developed from the 25-item CD-RISC scale (Connor & Davidson, 2003). It consists of 10 items, rated on a four-point Likert scale, ranging from 0 (*not true at all*) to 4 (*true nearly all the time*). The total scale ranges from 0 to 40 with higher score indicating higher levels of resilience (Campbell-Sills & Stein, 2007).

Mental Health

It refers to the level of mental well-being of an individual and can be measured using the adult version of Mental Health Continuum Short Form (MHC-SF; Keyes et al., 2008). The MHC-SF is derived from the Mental Health Continuum Long form (MHC-LF), which consists of 40 items, developed by Keyes (2002). The MHC-SF consists of 14 items that assess mental health by focusing on the three dimensions: emotional, psychological, and social well-being (Luijten et al., 2019). The MHC-SF items are used to differentiate three subgroups which include flourishing, moderate, and languishing. The MHC-SF is rated on a six-point Likert scale, ranging from 0 (*never*) to 5 (*everyday*). The total score of MHC-SF ranges from 0 to 70, a higher score indicates a higher level of well-being (Keyes et al., 2008).

Chapter II

Literature Review

Perceived Risk and Mental Health

Perceived risk and mental health during a pandemic (e.g., SARS, Ebola, COVID-19) have been extensively studied by past researchers (e.g., Ahorsu et al., 2020; Brug et al., 2016; Cheng et al., 2006; Dorfán & Woody, 2011; Khosravi, 2020; Kim et al., 2020b; Mækela et al., 2020; Malesza & Kaczmarek, 2020; Styra et al., 2008; Varti et al., 2009; Wu et al., 2009; Yang & Chu, 2016; Yildirim & Güler, 2020b; Zhang et al., 2020). A study conducted by Yildirim and Güler (2020b) among 3,109 Turkish adults revealed a significant negative correlation between perceived risk of infection and psychological well-being, in which high perceived risk correlates with more distress and less happiness. One possible reason is that the extreme level of the perceived risk of COVID-19 leads to an increased experience of death distress, resulting in poorer psychological well-being (more distress, less happiness). This result is consistent with the previous studies that examined the correlation between perceived risk and mental health (e.g., Ahorsu et al., 2020; Xiao, 2020; Zhang et al., 2020).

Instead of focusing on a country, Mækela et al. (2020) conducted a study on perceived risk and mental health among adults from six countries (e.g., Brazil, Colombia, Germany, Israel, Norway, United States) to increase the generalizability of their study. The findings revealed a positive correlation between perceived risk and mental health (distress). Respondents who believe that the government is unable to manage the COVID-19 pandemic effectively and successfully (e.g., reduced beliefs regarding the controllability of the COVID-19 pandemic) tend to have a higher perceived risk of infection and higher distress levels. This is consistent with the study carried out by Malesza and Kaczmarek (2020) among Polish

adults. However, the study had a limitation in terms of generalizability among respondents from Colombia as the respondents were mainly students.

Kim et al. (2020a) carried out a longitudinal study on perceived risk and mental health among a different population- South African adults who had childhood trauma. The researchers found that individuals with childhood trauma have a higher perceived risk of infection and there is a positive and significant correlation between perceived risk and depression among adults who had childhood trauma. The finding showed that the depressive impacts were more severe when the perceived risk of infection is high among adults with childhood trauma in which they have a double risk of experiencing depressive symptoms for every unit increase in perceived risk of COVID-19 pandemic. A possible reason is individuals who reported childhood trauma have limited coping mechanisms and their development of psychological mechanisms has been altered (e.g., brain function, amygdala, and hippocampus), leading to poorer regulation of risk perception and emotions. This study highlighted the effect of past traumatic histories and stress exposure (perceived risk) on the severity of depressive symptoms.

In the context of the SARS epidemic, past researchers reported similar results compared to the COVID-19 pandemic. Wu et al. (2009) conducted a study among 549 healthcare professions that found a positive and significant correlation between the perceived risk of SARS and posttraumatic stress symptoms (PTS) since the SARS outbreak in 2003 (data collected in 2006). Healthcare workers tend to have greater perceived risk due to close and frequent contact with SARS patients. In addition, the SARS epidemic has a rapid transmissibility and mortality rate, resulting in fear of infection, which leads to an increase in the experience of stress. This study concluded that an epidemic brings long-lasting changes to individuals' psychological health. Similar findings were obtained by Brug et al. (2004), Styra

et al. (2008), and Vartti et al. (2009) who found that perceived risk of infection influences one's mental health (distress, worries).

On the contrary, an inconsistent finding showed that higher perceived risk predicts lower psychological maladjustment among collectivistic Italian emerging adults (Germani et al., 2020). Emerging adults with collectivistic orientation tend to endorse more collectivistic attitudes which increase their perceived risk of infection. However, lower psychological maladjustment was due to their social connectedness and sense of belongingness which serves as a buffer against the risk of infection as well as psychological maladjustment.

Although perceived risk and mental health have been extensively studied, most of the studies are focusing on healthcare workers and there are limited studies carried out among emerging adults (Germani et al., 2020) despite the deterioration of the mental health of emerging adults. Additionally, there is a lack of study carried out in Malaysia, and most of the studies were carried out in Western and Middle-East cultural context (e.g., Italy, Africa, Turkey, Brazil, Colombia, Germany, Israel, Norway, United States). Therefore, this study aims to explore the influential role of perceived risk on mental health among Malaysian emerging adults to fill the literature gap.

Fear of COVID-19 and Mental Health

Fear of infection and mental health have been extensively studied by previous researchers (e.g., Ahorsu et al., 2020; Ahuja et al., 2020; Banerjee, 2020; Fitzpatrick et al., 2020; Hetkamp et al., 2020; Lin et al., 2020; Shigemura et al., 2020; Zolotov et al., 2020) in a different population (e.g., general population, adults, young adults, university students, and frontline professions) except emerging adults. A study carried out by Ahorsu et al. (2020)

found that the fear of COVID-19 pandemic is correlated negatively with mental health among the general Iranian population. The finding revealed that with the high infection rate and mortality as well as no effective vaccine against the disease, people inevitably start worrying and fearing about COVID-19. An extreme level of fear can inhibit individuals to think irrationally during COVID-19, leading to poorer mental health. Similar findings were obtained by Huang and Zhao (2020b), who conducted their study among 7,236 Chinese population. Coronavirus is full of uncertainty. People did not know what kind of virus it is and there is no vaccine. All these increase one's fear, thus, lead to worry and restlessness (Banerjee, 2020).

Furthermore, a study was conducted among adults from the United States. The result revealed a significant and negative relationship between fear and mental health consequences on the socially vulnerable respondents (e.g., Hispanic, Asian, female, foreign-born, families with children; Fitzpatrick et al., 2020). Similar findings in the Western context were obtained by other studies as well (National Public Radio, 2020) which stated that 50% of the adults reported higher fear and worry due to the COVID-19 pandemic and it had negatively impacted their mental health. Similarly, Ahuja et al. (2020) who has conducted a study on perceived risk and mental health among Indian adults reported similar findings, in which fear of COVID-19 was found to be negatively and significantly correlated with mental health.

Lin et al. (2020) reported a positive significant correlation between fear of COVID-19 and insomnia. Fear is the first psychological response when responding to threats and risks. An extremely high and prolonged fear results in the development of anxiety and depression due to the intense experience of fear and a highly stimulated brain, leading to insomnia and deterioration of mental health. The finding obtained is consistent with another study carried out by Shigemura et al. (2020), which revealed that the experience of fear led to a range of mental health concerns, which include health risk behaviour (social isolation), distress

reactions (extreme fear of illness and insomnia), mental health disorder (anxiety disorder and depression) as well as lower levels of perceived health. Similarly, Kumar and Nayar (2020) found that fear caused by the COVID-19 pandemic leads to mental health problems (increased anxiety levels).

Another study conducted by Zolotov et al. (2020) found that fear of COVID-19 was negatively associated with mental health problems among Israeli university students. The finding showed that respondents who were reported to be more depressed scored higher in the mean score of fear of COVID-19 compared to those who reported no change, which suggested that fear serves as an underlying element that could lead to deterioration in mental health. This is because fear is conceptualized as an unpleasant feeling while an extreme level of fear can destroy one's mental health and physical health. Similarly, Son et al. (2020) carried out a study among university students in the United States which reported an increased fear of infection (themselves and their loved ones) and increased levels of stress, depressive thoughts, and anxiety.

A similar finding was obtained by Irshad et al. (2020) who conducted a study among Pakistani nurses. The researchers explained that nurses as frontline workers are required to have close contact with the patients and have experienced the real-life example of how COVID-19 affects an individual's health, regardless of its seriousness, which then causes them to have increased fear of COVID-19 pandemic. This is consistent with the findings obtained by Labrague and Santos (2020) who carried out their studies among frontline professions.

In the context of Middle East Respiratory Syndrome (MERS), Jeong et al. (2016) conducted a study among 1,692 Korean on fear of infection and mental health (anxiety and emotional distress). The findings revealed that fear of infection and mental health being were

negatively correlated. One of the possible reasons is people who were experiencing a high level of infection were worrying that they might spread the virus to their family members and how society will view them (afraid of the social stigma attached to MERS).

Nevertheless, Hetkamp et al. (2020) who conducted a study among the 16,245 German general population obtained a different result compared to the previous studies. The researchers concluded that no correlations can be drawn between fear of COVID-19 and mental health (anxiety). Fear of COVID-19 increased drastically when the infection number increases and remain at the same level despite the number of reported cases and death, suggesting that people are experiencing more functional fear compared to the fear of COVID-19. On the other hand, the level of anxiety remained stable over time. One possible reason is that people are experiencing a high psychological burden and are exposed to too many COVID-19 related media reports.

Overall, these studies indicate that fear of COVID-19 has been an issue since the MERS epidemic. An increased level of fear of COVID-19 brings destruction to one's mental health. However, there is a lack of studies conducted in the Malaysian context. Thus, the current study hopes to examine the predictive effect of fear of COVID-19 on mental health in Malaysian emerging adults.

Resilience and Mental Health

Resilience is a complex construct as it can be regarded as a process or a trait (Agaibi & Wilson, 2005), that functions as a regulation on how individuals cope with demanding events (Southwick et al., 2014). However, in the present study, resilience is defined as a dynamic process and the ability to “bounce back” quickly and adapt easily despite the

surrounding pressures and crises (Bonanno, 2004; Smith et al., 2008). This is opposed to the trait construct because protective factors (resilience as a trait) would vary across situations highlighting that when one reacts positively in a crisis, it does not mean that one will react in a similar way across different situations. In addition, resilience is also known as a powerful mechanism mitigating the negative consequences of a catastrophic event (Ran et al., 2020). According to Kashdan and Rottenberg (2010), psychological resilience is considered the main contributor to one's mental health and well-being.

The relation between resilience and mental health is well established; a meta-analysis by Hu et al. (2015), on the trait of resilience and mental health reviewed 60 studies, aiming to study the moderating variables (e.g., age, gender, and adversity). This study concluded a negative correlation between trait resilience and the negative indicators of mental health. The findings suggested a similar explanation proposed by the Model of Three Resilience System mechanism whereby resilience; through harm reduction, protection, and promotion, nurtures one's mental health. The strength of this study is that a large number of studies have been included and reviewed in the meta-analysis which is important to provide a wider understanding. However, the weakness is the limited indicators of mental health (negative and positive indicators) which do not reflect mental health as a whole. Complementing this study, another few studies (e.g., Blackmon et al., 2017; Osofsky et al., 2011) have highlighted the role of resilience in reducing negative psychological consequences caused by catastrophic events.

Moreover, Rudwan and Alhashimia (2018) carried out a study on identifying the relationship between resilience and mental health in light of other variables (e.g., gender and age difference) among a student sample at the University of Nissi. This study conducted a survey, in which responses were collected from 1,000 university students. The results revealed that resilience is a significant determinant of mental health as it showed a positive

correlation. However, there is a lack of explanation on the reasoning for the results. Furthermore, the results also showed no age difference in respect to resilience and mental health level. Nevertheless, there is a limit to the result's generalizability as the sample of students was closed in age.

A similar finding was found in a study carried out by Paudel-Tandukar et al. (2019) on the relationship between resilience and mental health (anxiety and depression) among 225 refugees in Western Massachusetts. The result showed that resilience was inversely correlated with anxiety and depression. Resilience in this study includes two constructs, which are personal competence and acceptance of self and life. Only personal competence which examines self-reliance, independence, resourcefulness, and perseverance, showed an inverse association with anxiety and depression. This is consistent with the next study, highlighting the possible protective effect of resilience on mental health. However, this study cannot guarantee that confounding factors such as social support and lifestyle did not influence the result. Thus, the generalizability of the finding is questionable.

In the context of the COVID-19 pandemic, consistent findings were obtained by Ran et al. (2020) which reported a significant and negative correlation between psychological resilience and negative mental health (e.g., depression, anxiety, and somatization symptoms) among the general population in China. This study was carried out at the pinnacle of its epidemic which is a strength of this study as it also reflects the peak of difficult times. In this study, resilience was measured in three dimensions namely strength, tenacity, and optimism. However, only strength and tenacity were found to be correlated with negative mental health. Therefore, highlighting that individuals who have high psychological resilience depicted the ability to recover quickly after a setback and become stronger (strength); and shows calmness, agility, perseverance, and a sense of control in times of adversities (tenacity). This

highlights the traits of psychological resilience which play a protective role against mental health issues.

On the other hand, Killgore et al. (2020) carried out a study during the third week of quarantine implemented by the United States government. The study depicted that higher resilience predicts lower psychological distress such as worry about the effects of COVID-19. This is because the participants with higher resilience revealed that they practice activities (e.g., more days spent under the sun for at least 10 minutes and exercise more) that promote resilience and showed lower psychological distress compared to those who have lower resilience. The finding is consistent with another study by Yildirim & Arslan (2020) who conducted their studies in the early stage of COVID-19, in which resilience was found to have a direct predictive effect on subjective well-being and mental health among 220. A similar finding was also found among nurses where resilience was found to be a predictor of general well-being and mental health (Gao et al., 2017).

A study conducted by Barzilay et al. (2020) across healthcare workers and non-healthcare workers reported that people with higher resilience tend to have lower levels of COVID-19-related worries as well as a lower rate of depression and anxiety, in which resilience helps in reducing depression and anxiety levels. Although the study covered a wide range of the population in terms of age (18 to 79 years old), the participants involved were more educated and professional (e.g., healthcare providers and academics) due to biased sampling used. In addition, a similar finding was found in the context of career adaptability, in which a negative correlation was revealed between resilience and mental health issues (Xu et al., 2020).

In line with previous findings, Kavčič et al. (2020) support the buffer effect of resilience against mental health problems in the study conducted among 2,722 participants.

The result points the reasoning to the idea of trait resilience helps to protect individuals against the impacts of COVID-19 and improves their ability to face threats. The result also showed that younger people have a higher risk for poorer mental health during the pandemic which is consistent with findings in China (Huang & Zhao, 2020a).

Across these studies, there is a consistent finding which concluded resilience as a significant predictor of mental health. Studies have contextualized the association between resilience and mental health broadly. Nonetheless, there is a lack of research conducted in a Malaysian context that has gained the attention of the authors of the present study.

Furthermore, there are limited studies that focus solely on emerging adults even though it has been pointed out that this specific population posits a higher risk for poorer mental health (Huang & Zhao, 2020b), leading to the focus group of the present study.

Perceived Risk, Fear of COVID-19, and Mental Health

A study conducted by Yildirim et al. (2020a) reported the significant mediating role of fear of COVID-19 on the relationship between perceived risk and mental health among 204 healthcare workers revealed that fear of COVID-19 fully mediated the relationship, in which healthcare workers with greater perceived risk and greater fear of COVID-19 have poorer mental health. On the other hand, healthcare workers with greater perceived risk but lower fear of COVID-19 have better mental health. Possible reasons could be that perceived risk is the common source of fear (Al-Qahtani et al., 2020) and perceived risk is a neutral perception, while fear has a direct effect on mental health, such as leading to stress and anxiety (Liao et al., 2017). The findings are consistent with previous studies where perceived risk was found to have a direct predictive effect on fear of COVID-19 and mental health

among 344 health care professionals and 4,607 Chinese public respectively (Harper et al., 2020; Li et al., 2020a).

Ahorsu et al. (2020) conducted a study on the relationship between perceived risk, fear of COVID-19, and mental health among the general Iranian population (middle east) aged 18 years or older. Their findings revealed that fear of COVID-19 correlates positively and significantly with perceived risk but correlates negatively with mental health (depression and anxiety) because perceived risk can magnify the fear while fear may intensify the damage of the virus itself. One's mental health starts to deteriorate when experiencing an extremely high level of fear as it triggers them to be unable to use an appropriate coping mechanism to cope with their negative emotions.

Another study carried out by Germani et al. (2020) among 1,183 Italian emerging adults revealed that cultural orientation differences (individualistic and collectivistic) play a role in affecting one's perceived risks of infection and fear of COVID-19, which in turn affects one's mental health (worries). Individualistic orientation emphasis on one's independence while collectivistic orientation emphasis more on one's social connectedness. Although Italy is an individualistic country, many emerging adults are found to have a strong sense of relatedness and family connectedness. The researchers found that collectivistic orientation has a positive correlation with perceived risk, and higher perceived risk predicts higher fear of infection, while higher fear of infection leads to more worries, distress, and anxiety (about infecting others) but lower psychological maladjustment in time of social isolation. This former correlation can be the result of collectivistic orientation individuals having a strong sense of responsibility and belongingness. Similar findings were obtained by Kim et al. (2016) who conducted their studies in the context of Ebola. Collectivistic orientation individuals are found to have more worries but low psychological maladjustment.

This can be due to their view of their family as a safe place where they can turn to when they are struggling with negative emotions.

In the context of the SARS epidemic, Fiksenbaum et al. (2006) carried out a study among 333 nurses that revealed a positive correlation between the perceived threat of SARS and fear of infection: a negative correlation between fear of infection and mental health. The perceived risk among nurses was high due to the more frequent contact with infected patients, causing them to experience greater fear and uncertainty. This finding is consistent with previous researchers who carried out their studies during the SARS outbreak (e.g., Cheng et al., 2006; Robertson et al., 2004). Fiksenbaum et al. (2006) continued revealing a negative correlation between fear of infection and mental health. Nurses who were experiencing greater fear were found to have higher levels of state anger and worry due to the uncertainty about the future and their health.

A study carried out by Myer et al. (2009) in the context of HIV/AIDS, among South African adults found that perceived risk of HIV and HIV-related fears were positively associated with one another while they are negatively correlated to mental disorders. The study revealed a different direction of the three variables, which individuals with a mental disorder (specifically anxiety disorder) reported greater fear related to HIV and greater perceived risk. However, this study includes other variables as well, such as HIV-related behavioural changes and the substance used history.

Mertens et al. (2020) conducted a cross-sectional online survey study among 439 adolescents and adults from 28 different countries. The study found that perceived risk, specifically the risk of infection for a loved one has the strongest predictive effect on fear of COVID-19 compared to intolerance of uncertainty, worry, and media exposure. On the other hand, categorical predictors such as sex, infection status, and working status (healthcare)

were insignificant predictors of fear of COVID-19. This finding suggested that individuals' risk perception is influenced strongly by the health of their loved ones. This is because intimate relationships which reflect the close proximity of loved ones will result in a faster speed of infection if they are tested positive for COVID-19. The finding is consistent with Khosravi (2020), who explained that worrying and fear are the affective emotional responses toward the perceived risk of infection.

Nevertheless, a different result was obtained by Detoc et al. (2020), who conducted a study among 2,512 France healthcare workers. The researchers found that healthcare workers are not experiencing higher perceived risk of infection but reported higher fear of COVID-19. In short, people who are experiencing the fear of COVID-19 do not necessarily have high perceived risk, indicating that fear of COVID-19 did not influence one's perceived risk. A possible explanation for the insignificant result of perceived risk is healthcare workers are well-equipped with knowledge about the transmission mode of COVID-19. Thus, they have lower perceived risk when they know that as long as precautionary steps are taken such as wearing a medical mask, their risk of infection is as normal as others. The finding is inconsistent with previous studies conducted during the SARS epidemic. Past researchers found that perceived risk and fear of infection are positively correlated among healthcare professions. For example, Fiksenbaum et al. (2006) conducted a study which revealed that nurses were experiencing a higher perceived risk of SARS contagion and fear of infection.

In the context of COVID-19, there are limited studies on the predictive role of perceived risk and fear of COVID-19 on mental health (Yildirim et al., 2020a). In addition, many researchers neglected the underlying mechanism between perceived risk and mental health. According to Gellman and Tumer (2013), perceived risk is defined as the subjective judgement of an uncertain outcome. One's perceived risk will not directly affect one's mental health if one does not associate the uncertain outcome with negative feelings or emotions

such as fear. Thus, the degree of fear can determine the impact of perceived risk on mental health.

Perceived Risk, Resilience, and Mental Health

According to Luthar and Cicchetti (2000), risk is a fundamental element of resilience because resilience shows positive adaptation in the company of risk. A study conducted by Fletcher and Sarkar (2012) suggested that perceived risk affects one's following emotive, cognitive, and behavioural responses and the ultimate outcome which is seen as a resilience process. Thus, suggesting the link between perceived risk and resilience.

According to a study conducted by Son et al. (2020) on the psychological resilience of 280 hospital workers after the 2015 MERS outbreak, it was revealed that perceived risk correlates significantly with resilience. The study revealed a negative direction for the relationship among hospital workers. The findings showed that high perceived risk was linked directly and indirectly (through emotional experience) with low resilience which was highlighted by the increased probability of Posttraumatic stress disorder and reduced willingness to work during the pandemic. However, in the study conducted by Yildirim et al. (2020a), the findings revealed that perceived risk does not have a direct effect on resilience.

On top of that, resilience has been used by past studies as a mediator between psychological variable and mental health. These studies include the study carried out by Catabay et al. (2019) that examined the relationship between perceived stress and mental health among Black women who have exposure to sexual violence, with resilience acting as one of the mediators on the relationship between perceived stress and mental health. Perceived stress measures the extent to which situations are viewed as stressful,

unpredictable, or uncontrollable which is in the same nature as perceived risk. The finding showed perceived stress to be closely linked with poor mental health. In addition, resilience was found to be partially mediating the negative influences of perceived stress on mental health, particularly depression. This is because resilience serves as an effective coping mechanism for women to cope with the adverse impacts derived from perceived stress, thus helping them to maintain their mental health.

In the context of addiction, Wang et al. (2018) conducted a study on the mediating and moderating effects of resilience on the relationship between perceived stress and depression among 138 heroin addicts. The findings obtained revealed a positive correlation between perceived stress and depression, while a negative correlation was shown between resilience and both perceived stress and depression, which is consistent with the previous study. The results further depicted resilience to partially mediate the relationship between perceived stress and depression. One possible explanation is resilient people have higher psychological adjustment ability, enabling them to cope with stressful events.

From the literature above, gaps can be identified in the literature. Firstly, there is a lack of research examining the relationship between perceived risk and resilience (Son et al., 2019). On top of that, the available studies do not provide consistent findings. Thus, it is essential that the present study widens the literature by contributing to the knowledge of the relationship. Moreover, from having limited studies on the correlation between perceived risk and resilience and wide studies conducted on resilience and mental health, there are no studies found to study the mediating effect of resilience on the relationship between perceived risk and mental health. However, there are limited studies that have been conducted on perceived stress instead which is similar to perceived risk. Therefore, the present study hopes to bridge the gap in the literature.

On the other hand, resilience has been extensively studied by researchers (Catabay et al., 2019; Egeland et al., 1993; Fletcher & Sarkar, 2013; Gao et al., 2017; Zhao et al., 2020); however, many researchers who conducted their studies in the context of COVID-19 were focusing on the impacts of the pandemic to one's mental health (Grover et al., 2020; Javed et al., 2020; Rossi et al., 2020; Talevi et al., 2020). Little attention is given to the underlying mechanism that reduces the negative impacts on mental health. Hence, this provides an opportunity to study resilience as it is known to mitigate the negative consequences of a global pandemic (Ran et al., 2020).

Theoretical Framework

Stimulus-Organism-Response framework (SOR) by Mehrabian and Russell (1974) is a cognitive theory which assumes that environmental factors (stimulus) can influence individuals' internal states (organism), which drive their emotional responses or reaction (response) as illustrated in Figure 2.1. This model has been used and supported by past researchers who conducted their study in the context of the COVID-19 pandemic (e.g., Islam et al., 2020; Song et al., 2020; Zheng et al., 2020). This framework provides a visualized framework and reveals the potential mechanism of a relationship.

Stimulus

According to Mehrabian and Russell (1977), stimulus is defined as an individual's environment and is represented by a set of sensory variables in an environment. The researchers then proposed a general measurement of the environmental stimulation, which is information load. Environment load refers to the degree of novelty and complexity. The

former is defined as the degree of expectation, surprise, new, and familiarity; the latter is defined as the number of elements and changes in an environment. In the SOR framework, the load of an environment directly correlates with the degree of arousal (will be introduced in the next paragraph), in which the higher the load of information, the higher the arousal (stimulated and alert) of a person.

Organism

Organism refers to the internal state of an individual which is based on one's cognitive reaction to the environmental stimulus (Liu et al., 2016; Luqman et al., 2020). There are three basic emotional states of an organism, which are pleasure-displeasure (degrees of enjoyment), arousal-no arousal (levels of mental alertness), and dominance-submissiveness (feelings of control over activities), while pleasantness and arousal are the main states compared to dominance. These three emotional states adequately explain the cognitive interpretations of environmental stimuli (Mehrabian & Russell, 1974). The SOR framework claimed that individuals' internal state (organism) mediates the relationship between the external environmental stimuli and their reactions or responses.

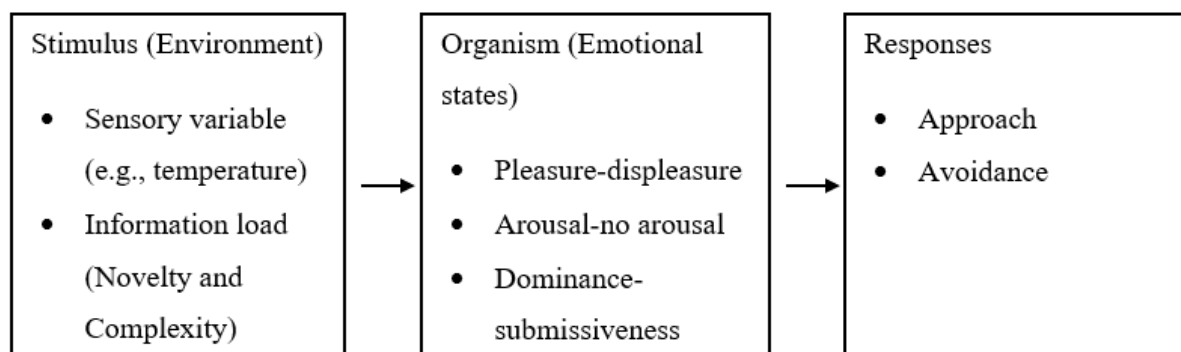
Response

Response is defined as reactions due to the environmental stimulus by the intervening organism response (Mehrabian & Russell, 1977). Responses can be divided into approach and avoidance response. Approach response is a positive reaction such as satisfaction, happiness; avoidance response is the feelings of dissatisfaction, anxiety, and boredom. Approach and avoidance responses are elicited from the emotional states (organism) of an

individual from an environment (Donovan & Rossiter, 1982). Past study has shown that responses and reaction are affected by individuals' internal states and emotional experiences which are stimulated by the environmental factors. Zheng et al. (2020) conducted a study on the pandemic among the Chinese and found that the pandemic severity and lockdown measure (stimuli) can influence individuals' psychological distance (organism), causing them to feel anxious (response).

Figure 2.1

SOR Framework



Conceptual Framework

In the present study, the variables involved are perceived risk of COVID-19, fear of COVID-19, resilience, and mental health. Figure 2.2 shows perceived risk as the stimulus (predictors), mental health as the response (outcome), fear of COVID-19 and resilience as the organism (mediators).

COVID-19 is a highly contagious disease that spread from person to person mainly via contact, airborne, and droplet. The reproductive number of COVID-19 was estimated to be 4.7 to 6.6, which means a person with COVID-19 tends to transmit the virus to at least

four people (Sanche et al., 2020). In the Malaysian context, the reproductive number is currently at around 1.3 (updated on 11th October 2020), with the highest recorded at 3.5 (Kementerian Kesihatan Malaysia, 2020b). The high transmission rate of COVID-19 increases the perceived risk of society. Therefore, the present study posits that the perceived risk of infection is the primary environmental stimulus in the Malaysian context.

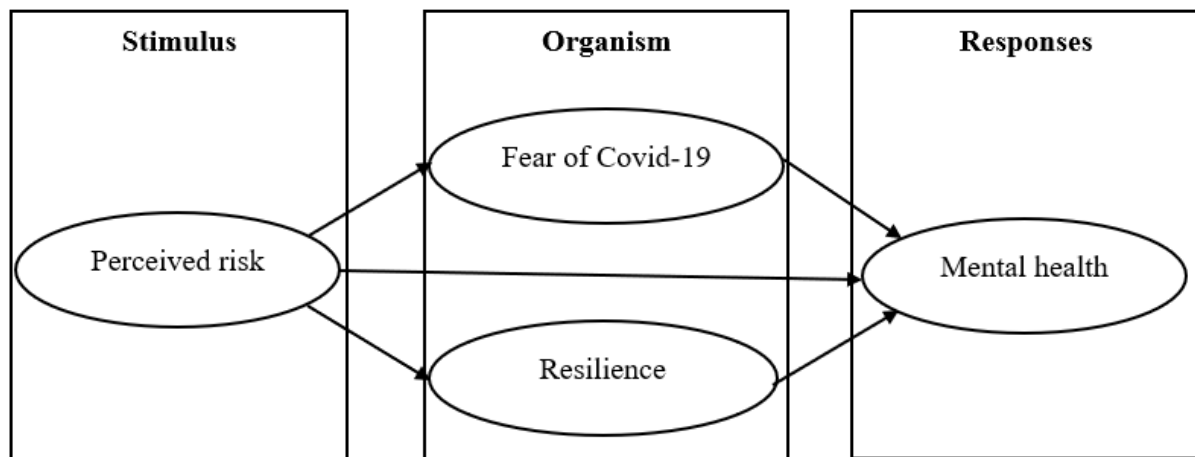
Furthermore, the pandemic influenced people's emotional states. Past researchers revealed that people were experiencing increased negative feelings such as fear of COVID-19 due to concerns about their own and loved ones' health (Harper et al., 2020; Lin, 2020). Prior empirical findings also revealed that fear of COVID-19 correlates with perceived risk. This is because when an individual's perception of risk is high, their psychological distance between themselves and COVID-19 is short, leading to a greater fear of COVID-19 (Khosravi, 2020; Mertens et al., 2020). Fear was echoed to one of the dimensions of organism, which is arousal (LaTour & Pitts, 1989; Woodson et al., 2020). Thus, fear of COVID-19 will be representing organism in the SOR framework, aside from resilience.

Resilience can be defined as individuals' ability to recover and adapt after an adverse event as well as their perception of their ability to adapt and recover (Satterwhite & Luchner, 2016). Resilience was found to have a correlation with other emotional states of organism, which are dominance and submissiveness. Past researchers found that people who have higher perceived control (dominance) are more resilient (McFadden et al., 2016; Martin & Marsh, 2006). This is because when everything is in control and there is no uncertainty, people have higher confidence that they can cope with the changes. In the context of the COVID-19 pandemic, resilience is an emotional state of an organism, enabling one to think positively (Yildirim & Arslan, 2020).

According to Mehrabian and Russell (1977), individuals' avoidance or approach response is determined by their organism states. Past researchers suggested that avoidance and approach correlate with mental health (depression) and well-being (optimism and self-esteem). For example, Coats et al. (1996) revealed that greater avoidance strivings predict greater depression and lower self-esteem as well as lower optimism, while greater approach strivings predict lower depression. A possible reason for this finding is people who applied avoidance response have a more negative evaluation and thinking, such as "I cannot do this", leading to poorer mental health. Hence, the present study suggests that approach response is represented by good mental health while avoidance response is represented by poor mental health.

Figure 2.2

Proposed Conceptual Model



Note. Fear and resilience are mediating variables.

Chapter III

Methodology

Research Design

The current study implemented a cross-sectional research design to examine (1) the predictive effects of perceived risk, fear of COVID-19, and resilience on mental health and (2) the mediating effects of fear of COVID-19 and resilience in the relationship between perceived risk and mental health among emerging adults in Malaysia during the pandemic. This study collected data from the target population at one point in time. One of the reasons for choosing a cross-sectional survey research design was because it is usually used for similar purposes with the present study. A cross-sectional study was commonly utilised to describe a sample of a population (emerging adults) concerning the risk factors (perceived risk and fear of COVID-19), the protective factor (resilience), and the outcome variable (mental health; Levin, 2006). In addition, it was also used when accessing the likelihood of the result of interest among the targeted group at one point in time (during the pandemic) (Mann, 2003). Furthermore, it was predicted that the COVID-19 vaccine will be available in Malaysia in the year 2021 (Chan, 2020) which further strengthened the reason for choosing a cross-sectional design. Thus, complementing the objectives of the current study. Moreover, this research design was chosen because it is cost-effective and allowed the researchers to collect large quantities of data in a short amount of time (Setia, 2016). Additionally, a cross-sectional design permits the use of numerous variables at once (Mann, 2003) which was presented as the predicting and mediating variables in the current study.

Next, this study applied a quantitative and descriptive approach for data collection by distributing a self-administered online survey questionnaire. The quantitative research approach is defined as research that examines variables to obtain scores, and usually, the data

collected are numerical scores that could be analysed and interpreted while descriptive research approach is referring to research intended to obtain a description of the characteristics of a targeted population (Gravetter, 2018). In the present study, self-administered surveys were distributed to the target sample through online platforms (i.e., Instagram, WhatsApp, and Messenger) and IBM Statistical Package of Social Science (SPSS) statistic computer software version 23 was used to analyse the hypotheses quantitatively.

Sampling Method

The sampling approach that was applied in the current study was the non-probability sampling method. Non-probability sampling is defined as a process that does not involve random selection; instead, it majorly relies on the subjective judgement of the researchers (Sharma, 2017). This study chose non-probability sampling because there was no sampling frame (Acharya et al., 2013). More specifically, there was no sampling frame available for the current study which focused on emerging adults in Malaysia. Furthermore, it was not feasible to generate a sampling frame. Thus, the fundamental criteria required for probability sampling were not present.

Under the non-probability sampling, this study used purposive sampling. This technique of sampling involved the selection of the sample based on the research team's decision on the inclusion criteria (Erikan et al., 2015; Etikan & Bala, 2017). More specifically, the inclusion criteria of the present study included the age range of emerging adults which is between 18 and 29 years old (Arnett et al., 2014). Most of them were either students in tertiary education, unemployed, or part of the workforce (Arnett, 2000a; Halfon et al., 2018). Overall, the inclusion criteria comprised of (1) emerging adults, (2) in Malaysia who are (3) either studying, looking for a job, or working. Furthermore, numerous empirical

studies have applied purposive sampling in gathering their data from emerging adults (Aw et al., 2018; Gupta et al., 2020; Ingram et al., 2020; Ting et al., 2020) to save time, cost and was considered more convenient as only individuals who met the inclusion criteria that has been set by the researchers, were recruited (Showkat & Parveen, 2017).

The present study used online survey because of its advantages such as its cost-effectiveness, high efficiency as it required lesser time and manpower, alongside convenience, yet able to reach a large sample size (Shaughnessy et al., 2014). In addition to that, the nature of this data collection was online because COVID-19 poses health risks (Kaur, 2020). Besides, due to the pandemic, emerging adults were scattered geographically with tertiary education being conducted online (Tukiman et al., 2020), those who were unemployed in their respective homes, while many employed emerging adults were working from home (Kaur, 2020). In other words, the location of the sample was not limited to a particular public setting (e.g., university, company) which can be easily accessible. This situation made it unfeasible to conduct a physical paper-and-pen survey. Therefore, online survey was implemented for the data collection. Under this method, a URL link to the online survey was sent to the target sample through social networking sites (SNS) such as Instagram, WhatsApp, and Messenger.

Sample Size

The present study applied two different methods to estimate the minimum sample size required, which were G*Power computer software version 3.1.9.4 and sample size recommended by Field (2019) for sample size calculation. G*Power is a computer software developed by Faul (2014), which consists of four components, including (1) effect size, (2) probability of alpha error, (3) statistical power, and (4) number of predictors. The present

study obtained an average effect size of .33 based on the effect size of .07, .24, and .68 from the past studies (Capone et al., 2020; Kocjan et al., 2020; Satici et al., 2020b), the statistical power of .95, and a probability level of .05 with three predictors. The minimum sample size calculated by using the G*Power software was 56 (refer to Appendix B, p.131).

According to Field (2019), the recommended minimum sample size for a study with statistic power of .8, three predictors, and a large size of effect (.26) is 36 (refer to Appendix B, p.132). The minimum sample size required for this study was obtained by applying the highest calculated minimum sample size based on these two methods, which was at least 56.

According to past researchers (Enders & Peugh, 2004; Kwak & Kim, 2017), the issue of missing data and outliers is normal in a quantitative study. Enders (2003) stated that 15% to 20% of the missing rate is common in a psychological study while Harper et al. (2011) mentioned that 1% to 10% of outliers are common in research studies. Thus, the current study anticipated a maximum percentage of missing data rate (20%) and outliers (10%). As recommended by Salkind (2012), the minimum sample size for the current study was increased by 40% to avoid the issue of lacking valid data. Therefore, the present study required a minimum number of 78 participants.

Participant

The targeted participants were emerging adults within the age group of 18 and 29 years old in Malaysia, who were either still enrolled in tertiary education, finding a job (Arnett et al., 2014; Department of Statistics Malaysia, 2020), or were already part of the workforce (Halfon et al., 2018; Hirschmann, 2020).

Location

The present study was carried out within Malaysia. Data were collected through an online survey with a given link which was circulated to the respondents who met the inclusion criteria, through widely used SNS (e.g., Instagram, WhatsApp, and Messenger).

Procedure

Before data collection for the pilot test and the actual study, the researchers applied for an ethical clearance to include human subjects for the current study from the Scientific and Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman Scientific (refer to Appendix C, p.133).

Pilot Study

A pilot test was conducted before the full study to assess the feasibility of the present study, to identify the potential problem of the research protocol, and to familiarise the researchers with the research procedures (Hassan et al., 2006). The minimum requirement of sample size for a pilot study was 30 (Kieser & Wassmer, 1996). Thus, 30 participants were recruited in the pilot study. Qualtrics, an online survey platform was used to administer the survey. The survey began with an electronic informed consent, followed by demographic details, perceived risk scale, fear of COVID-19 scale, resilience scale, and mental health scale. Before answering the survey, the participants were required to read and respond to the informed consent which was stated on the first page of the questionnaire. Participants were recruited by answering the questionnaire via a survey URL link which was sent through SNS (e.g., Instagram, WhatsApp, and Messenger).

Actual Study

The actual study was conducted by administering the online survey questionnaire and electronic informed consent using Qualtrics to the participants via SNS (e.g., Instagram, WhatsApp, and Messenger). Data analysis and interpretation were completed after data collection by using IBM SPSS Statistics computer software version 23.

Instruments

COVID-19 Perceived Risk Scale (CPRS)

CPRS is a multidimensional scale developed by Yıldırım and Güler (2020) which assesses COVID-19-related personal risk. It was adapted from the eight-item SARS Risk Perception Scale (Brug et al., 2004) and consists of eight items that measure the two dimensions including cognitive and emotional dimensions. For instance, items such as “What is the likelihood that you would acquire the COVID-19?” and “What is the likelihood that you would die from COVID-19?” measure the cognitive dimension while “How worried are you about contracting the COVID-19?” assesses the emotional dimension. A five-point Likert scale is used in rating the scale in which (1=*negligible*) to (5=*very large*) and the total scoring ranges from 8 to 40. A higher total summed-up score indicates a greater COVID-19-related personal risk. The scale suggests adequate internal reliability with a Cronbach’s alpha ranging from .70 to .74 for the cognitive dimension and from .84 to .88 for the emotional dimension (Yıldırım & Güler, 2020). In the current pilot study, the scale reported a highly reliable Cronbach’s alpha value, which is .80, while in the actual study, the scale was also found to have high reliability, which is .79.

The Fear of COVID-19 Scale (FCV-19S)

FCV-19S is a unidimensional scale constructed by Ahorsu et al. (2020) to measure the severity of the fear of COVID-19. The scale includes items such as “I am most afraid of coronavirus-19”, “I cannot sleep because I’m worrying about getting coronavirus-19”, and “My heart races or palpitates when I think about getting coronavirus-19”. This scale consists of seven items rated on a 5-point Likert scale (1=*strongly disagree*, 5=*strongly agree*). The final score of FCV-19S is calculated by summing up the score for each item. The total score ranges from 7 to 35, with higher scores indicating greater fear of COVID-19. The scale demonstrates a good internal consistency with a Cronbach’s alpha of .82 (Ahorsu et al., 2020). Besides, the scale reported a highly reliable Cronbach’s alpha value, which is .89 for both the pilot study and actual study.

The 10-item Connor-Davidson Resilience Scale (CD-RISC-10-item)

The 10-item Connor-Davidson Resilience Scale (CD-RISC-10-item) is developed by Campbell-Sill and Stein (2007) which measures self-perceived resilience level. It is unidimensional and contains 10 items such as “Tries to see humorous side of problems”, “Tend to bounce back after illness or hardship” and “Can stay focused under pressure”. CD-RISC-10-item is assessed with a five-point Likert scale which ranges from 0 (*not true at all*) to 4 (*true nearly all the time*). The total score of the scale can range from 0 to 40, with higher scores indicating higher levels of resilience. The internal reliability of the scale is adequate with a Cronbach’s alpha of .85 (Campbell-Sill & Stein, 2007). In the current pilot study, the scale reported a highly reliable Cronbach’s alpha value, which is .90, while in the actual study, the scale was also found to have high reliability, which is .86.

The Mental Health Continuum Short Form (MHC-SF)

The Mental Health Continuum Short Form (MHC-SF) is developed by Keyes (2005). It is a multidimensional scale derived from Mental Health Continuum Long Form (MHC-LF) and is consisted of 14 items that measure the three subscales including emotional well-being, social well-being, and psychological well-being. There are three items measuring emotional well-being, five items measuring social well-being, and six items measuring psychological well-being. The example of the items for emotional, social, and psychological well-being are “How often did you feel happy?”, “How often did you feel that the way our society works makes sense to you?”, and “How often did you feel confident to think or express your own ideas and opinions?” respectively. MHC-SF uses a six-point Likert scale which ranges from 0 (*never*) to 5 (*everyday*). The scoring of MHC-SF ranges from 0 to 70 with a higher score indicating higher levels of well-being. The scoring is categorised into three subgroups which include flourishing (presence of mental health), moderate (moderately mentally healthy), and languishing (absence of mental health). For the emotional well-being scale, the respondents have to answer 4 (*almost every day*) or 5 (*every day*) at least once, whereas, for social and psychological well-being, the respondents have to answer 4 (*almost every day*) or 5 (*every day*) at least six times to be diagnosed as flourishing. To be diagnosed as languishing, the respondents have to answer 0 (*never*) or 1 (*once or twice a month*) at least once on the emotional well-being scale and at least six times on the social and psychological well-being scale. Respondents who are not categorised under flourishing and languishing fall under the moderate subgroup. The three subscales show a good internal consistency: emotional well-being ($\alpha = .83$), social well-being ($\alpha = .74$), psychological well-being ($\alpha = .83$), and the total scale ($\alpha = .89$; Lamers et al., 2011). In the current pilot study, the scale reported a highly reliable Cronbach’s alpha value, which is .94, while in the actual study, the scale was also found to have high reliability, which is .93.

Data Analyses

Data Cleaning

In the present study, data cleaning was done as a preliminary data analysis in identifying and removing incomplete data or inaccurate records of data to ensure data quality and to increase the accuracy of the findings (Allen, 2017). Data cleaning was done by checking data entry errors, straight-lining data, blank responses, and missing values. The researchers randomly selected some data in Qualtrics and cross-checked it with the data file downloaded from Qualtrics to avoid data entry errors. Straight-lining data is referring to the identical or nearly identical answer given by the respondents, which may diminish the quality of the data (Kim et al., 2020b). Therefore, responses with identical or nearly identical responses across most of the items or all items on the scale were removed. The present study accepted only data with at least 75% completion to minimise the biases (Baruch & Holtom, 2008). In the present study, a total of 196 respondents were recruited. However, only 182 cases were remained after removing 14 cases, including seven cases with irrelevant data (e.g., invalid informed consent, age>29), and seven cases of missing values with less than 75% completion. No straight-lining data and blank response was found in this study.

Descriptive Statistics

Mean, standard deviation, frequency, and percentage were used to analyse the continuous data (e.g., perceived risk of COVID-19, fear of COVID-19, resilience, mental health, and age) in the current study while frequency and percentage were used to analyse the categorical data (e.g., sex and race).

Normality Test

Prior to the actual data analysis, a normality test was conducted to examine the extent to which the sample data fit into a standard normal distribution (bell curve shape; Schinka & Velicer, 2003). The normality indicators included a histogram, quantile-quantile plot (Q-Q plot), skewness, kurtosis, and Kolmogorov Smirnov (K-S) test.

Histogram. The univariate normality was examined through a histogram graph which represented a graphical plot that determined whether the distribution is around its mean or not (symmetrical bell curve shape) to be considered as normally distributed (Oppong & Agbedra, 2016).

Q-Q plot. It is a method that graphically compared two probability distributions by plotting two sets of quantiles including quantiles of a distribution (observed) and quantiles of normal distribution (expected; Das & Imon, 2016). The data can be considered as distributed normally when all the points are allocated nearly on the straight line.

Skewness and Kurtosis. Skewness is a measure of the asymmetry of distribution in which a skew value of zero indicates the distribution of variable is symmetrical. Kurtosis refers to the measure of the peakedness of a distribution in which zero excess kurtosis is characterised as a perfectly normal distribution (Kim, 2013). The data can be considered as distributed normally when the value (skewness and kurtosis) is between -2 to 2.

K-S Test. It is a form of empirical distribution function test used in comparing two data sets that observed distribution and expected cumulative normal distributions and is considered acceptable if the result is non-significant ($p > .05$; Gupta et al., 2019).

Multiple Linear Regression (MLR)

MLR was used for data analysis to determine the linear relationship between multiple independent variables (perceived risk, fear of COVID-19, and resilience) and the dependent variable (mental health) in the present study. All the assumptions of multiple linear regression were studied and tested, which included:

Multivariate Outliers. It is referring to highly influential points in which the big gap between observed outcome value and predicted outcome value has caused the observed outcome value to be over-influential which increases error variance (Osborne & Overbay, 2004; Schmidt & Finan, 2018). The three criteria to measure multivariate outlier are Mahalanobis Distance (MD), Cook's Distance, and Centered Leverage value. MD indicates the distance between a point and a distribution, and it is a common method to be used in detecting multivariate outliers (Algur & Biradar, 2017). Tabachnick and Fidell (2012) suggested that cases with MD more than 16.27 be considered as potential outliers in studies with three independent variables. Cook's Distance is an outlier detection method that combines observation's leverage and residual level, in which Cook's Distance increases when the leverage and residual increases (Cook, 1977). It is used to estimate the influential points during the least square regression analysis (Kannan & Manoj, 2015). The rule of thumb for Cook's Distance suggests that the outliers will be the influential points when the cases are larger than one (Dhakal, 2017). The assumption will be fulfilled when there is no influential case that can cause bias in the model. Moreover, the Centered Leverage value signifies the extent of influence the outcome variable's observed value has over the predicted value. Hoaglin and Welsh (1987) suggested that cases with values of more than the CL value (calculated by $\frac{2(p+1)}{n}$, whereby p indicated the number of independent variables and n represented the sample size) are possible multivariate outliers. To identify cases as

multivariate outliers, the cases should exceed the cut-off value of the two criteria out of three criteria.

Variables Type. Variable type is referring to the distribution of variables into categories of discrete (ordinal or nominal) or continuous (interval or ratio) before analysing the variables (Lutabingwa & Auriacombe, 2007).

Multicollinearity. Multicollinearity is referring to a high correlation among the predictor variables. The assumption is assessed using Variance Inflation Factor (VIF) values which measure the inflation of variance with respect to the correlation between predictors (Bager et al., 2017). The standard error concerning predictors' coefficient will increase when there is a correlation between predictors, causing the variance of predictors' coefficient to inflate (Daoud, 2017). The rule of thumb suggests that a VIF value of 10 or more than 10 (Bager et al., 2017) and a tolerance value that is less than .10 indicate multicollinearity among predictors (Daoud, 2017). As such, multiple regression assumes that the independent variables should not be highly correlated with each other to achieve non-multicollinearity.

Independence of Residuals. It was examined using the Durbin-Watson statistic which is used to measure autocorrelation in residuals (Chen, 2016). Autocorrelation refers to the data correlating with itself over successive time intervals, which will lead to underestimation of standard error causing misconception while deciding significant predictors. The Durbin-Watson test statistics values range from zero to four where the value of two is characterised as no autocorrelation, which aimed to avoid residuals that are not independent of each other. Hence, the closer to two the better it is. The assumption will be met when there is no autocorrelation if the test statistics value falls between the upper critical level and four minus the upper critical value (Sarstedt & Mooi, 2014). Based on the rule of thumb for the Durbin-Watson test, the test statistics value of approximately two is acceptable (Reddy & Sarma, 2015).

Homoscedasticity. It is referring to the residuals which are equally distributed across the regression line with similar variances (Knaub, 2007). Scatterplots were used to check homoscedasticity by plotting the residuals against the outcome variable. It is assumed that homoscedasticity is met when the residuals spread about the line of best fit without bunching together and spreading far apart at some values in the data set (Sarstedt & Mooi, 2014).

Normality of Residuals. It is characterised as a normal distribution of errors which is checked using a scatterplot. Large outliers and the non-linear relationship between predictor variables and outcome variables are the potential causes for non-normality (Sarstedt & Mooi, 2014). The assumption suggests that the points should fall closer to the horizontal line to be normally distributed.

Linearity of Residuals. Scatterplots were used in examining the linearity of residuals. The assumption is met when the scatterplots show a linear pattern (linear model; Casson & Farmer, 2014).

Andrew Hayes PROCESS Macro Model

Andrew Hayes PROCESS Macro Model version 3.5 was used to analyse the mediating effect of fear of COVID-19 and resilience in the relationship between perceived risk of infection and mental health in this study.

Chapter IV

Results

Normality Assumptions

Normality assumptions were assessed using histogram, Quantile-Quantile (Q-Q) plot, Skewness values, Kurtosis values, and Kolmogorov Smirnov (K-S) test.

Histogram

Furthermore, histogram was used to check the normality of distribution. The histogram graph of each variable showed an approximately symmetrical bell-shaped curve, and the distribution is around its mean, which indicated that normality assumption for histogram was achieved (refer to Appendix D, p.135).

Quantile-Quantile (Q-Q) Plot

Moreover, normality was also checked by using a Q-Q plot. This study also indicated that the assumption of normality was achieved as the Q-Q plot of each variable showed that all points were allocated nearly on the straight line (refer to Appendix D, p.138).

Skewness and Kurtosis Values

Next, other tests such as skewness and kurtosis tests were used to test the normality. In the current study, the skewness and kurtosis were considered acceptable as the values fell between -2 and 2, which indicated that the normality assumption for skewness and kurtosis were met.

Table 4.1*Skewness and Kurtosis*

Variables	Skewness	Kurtosis
Perceived risk	.50	.09
Fear of COVID-19	.52	.68
Resilience	1.44	-.90
Mental health	-.60	-1.35

Kolmogorov-Smirnov (K-S) Test

Lastly, the K-S test was used to check normality as well. According to Gupta et al. (2019), the normal distribution is considered acceptable when the result showed a non-significant p -value ($p > .05$). Based on Table 4.2, results showed that the p -value of variables perceived risk, fear of COVID-19, and resilience were smaller than the significance level ($p < .05$), which indicated that the normality assumption was not met. In contrast, mental health showed a non-significant p -value ($p > .05$), which indicated a desirable result (refer to Appendix D, p.140). The normality assumption for the K-S test was not met.

Summary

This study met the normality assumptions for all the tests except the K-S test. According to Peat and Barton (2005), the K-S test is highly sensitive to extreme values. Thode (2002) suggested that the result of the K-S test should not be considered seriously for normality testing due to its low power. Thus, it can be concluded that the data collected in this study is normally distributed since all the normality assumptions were met except the K-S test.

Table 4.2*Kolmogorov-Smirnov (K-S) Test*

Variables	Significant value
Perceived risk	.008
Fear of COVID-19	.005
Resilience	.003
Mental health	.200

Outliers*Univariate Outliers*

The present study applied boxplot to detect the presence of univariate outliers. Two univariate outlier cases were detected, which are cases 55 and 72 (refer to Appendix E, p.141). However, the researchers chose not to remove the univariate outliers as (1) it is normal to have around 5% of outliers (more than two standard deviations) or 0.27% of outliers (more than three standard deviations) as it reflects the population at large, (2) it does not affect the normality of distribution (Aguinis et al., 2013), and (3) it does not damage the results of the present study (Hecht, 1991).

Multivariate Outliers

The present study applied Mahalanobis Distance (MD), Cook's Distance (CD), and Centered Leverage (CL) value to examine multivariate outliers by using the standard deviation of two (refer to Table 4.4). Six cases went beyond the standard deviation of two, indicating potential multivariate outliers. Based on the MD and CD results, the assumption

was not breached as none of the cases surpassed the benchmark of 15, as suggested by Barnett and Lewis (1978) and one, as suggested by Cook and Weisberg (1982) respectively. Moreover, the CL value of 0.0439 was obtained by the calculation $\frac{2(p+1)}{n}$. According to Hoaglin and Welsch (1978), cases with values of more than the CL value such as cases number 62, and 72 suggest potential multivariate outliers. Nevertheless, these cases were not deleted as there were no breaches in MD and CD.

Table 4.4

Multivariate Outliers Test

			Mahalanobis		Centered	
			Case Number	Distance	Cook's Distance	Leverage Value
Group_MO	1	1	62	15.74590	.41477	.08699
		2	72	8.08966	.11559	.04469
		3	90	1.51776	.01569	.00839
		4	107	4.11522	.03144	.02274
		5	116	2.36990	.03678	.01309
		6	166	4.47072	.04369	.02470
	Total N			6	6	6

Descriptive Statistics

Among the 182 respondents, the majority of them were Chinese (90.70%) with an age range from 19 to 29 years old ($M = 23.04$, $SD = 2.42$). Nearly half of the respondents were Buddhist (51.10%), followed by Christian (37.90%), other religion (7.70%), Hindu (2.20%), and Muslim (1.10%). Most of the participants were university students (64.30%), followed by working adults (30.80%) and unemployed adults (4.90%). 41.80% of the participants were males and the remaining were females.

Furthermore, most of the participants had low perceived risk of COVID-19 (54.90%, $n = 100$) and low resilience (51.60%, $n = 94$). Half of the participants had low fear of COVID-19 (50.00%, $n = 91$) and low mental health (50.00%, $n = 91$; refer to Table 4.3).

Table 4.3

Frequency Distribution of Participants' Demographic Variables and Main Variables

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
Age			23.04	02.42
Sex				
Male	076	41.80		
Female	106	58.20		
Race				
Malay	002	01.10		
Chinese	165	90.70		
Indians	006	03.30		
Others	009	04.90		
Religion				
Muslim	02	01.10		
Buddhist	93	51.10		
Christian	69	37.90		
Hindu	04	02.20		
Others	14	07.70		
Employment Status				
Employed	056	30.80		
Unemployed	009	04.90		
Students	117	64.30		
Perceived risk			25.62	05.14
Low (<25.62)	100	54.90		
High (\geq 25.62)	082	45.10		
Fear of COVID-19			19.12	05.87
Low (<19.12)	91	50.00		
High (\geq 19.12)	91	50.00		
Resilience			24.82	05.32
Low (<24.82)	94	51.60		
High (\geq 24.82)	88	48.80		
Mental health			37.45	12.47
Low (<37.45)	91	50.00		
High (\geq 37.45)	91	50.00		

Multiple Linear Regression Assumptions

Variable Types

All variables in the current study consist of continuous variables which are aligned with the assumption of a multiple linear regression analysis where independent variables need to be quantitative or continuous, while the dependent variable must be continuous. Thus, this assumption has been met.

Independent

It is assumed that all the values of the outcome variables are independent (Berry, 1993). This assumption was met as the data collected from participants are independent of each other.

Multicollinearity

Moreover, a non-multicollinearity assumption is required in a multiple regression analysis which shows low correlations between predictors. Thus, Tolerance and Variance Inflation Factor (VIF) were utilized to check this assumption where the cut-off point for tolerance values is greater than .1 (Daoud, 2017) and VIF values lesser than 10 (Bager et al., 2017), indicating the absence of multicollinearity issue. Table 4.5 showed that the assumption of non-multicollinearity was not violated (refer to Appendix G, p.151).

Table 4.5

Collinearity Statistics

	Tolerance	Variance Inflation Factor
Perceived Risk	.774	1.292
Fear of COVID-19	.773	1.294
Resilience	.998	1.002

Independence of Residuals

Furthermore, the independence of residual assumption was accessed by using the Durbin-Watson test. Based on Table 4.6, the result displayed that this assumption was met as the value fell within the acceptable range between one to three, as suggested by Durbin and Watson (1951) (refer to Appendix G, p.151).

Table 4.6

Independent Error Test

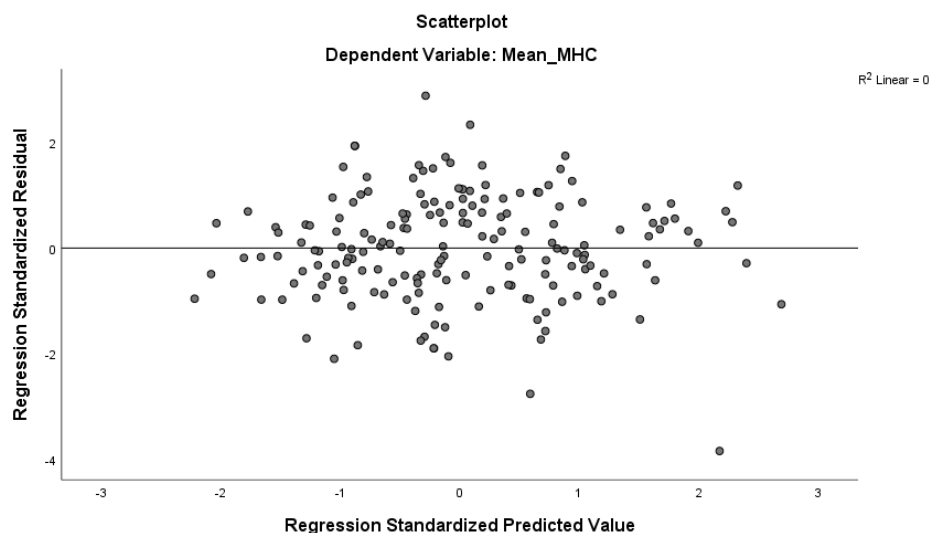
Model	Durbin-Watson
1	2.152

Homoscedasticity, Normality of Residuals, and Linearity of Residuals

Additionally, homoscedasticity, residual normality, and residual linearity were some of the assumptions of multiple linear regression analysis. In Figure 4.1, the scatterplot showed that most of the residuals fell randomly and evenly along the zero line which implies that the three assumptions were met.

Figure 4.1

Scatterplot Showed Homoscedasticity, Normality of Residuals, and Linearity of Residuals among Variables



Multiple Linear Regression Analysis

Multiple regression analysis was used to test if perceived risk, fear of COVID-19, and resilience can significantly predict mental health as all the multiple linear regression assumptions have been met. The model was statistically significant as $F(3, 113.242) = 15.921, p < .001$ and accounted for 19.8% of the variance (refer to Table 4.7). According to Cohen (1988), the value of R^2 greater than .02, .13, and .26 indicates small, medium, and large effect size respectively. Therefore, the model showed a medium effect as the value .198 is greater than .13. Moreover, it was found that resilience significantly and positively predicted mental health ($\beta = .459, p < .001$). However, perceived risk ($\beta = .047, p = .536$) and fear of COVID-19 ($\beta = -.015, p = .844$) were not found as significant predictors of mental health among emerging adults. The results revealed that resilience was the only significant predictor of mental health (refer to Table 4.8, Appendix G, p.152). Therefore, it can be concluded that hypotheses 1 and 2 were not supported while hypothesis 3 was supported.

Table 4.7

Result of Regression Model

	<i>df</i>	<i>F</i>	<i>p</i>	Adj. R^2
Regression	3	15.921	.000	.198
Residual	178			
Total	181			

Note. Dependent Variable = Mental health. Predictors = Perceived risk, fear of COVID-19, and resilience.

Table 4.8

Result of Regression Coefficient

	Std. β	<i>t</i>	<i>p</i>
Perceived risk	.047	.620	.536
Fear of COVID-19	-.015	-.197	.844
Resilience	.459	6.889	.000

Note. Dependent Variable = Mental health.

Mediation Analysis

The current study used Andrew Hayes PROCESS macro with model 4 to test the mediating effect of fear of COVID-19 and resilience on the relationship between perceived risk and mental health. Alwin and Hauser (1975) proposed two measures for calculating the decomposition of effects in path analysis. The first measure is used to calculate the ratio of the indirect effect to the total effect while the second formula is used to determine the ratio of direct effect to the total effect, in which a represents the slope linking the predictor to the mediator, b represents the conditional slope linking the mediator to the outcome, c is the total effect of the predictor to the outcome while c' is the direct effect of the predictor to the outcome before the inclusion of mediator.

$$P_M = \frac{ab}{ab + c'} = \frac{ab}{c}$$

$$1 - P_M = 1 - \frac{ab}{ab + c'} = 1 - \frac{ab}{c}$$

Perceived Risk, Fear of COVID-19, and Mental Health

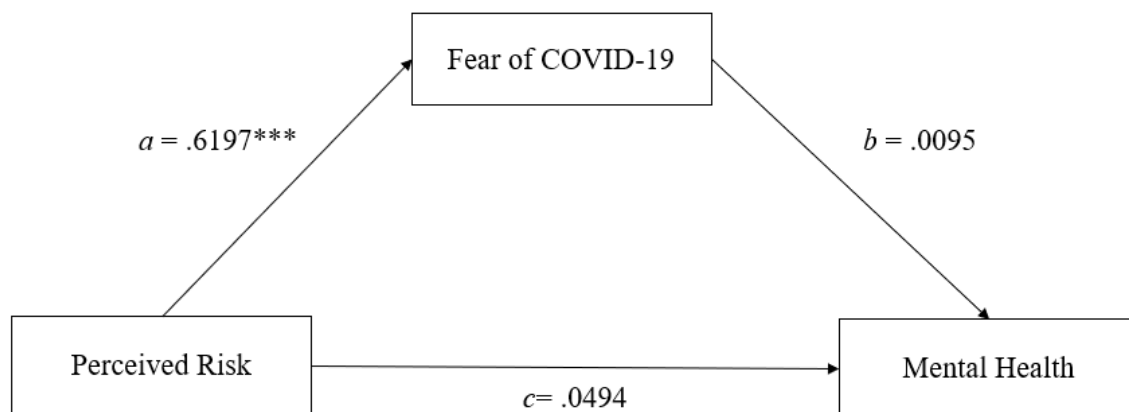
Based on Figure 4.2, the results revealed that perceived risk had a significant effect on fear of COVID-19 ($B = .6197$, $SE = .0856$, $t = 7.2377$, $p < .001$, 95% CI [.4508, .7887], path a). On the other hand, fear of COVID-19 did not have significant effect on mental health ($B = .0095$, $SE = .0902$, $t = .1058$, $p = .9159$, 95% CI [-.1684, .1875], path b). The indirect effect between perceived risk and mental health was insignificant, $B = .0059$, $SE = .0570$, 95% CI [-.1052, .1184]. According to Hayes (2017), the mediation effect exists when the bootstrap confidence interval does not include zero. In the current study, fear of COVID-19 is not a significant mediator between perceived risk and mental health as the bootstrap confidence

interval included zero. The total effect of perceived risk on mental health was not significant as well ($B = .0494$, $SE = .1033$, $t = .4782$, $p = .6331$, 95% CI $[-.1545, .2533]$, refer to Appendix H, p.153). Thus, hypothesis 4 was supported while hypothesis 6 was not supported. Based on the above-mentioned formula, the ratio of the indirect effect to the total effect was .1191 and the ratio of the direct effect to the total effect was .8809.

Figure 4.2

Mediating Effect of Fear of COVID-19 on Perceived Risk – Mental Health

*** $p < 0.001$



Perceived Risk, Resilience, and Mental Health

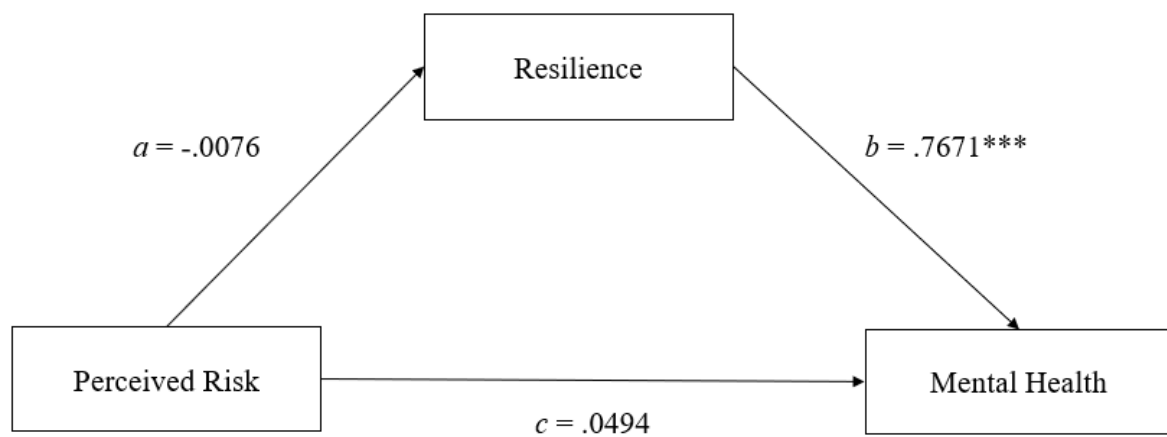
Figure 4.3 showed that perceived risk did not have a significant effect on resilience ($B = -.0076$, $SE = .0618$, $t = -.1234$, $p = .9020$, 95% CI $[-.1295, .1143]$, path a). However, resilience had significant effect on mental health ($B = .7671$, $SE = .1111$, $t = 6.9060$, $p < .001$, 95% CI $[.5479, .9863]$, path b). The indirect effect between perceived risk and mental health was not significant, $B = -.0058$, $SE = .0504$, 95% CI $[-.1110, .0899]$. Besides, the bootstrap confidence interval included zero, showing that resilience is not a significant mediator between perceived risk and mental health. The total effect of perceived risk on mental health

was not significant as well ($B = .0494$, $SE = .1033$, $t = .4782$, $p = .6331$, 95% CI [-.1545, .2533], refer to Appendix H, p.155). Therefore, both hypothesis 5 and 7 were not supported. Based on the above-mentioned formula, the ratio of the indirect effect to the total effect was -.1180 while the direct effect to the total effect was 1.1180.

Figure 4.3

Mediating Effect of Resilience on Perceived Risk–Mental Health

*** $p < 0.001$



Summary of Findings

Table 4.9

Summary of Results

Hypotheses	Decision
H1. Perceived risk negatively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.	Not supported
H2. Fear of COVID-19 negatively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.	Not supported
H3. Resilience positively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.	Supported
H4. Perceived risk positively and significantly predicts fear of COVID-19 among Malaysian emerging adults during COVID-19 pandemic.	Supported
H5. Perceived risk negatively and significantly predicts resilience among Malaysian emerging adults during COVID-19 pandemic.	Not supported
H6. The negative relationship between perceived risk and mental health among Malaysian emerging adults is mediated by fear of COVID-19 during COVID-19 pandemic.	Not supported
H7. The negative relationship between perceived risk and mental health among Malaysian emerging adults is mediated by resilience during COVID-19 pandemic.	Not supported

Chapter V

Discussion

H1. Perceived risk negatively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.

The result does not support the first hypothesis of the current study, indicating that perceived risk does not predict mental health negatively and significantly among Malaysian emerging adults during the COVID-19 pandemic. As such, inconsistent result was found between the current study and the previous studies whereby previous studies claimed that perceived risk negatively predicts mental health (Mækelaë et al., 2020; Yildirim & Güler, 2020b; Zhong et al., 2020). Nevertheless, the current finding is consistent with Germani et al. (2020) who revealed a non-significant predicting effect of perceived risk on psychological maladjustment among emerging adults.

This can be explained by the protection-motivation theory which claims that people tend to participate in protective behaviour as a coping mechanism when the perceived severity or risk is high (Rogers, 1975). In other words, when people are experiencing high perceived risk, they tend to involve themselves in preventive behaviours (e.g., wearing a mask, social distancing, and frequent handwashing). These involvements in preventive behaviours serve as a coping mechanism for people to fight the pandemic and protect their mental health by reducing anxiety and worry which are triggered due to high perceived risk. Fasse and Newby (2020) and Yildirim et al. (2020b) revealed a predicting effect of perceived risk on preventive behaviour. Moreover, Gamma (2019) and Mukhtar (2020) revealed that preventive behaviours are positively associated with mental health.

Besides, the insignificant result can also be explained by cultural context, in which people in collectivistic culture have stronger social connectedness and a sense of belongingness. Social connectedness and a sense of belonging serve as protective factors as they provide a sense of security and increase one's self-efficacy, which they will be protected by the community. This is consistent with Kim et al. (2016) who carried out their study during the Ebola epidemic and found that collectivistic individuals have higher self-efficacy and tend to work together to protect one and another when the perceived risk is high in times of crisis. Malaysia is a collectivistic culture (Ndubisi et al., 2011). Therefore, even though people have higher perceived risk, the social connectedness and sense of belongingness act as a buffer against the perceived risk of infection.

In addition, the inconsistent result obtained in this current study can be due to demographic variables such as age and level of education. Most of the participants (64.3%) in this study are university students and the mean age of the participants is 23.04. Past studies demonstrated that age and level of education are correlated with preventive behaviours, in which young people (Kuper-Smith et al., 2020; Wise et al., 2020) with a higher level of education tend to be more involved in preventive behaviour (Yildirim et al., 2020b), while higher involvement in preventive behaviour leads to better mental health (Vally, 2020). Thus, the significant results that supported the theory that perceived risk negatively predict mental health from many past researchers can be due to the fact that most of the past studies were conducted among adults (e.g., Kim et al., 2020a; Mækela et al., 2020; Malesza & Kaczmarek, 2020; Yildirim & Güler, 2020), suggesting that different age group leads to a different result.

H2. Fear of COVID-19 negatively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.

The second hypothesis is not supported by the findings of the current study in which, fear of COVID-19 does not predict mental health negatively and significantly. Based on the results obtained, the outcome of the current study is not consistent with previous findings which indicated a negative and significant correlation between fear of COVID-19 and mental health (Ahorsu et al., 2020; Fitzpatrick et al., 2020; Zolotov et al., 2020).

According to Lang (1968), fear consists of three components, which are cognitive, behavioural, and physiological. The fear of COVID-19 scale consists of two components of fear which are cognitive and physiological. The cognitive components are shown in items 1, 2, 4, and 5. For example, items such as “I am most afraid of COVID-19” require participants to self-evaluate their level of fear which involves cognition. Physiological components are shown in items 3, 6, and 7. An example of an item is “My hands become clammy when...” The data collected in the current study showed a higher average mean score in emotional components ($M=3.19$, $SD=1.13$) and lower in physiological components ($M=2.13$, $SD=1.02$), indicating a high possibility that people are not experiencing fear but think that they are in fear. People think that they are in fear as the outbreak of the pandemic has lasted for nearly a year. In the past year, people were initially experiencing fear due to uncertainties about the virus itself and their future. However, the level of fear experienced a decrease over time due to the increase of COVID-19 related knowledge and understanding (Bakioğlu et al., 2020).

Besides, the insignificant result obtained in this study can be explained by functional “fear”. According to Ahorsu et al. (2020), the developer of FCV-19S, fear can inhibit individuals to think clearly and react rationally in times of pandemic. Nevertheless, Harper et al. (2020) found that most of the items in FCV-19S are measuring anxiety instead of fear.

Fear and anxiety are different responses as the former inhibits one to take action while the latter prepares one to take action. Anxiety refers to preparatory response in times of ambiguity (McNaughton & Corr, 2008, p44). In this study, a high level of COVID-19 fear (should be a high level of anxiety) motivates one to participate in health protective behaviours. This is supported by Yildirim et al. (2020b) who revealed a positive correlation between fear of COVID-19 and protective behaviours. According to Vally (2020), more protective behaviour leads to better mental health. Therefore, when people are experiencing a high level of “fear” (anxiety), they are encouraged to take health protective measures, which tend to help maintain their mental health.

Moreover, the non-significant effect of fear of COVID-19 on mental health can be explained by the fear-avoidance model which claimed that avoidance behaviour is actionable and serves as a coping mechanism for people to cope with the feeling of fear (Norton & Asmundson, 2003). For instance, protective behaviours such as avoiding public places, dodging people who show symptoms of COVID-19 (e.g., flu, cough, and fever), washing hands with soap, wearing masks, and practicing social distancing, contribute to feelings of security which decrease one’s level of fear. This is further supported by Harper et al. (2020) and Yildirim et al. (2020b), where higher fear is positively correlated with a higher frequency of protective behaviour. According to Vally (2020), more protective behaviour leads to better mental health. Furthermore, during the data collection of the present study, the Movement Control Order (MCO; lockdown) and Conditional Movement Control Order (CMCO) were implemented throughout Malaysia. When the lockdown was implemented, people were requested to stay at home. This also serves as a coping mechanism of fear of COVID-19 by avoiding the pandemic, which then helps to maintain their mental health.

Another possible reason for an insignificant result can be due to the separation of fear of COVID-19 and fear of death. Malaysia has a lower mortality rate of COVID-19 (0.37%) in

comparison to the worldwide mortality rate, which is 3%, and a high recovery rate (95.4%; updated in March 2021). The low mortality rate and high recovery rate further increase one's optimistic bias. Optimistic bias refers to the perception that one's risk is lesser than other's risk (Schwarzer, 1994). In the context of the pandemic, even though one is having a high perceived risk of infection and high fear of COVID-19, the low mortality rate and high recovery rate promote the thinking that they would not be the ones that die due to COVID-19 and COVID-19 is just a more serious version of flu. Besides, Azlan et al. (2020) found a high level of trust in the government on handling the pandemic (90%), low level of uncertainty among Malaysians (14%) which is associated with lower knowledge about the virus. All these provide a sense of security to the people that they will not die due to the virus as they have less knowledge about the COVID-19. In addition, the insignificant result can be explained by the high level of trust from Malaysians in the healthcare system, indicating that people are afraid of the virus, but not afraid of death (Ipsos, 2020). Thus, explaining why a high level of fear has little influence on mental health.

Furthermore, the significant predicting effect obtained by past researchers can be due to the data collection timing, where at the beginning of the COVID-19 outbreak, people have poorer mental health due to environmental factors such as high uncertainty, instead of a single factor of fear. Their mental health is improving over time as the level of uncertainty drops (Azlan et al., 2020).

H3. Resilience positively and significantly predicts mental health among Malaysian emerging adults during COVID-19 pandemic.

The result of the present study supported the third hypothesis in which, resilience was found to be significantly and positively associated with mental health. This suggests that

individuals with higher resilience tend to have better mental health than those who have lower resilience. Therefore, findings in the present study have shown to be in accordance with the past studies (Barzilay et al., 2020; Blackmon et al., 2017; Gao et al., 2017; Morales-Vives et al., 2020; Osofsky et al., 2011; Poudel-Tandukar et al., 2019; Rudwan & Alhashimia, 2020). Particularly, Osimo et al. (2021) found individuals with higher resilience responded well emotionally to the pandemic and suggested that resilience is able to protect an individual from unpleasant emotional distress as a result of the pandemic. In other words, resilience plays the role of a defence mechanism against the progression towards mental issues and helps bounce back or maintain good mental health during times of adversities (Davydov et al., 2010; Fergus & Zimmerman, 2005).

This result can be credited to how Malaysian emerging adults perceive themselves to be. In the present study, the majority of the emerging adults saw themselves as someone who is capable, strong, optimistic, and able to handle life's challenges that go their way. These attributes contribute to one's resilience and reflect high self-esteem which instinctively leads to good mental health (Keliat et al., 2019). This is further supported by Benetti et al. (2006) and Bonanno (2004) suggesting that resilience, through positive emotions, gives rise to improve self-esteem and effective resistance towards unpleasant stressors, leading to successful adaptability and better mental health. Another possible explanation could be related to the collectivistic culture of Malaysia (Tan et al., 2017) where social support is a norm that promotes resilience (Southwick et al., 2016). Thus, shaping the way an individual evaluates an event which then determines a series of coping strategies to deal with stressful incidents and mental sufferings (Fletcher & Sarkar, 2013; Poudel-Tandukar et al., 2019). For instance, many Malaysians dealt with the pandemic, especially when the implementation of lockdown was announced, by travelling back to their hometown to be with their families as a coping mechanism (Radhi, 2020). This action suggests that family symbolizes refuge for

many when faced with adversities (Crocetti & Meeus, 2014). A similar finding was found among Italian emerging adults (Germani et al., 2020) who are collectivistic which is akin to the Malaysian culture (Tan et al., 2017).

H4. Perceived risk positively and significantly predicts fear of COVID-19 among Malaysian emerging adults during COVID-19 pandemic.

The results of the present study have shown evidence supporting the hypothesis that perceived risk significantly and positively predicts fear of COVID-19. This indicates that individuals with higher perceived risk are more likely to have a higher level of fear concerning COVID-19. The result is in line with several prior studies (Ahorsu et al., 2020; Germani et al., 2020; Li et al., 2020a; Li et al., 2020b; Mertens et al., 2020; Yildirim et al., 2020a). A possible reason could be the upsurge in COVID-19 cases when the researchers were collecting data (9th January 2021 until 6th February 2021), where cases were increasing each day by the thousands (Nurhayati-Wolff, 2021; Statista). The data as of the 31st January 2021 from the *Kementerian Kesihatan Malaysia* (2021a) showed that the number of COVID-19 cases was rising in each state, where Selangor had reached a total number of COVID-19 cases of 67,934, Sabah with 48,868 cases, Kuala Lumpur with 25,601 cases, Johor with 21,558 cases, Negeri Sembilan with 11,650, Pulau Pinang with 7,848 cases, Perak with 6,107 cases, Kedah with 5,786 cases, Sarawak with 4,450 cases, Melaka with 3,575 cases, Kelantan with 3,251 cases, Pahang with 2,984 cases, Labuan with 2,147 cases, Terengganu with 2,142 cases, Putrajaya with 882 cases, and Perlis with 176 cases. This increases the perceived risks of contracting COVID-19 as community transmission was on the rise nationwide. Naturally, individuals would develop a fear of COVID-19 due to the adverse effects of it such as death (Ling, 2021).

Another possible reason could be due to the overload of COVID-19 related information which is widely accessible through the internet. For example, updates on the COVID-19 cases counts were reported daily (*Kementerian Kesihatan Malaysia*, 2021b) and news on the announcements of measures needed to be taken by the citizen (e.g., tighter standard operating procedure or the implementation of different forms of lockdown such as conditional movement control order and recovery movement control order; Yusof & Krishnan, 2021). As such, the constant exposure to COVID-19 related news led to higher knowledge on the seriousness of contracting COVID-19 (Germani et al., 2020; Liu et al., 2020). As a result, forming higher risk perception and subsequently higher fear of COVID-19. Furthermore, the significant result can also be attributed to the collectivistic culture of Malaysia (Tan et al., 2017), which was linked to higher perceived risk (Germani et al., 2020). This is because collectivistic culture emphasises interconnectedness and values group identity. Thus, individuals from a collectivistic culture are more prone to be concerned about their family members being infected (Mertens et al., 2020) or infecting their family members (Germani et al., 2020). As such, instilled higher perceived risk for themselves and others, leading to fear of COVID-19. This can be seen in the recent Chinese New Year festival where strong measures were taken by the government by implementing interstate and inter-district ban weeks before the festival. This prohibited many from returning to their hometowns for the celebration (Mah, 2021). However, the citizens complied to the law, knowing that the ban is for the good of their own family members, the community, and the country.

H5. Perceived risk negatively and significantly predicts resilience among Malaysian emerging adults during COVID-19 pandemic.

The finding of this study does not support the fifth hypothesis of this study, indicating that perceived risk does not negatively and significantly predict resilience. This is inconsistent with past studies (e.g., Forrest-Bank et al., 2015; Son et al., 2020) which obtained a significant negative correlation between psychological variables (perceived risk of infection, perceived stress) and resilience (Prime et al., 2020; Shanahan et al., 2020).

One possible explanation for the nonsignificant result obtained in this study is due to the presence of confounding variables of resilience. For example, Ferreira et al. (2020) revealed a positive and significant predicting effect of age and education on resilience during the pandemic, while Willis and Burnett (2016) found a negative predicting effect of perceived stress on resilience. Besides, Killgore et al. (2020) found that exercise, frequency of prayer, family and social support positively predicted resilience. On the other hand, personality traits such as low neuroticism, high extraversion, and conscientiousness determine high resilience (Campbell-Sills et al., 2006). All these variables play a more significant role in predicting resilience compared to perceived risk. Thus, an insignificant result is obtained in this study as all these variables were not held constant.

Furthermore, the inconsistent result can be explained by the data collection timing, where most of the past studies were conducted at the beginning of the COVID-19 outbreak while the data of the current study were collected nearly a year after the COVID-19 outbreak. This is because individuals' resilience increases over time when they are continuously facing aversive events or continuously living under stress. This is supported by Bonanno (2004) and Bonanno et al. (2008) who carried out their study during the SARS outbreak and found a significantly higher resilience among SARS survivors than those who did not suffer from

SARS. This is because when people are living in an aversive environment or having a high level of perceived risk for a long period of time, their resilience will be triggered, which helps them to cope with the perceived risk as it is human's nature to stay alive. However, most of the past studies which obtained a significant negative result between perceived risk and resilience were carried out as soon as the COVID-19 outbreak occurred (e.g., Son et al., 2020; Yildirim et al., 2020a). At the beginning of the COVID-19 pandemic, people do not have enough time to develop resiliency, thus explaining why past studies obtained a negative correlation between perceived risk and resilience.

H6. The negative relationship between perceived risk and mental health among Malaysian emerging adults is mediated by fear of COVID-19 during COVID-19 pandemic.

The outcomes of the current study did not support the sixth hypothesis. This indicates that fear of COVID-19 was found to have no mediating effect in the relationship between perceived risk and mental health, where fear of COVID-19 was found to be a non-significant predictor of mental health. However, a significant positive correlation was found between perceived risk and fear of COVID-19. The current study yielded inconsistent results with prior studies which showed successful replications of results supporting the notion that fear of COVID-19 mediates the association between perceived risk and mental health (Ahorsu et al., 2020; Robertson & Stewart, 2004; Yildirim et al., 2020a).

The insignificance of fear of COVID-19 as a mediator between perceived risk and mental health can be attributed to the following reasons. Firstly, the fatality of the COVID-19 virus is fairly low, especially for those in the age range of 18 to 29 years old (Scott, 2020). Secondly, individuals in the age group of 18 to 29 years old are more affected by other types

of fears. These include the postponement of public examination such as the “*Sijil Pelajaran Malaysia*” and “*Sijil Tinggi Persekolahan Malaysia*” (Menon, 2020), the adaptation into online teaching and learning of colleges and universities (Solhi, 2020), as well as the uncertainty in the job market (Hani, 2020). Thirdly, all preventive measures such as washing hands, maintaining social distance, and wearing masks in public places, can be easily carried out which in turn gives a sense of security and self-protection. This is the result from the adoption of negative affect and heightened risk perception as suggested by the behavioural immune system theory (Terrizzi Jr et al., 2013). Overall, the relationship between perceived risk and mental health is not mediated by fear of COVID-19 as emerging adults are more worried and afraid of other issues instead of the COVID-19 pandemic.

H7: The negative relationship between perceived risk and mental health among Malaysian emerging adults is mediated by resilience during COVID-19 pandemic.

The last hypothesis of this study was not supported. This result is inconsistent with past researchers (Catabay et al., 2019; Wang et al., 2018) who revealed the mediating role of resilience in the relationship between psychological variables (perceived stress) and mental health. However, the result of the current study is consistent with Yildirim et al. (2020a) who found that resilience does not mediate the relationship between perceived risk and mental health. Besides, a non-significant negative correlation was found between perceived risk and resilience, reflecting that perceived risk has no influence on resilience.

According to Fraser et al. (1999), perceived risk has a neutral or less effect on resilience when the perceived risk is low. On the other hand, it has a greater influence on resilience when the perceived risk is high, suggesting that perceived risk is not always negatively correlated with resilience. In the current study, most of the participants were

experiencing low to moderate perceived risk ($M=3.20$, $SD=1.01$). Resilience has a buffering effect on the relationship between perceived risk and mental health. When one is experiencing high perceived risk, resilience helps to buffer the negative effect of perceived risk on mental health. Nevertheless, when one is having low perceived risk, there is nothing need to do with resilience as low perceived risk does not affect one's mental health. Thus, explaining why resilience failed to mediate the relationship between perceived risk and mental health in the current study.

Implication

Theoretical Implication

The current study adopted the Stimulus-Organism-Response (SOR) model by Mehrabian and Russell (1974) to examine (1) the predicting effects of perceived risk, fear of COVID-19, and resilience on mental health and (2) the mediating effects of fear of COVID-19 and resilience in the relationship between perceived risk and mental health. However, the non-significant findings of the mediating effects in the current study imply that the SOR model has low applicability to psychological research during the pandemic. One possible reason could be due to the complexity of human cognition and psychological responses, which is hardly explained by the selected predictors and mediators. In the current study, the mediator, fear of COVID-19 (organism) has no influence on an individual's mental health (response), while perceived risk (stimulus) has no influence on an individual's resilience (organism). This is because psychological responses involve multiple variables. For instance, mental health is influence by stress (Li et al., 2020a; Limcaoca et al., 2020), lockdown (Amerio et al., 2020; Mucci et al., 2020; Rossi et al., 2020), and economic crisis (Cerami et al., 2020; Peppou et al., 2020). Thus, this study contributes to the theory by suggesting that

the SOR model is more applicable to study a simple effect on a behavioural mechanism, rather than a complex study with multiple potential confounding variables.

Besides, the insignificant result in the current study implies that the SOR model is more applicable to well-studied variables instead of less-studied variables such as resilience as the mediator between perceived risk and mental health during the COVID-19 pandemic in this study. This is because the SOR model only offers one organism as the mediator of stimulus to response. It is more applicable for variables that have been studied extensively by prior researchers as the working mechanism of the predictor (stimulus) on the outcome variable (response) is well understood. In the current study, the role of resilience as a mediator during the pandemic is less studied by past researchers. In addition, the outbreak of the COVID-19 pandemic only happened a year ago, which means that there are limited existing literature. Therefore, the current study contributes to the SOR model by suggesting its applicability to a relationship in which the working mechanism is more studied.

Furthermore, the current study contributes to the theory by implying that it is more applicable for the stimulus with a stable predicting effect on the organism and for the organism with a stable predicting effect on the response. The insignificant result of the stimulus (perceived risk) on the organism (resilience) is due to the highly changeable nature of these variables as they can be easily influenced by other environmental factors. The inconsistent findings obtained for perceived risk and resilience reflect the presence of confounding variables such as demographic variables (age and education), exercise, and personality traits on the predicting effect of perceived risk on resilience. In addition, the current study suggests that the model is only applicable when the environmental factors (stimulus) are associated with feelings and emotions or able to stimulate the internal state of an individual (organism; e.g., Islam et al., 2020; Song et al., 2020).

Practical Implication

The present study is able to contribute to the current research field by suggesting that perceived risk has little or no influence on mental health among Malaysians, which is inconsistent with many of the past findings. Hence, the government, media, and mental health workers can allocate more attention on other possible factors which could affect the mental health of emerging adults. Besides, the inconsistent findings can draw more researchers to further study the possible explanation, which serves as a new source to the literature field.

Besides, the findings of the current research suggest that more focus can be allocated to other factors which could lead to poorer mental health. The findings of the current study help in changing the intervention programme or therapeutic approaches which are focusing on perceived risk and fear of COVID-19 as it might be less applicable in the Malaysian context. In addition, the current study provides evidence for the predicting role of resilience on mental health, which can encourage healthcare professionals to develop resilience-based interventions to improve the public's mental health. For instance, Heath et al. (2020) developed a resilience-based intervention programme for front-line healthcare workers by increasing their resiliency to prevent burnout or deterioration of mental health. The intervention programme summarises the available strategies to increase individuals' resilience, which includes self-care (exercise, social support, and sleep hygiene), emotional health (mindfulness practice), and meaningful work (small group sharing and reflective counselling). By referring to the above intervention programme, healthcare professionals can modify it or even develop their own intervention programme which is well-suited in the Malaysian context for the public.

Limitations of Study

Like any other study, the present research has its own set of limitations that need to be addressed. Firstly, the focused population of the present study included only emerging adults. As such, the findings of the current study cannot be generalized to all populations across other life stages such as infancy, early childhood, adolescence, middle adulthood, and later adulthood. This is because individuals from different stages of life differ in various ways such as mindset and approaches to negative situations (Charles & Carstensen, 2008). For example, younger individuals are more likely to be affected and easily angered by negative judgement towards them, as compared to older individuals. Thus, emphasising that the generalisability of the finding is constrained to only emerging adults.

Secondly, the present study was conducted in a Malaysian setting which limits the generalisability across countries due to the differences in culture. This can be observed through the lens of the 6-D model of national culture, proposed by a social psychologist called Geert Hofstede. The model is made up of six dimensions of culture, namely, power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence. For example, when compared to Malaysia with the United States, Malaysia showed greater power distance, collectivism, and a long-term orientation, while the United States showed higher individualism, masculinity, uncertainty avoidance, and indulgence (Hofstede Insights, n.d.). The differences in culture can also be seen when compared to other countries. Therefore, the generalizability across countries is limited.

Thirdly, the data of the present study was collected amidst the rise in COVID-19 cases, during the lockdown in the form of movement control order which took effect nationwide. Because of this, the findings of this study may not be generalisable to other countries as every countries' lockdown differs ("Coronavirus: The lockdown debate in other

countries”, 2020). For instance, in France, a curfew was imposed on everyone including shops and businesses, closed borders to non-EU countries, and weekend measures implemented in certain areas. While in Germany, lockdown has been lifted with rules and regulations in place, such as the mandatory use of clinical masks in public places and the banned of home-made cloth masks or shawls as face coverings (“Covid: How are European countries tackling the pandemic?”, 2021). Thus, highlighting the difference in lockdown measures in different countries which limits the generalisability of the findings of this study.

Next, this study employed a cross-sectional research design that records the responses among emerging adults at only one point in time (Loh et al., 2019). However, the predictors (perceived risk, resilience, and fear of COVID-19) and dependent variable (mental health) in the present study may be influenced by the instability of COVID-19 cases when the data was collected. For instance, towards the end of the year 2020, the COVID-19 cases were under control after undergoing many forms of lockdown (e.g., movement control order, conditional movement control order, and recovery movement control order). However, due to a single incident in Sabah (i.e., election), the number of COVID-19 cases rose rapidly through community transmission (Geraldine, 2020). In addition, the absence of COVID-19 vaccine in the year 2020 and the presence of vaccine in the year 2021, may also influence the participant’s responses. For instance, an individual may score lower on the Fear of COVID-19 scale due to the knowledge and assurance of the vaccine, as compared to if the vaccine was not available.

Lastly, the results from the present study showed that only 19.8% of the predictors accounted for the variances in mental health which is relatively low. This is because two out of three predictors (i.e., perceived risk and fear of COVID-19) were found to be insignificant. In addition to that, the fear of COVID-19 and resilience were also found to be non-significant mediators in the relationship between perceived risk and mental health. This indicates that

there are still other factors that could influence Malaysian emerging adult's mental health during the COVID-19 pandemic.

Recommendations of Study

There are a few recommendations for future studies to address the limitations of the present study. Firstly, the constricted generalisability of findings to only emerging adults can be addressed by conducting another study involving a balanced ratio of individuals from different stages of life. This allows the sample of future studies to be more wholesome, which increases the generalisability of results. Secondly, the issue of limited generalisability across countries due to differences in culture and lockdown forms can be tackled by conducting cross-country research. This involves the collection of data from various countries (Loh et al., 2019), taking into consideration each country's attributes such as culture, environmental factors, policies, and the extent of lockdown and precaution measures that may influence the response of participants. Therefore, conducting cross-country research may widen the scope of the finding's generalisability.

Thirdly, to address the limitation of cross-sectional research design where it shows the opinion of respondents from only one specific point of time (Mann, 2003), the present study suggests for future studies to adopt a longitudinal approach. This is because longitudinal study allows researchers to collect data repeatedly over a period of time to make a comparison of data and follow changes (e.g., number of COVID-19 cases) which may yield results that reflect more accurately within the same cohort. For instance, researchers may be able to identify the influence of COVID-19 cases on the findings after data collected from a period with low COVID-19 cases and high COVID-19 cases respectively, within the same sample. In addition, a longitudinal study also allows researchers to determine the sequence of

events, eliminates recall bias in respondents, and able to be flexible with cohort effect (Caruana et al., 2015).

Lastly, it is undeniable that the COVID-19 pandemic has affected millions of lives worldwide and plays a significant role in influencing one's mental health through various ways (e.g., loss of job due to the economic downturn, deteriorating health, and quarantine). Since the COVID-19 outbreak occurred recently, there are limited literature available relating to the COVID-19 pandemic, specifically among emerging adults. As such, future studies should consider other contributing factors to mental health as variables presented in the current study yielded low significant findings. Other potential predictors may include self-esteem, hope, positivity, social support, and perceived knowledge.

Conclusion

In summary, the current study supported (1) the third hypothesis, in which resilience positively and significantly predicts mental health among Malaysian emerging adults during the COVID-19 pandemic, and (2) the fourth hypothesis, in which perceived risk positively and significantly predicts fear of COVID-19 among Malaysian emerging adults during the COVID-19 pandemic. However, perceived risk and fear of COVID-19 do not significantly predict mental health. In the mediation analysis, Andrew Hayes PROCESS macro model was used to study the mediating effects of fear of COVID-19 and resilience, which were found to be insignificant mediators in the relationship between perceived risk and mental health. The present finding indicated that high perceived risk predicts high fear of COVID-19, which suggests that risk and fear are not separable. Besides, higher levels of resilience resulted in better mental health which suggests the role of resilience as a protective factor of better mental health during the pandemic.

Thus, this study has provided a clearer understanding on the predictor of better mental health, which could be of help in providing intervention programs to build better mental health among emerging adults in the future. Besides, the findings also help the mental healthcare workers to pay less attention to perceived risk as a risk factor of poor mental health and pay more attention to other possible factors during the pandemic. Lastly, the present study can contribute by acting as a reference point for future researchers who wish to examine the perceived risk, fear of COVID-19, resilience, and mental health in a collectivistic and multicultural country such as Malaysia.

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Appendix A

Questionnaire



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Default Question Block

PERSONAL DATA PROTECTION STATEMENT

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

Notice:

1. The purposes for which your personal data may be used are inclusive but not limited to:-
 - For assessment of any application to UTAR
 - For processing any benefits and services
 - For communication purposes
 - For advertorial and news
 - For general administration and record purposes
 - For enhancing the value of education
 - For educational and related purposes consequential to UTAR
 - For the purpose of our corporate governance
 - For consideration as a guarantor for UTAR staff/ student applying for his/her scholarship/ study loan

2. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when

disclosure is necessary to comply with applicable laws.

3. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

4. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

1. By submitting this form you hereby authorise and consent to us processing (including disclosing) your personal data and any updates of your information, for the purposes and/or for any other purposes related to the purpose.

2. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

3. You may access and update your personal data by writing to us at:

- Glory Ho Lee Lin glory991227@1utar.my
- Esther Low Mei Jen estherlow@1utar.my
- Erika Liew Wye Keet erikaherondale99@1utar.my

Acknowledgment of Notice

- I have been notified by you and that I hereby understood, consented and agreed per UTAR above notice.
- I disagree, my personal data will not be processed.

Participants' Personal Demographic**Section A**

Age:

Gender:

- Male
- Female

Race:

- Malay
- Chinese
- Indians
- Others

Religion:

- Muslim
- Buddhist
- Christian
- Hindu
- Others

Employment Status:

- Employed
- Unemployed
- Student

COVID-19 Perceived Risk Scale

Section B

Please read each of the following statement and choose an answer that best describes you.

	1 (Negligible)	2	3	4	5 (Very Large)
1. What is the likelihood that you would acquire the COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. What is the likelihood that you would acquire the COVID-19 compared to other persons?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. What is the likelihood that you would catch other diseases (e.g., diabetes/asthma)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. What is the likelihood that you would die from the COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. How worried are you about contracting the COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. How worried are you about a family member contracting the COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. How worried are you about the COVID-19 occurring in your region?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. How worried are you about the COVID-19 emerging as a health issue?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fear of COVID-19 Scale

Section C

Please respond to each item by ticking (✓) one of the five (5) responses that reflects how you feel, think or act toward COVID-19.

	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. I am most afraid of coronavirus-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. It makes me uncomfortable to think about coronavirus-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. My hands become clammy when I think about coronavirus-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I am afraid of losing my life because of coronavirus-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. When I watch news and stories about coronavirus-19 on social media, I become nervous or anxious.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I cannot sleep because I'm worrying about getting coronavirus-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. My heart races or palpitates when I think about getting coronavirus-19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Connor-Davidson Resilience Scale

Section D

Please indicate how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

	0	1	2	3	4
	Not true at all	Rarely true	Sometimes true	Often true	True nearly all the time
1. I am able to adapt when changes occur.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I can deal with whatever comes my way.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I try to see the humorous side of things when I am faced with problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Having to cope with stress can make me stronger.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I tend to bounce back after illness, injury, or other hardships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I believe I can achieve my goals, even if there are obstacles.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Under pressure, I stay focused and think clearly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I am not easily discouraged by failure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I think of myself as a strong person when dealing with life's challenges and difficulties.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. During the past month, how often you have experienced or felt that **people are basically good**.

8. During the past month, how often you have experienced or felt that **the way our society works makes sense to you**.

9. During the past month, how often you have experienced or felt that **you liked most parts of your personality**.

10. During the past month, how often you have experienced or felt **good at managing the responsibilities of your daily life**.

11. During the past month, how often you have experienced or felt that **you had warm and trusting relationships with others**.

12. During the past month, how often you have experienced or felt that **you had experiences that challenged you to grow and become a better person**.

13. During the past month, how often you have experienced or felt **confident to think or express your own ideas and opinions**.

14. During the past month, how often you have experienced or felt that **your life has a sense of direction or meaning to it**.

Block 6

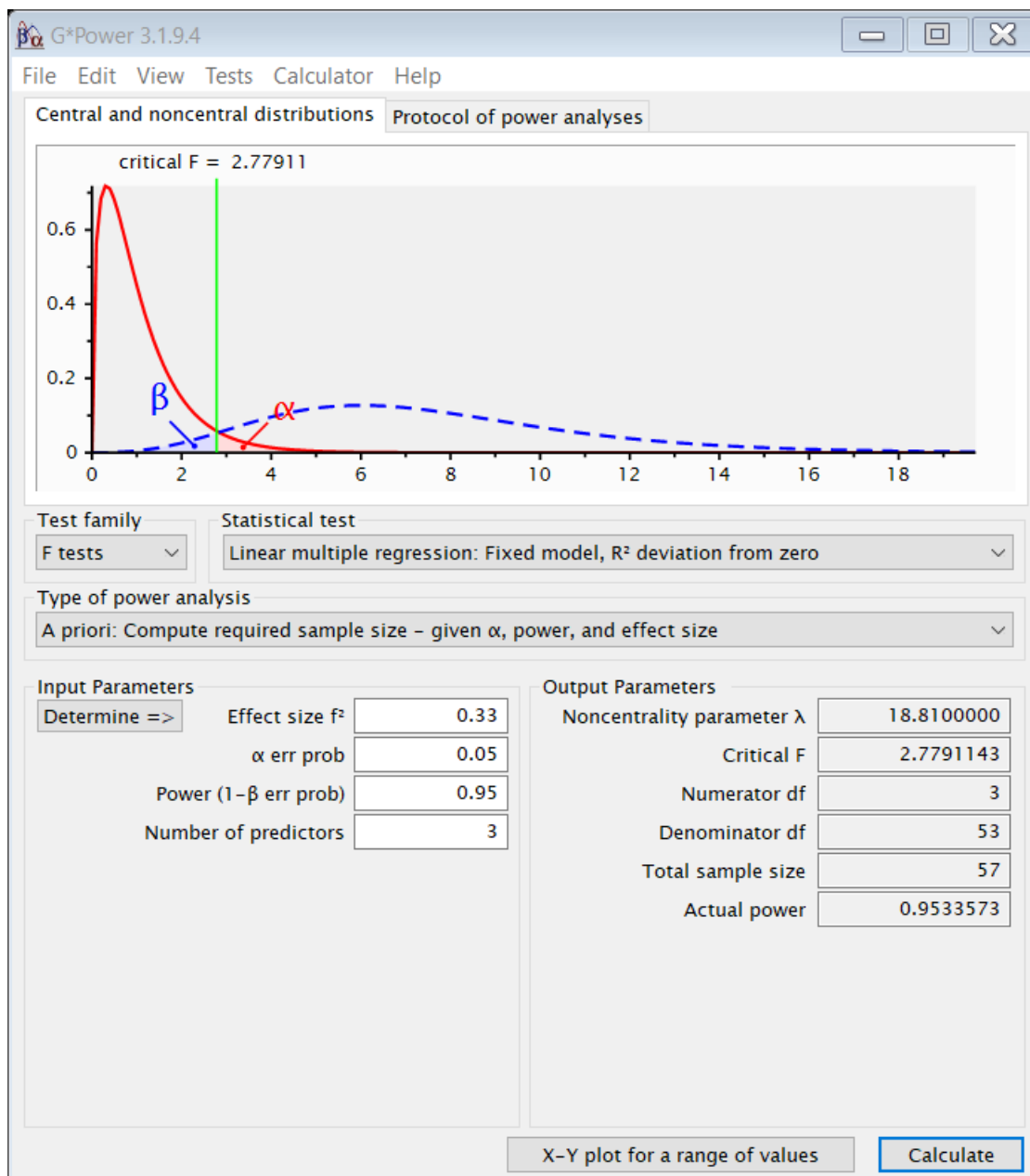
If you find yourself struggling with mental health issues, you may contact the hotlines below to seek for help and emotional support:

Mental Health Services	Hotline Numbers	Address
Befrienders Malacca	(06) 284 2500	No.364K, Jalan Low Hee Kong, City, 75050 Ujong Pasir, Malacca.
Befrienders Penang	(04) 281 5161 (04) 281 1108	Mewah Court, Blok 104 – 1A, Jalan Tan Sri The Ewe Lim, Jelutong 11600, Pulau Pinang.
Befrienders Kuala Lumpur	(03) 7956 8144 (03) 7956 8145	No. 95, Jalan Templer, Petaling Jaya 46000, Selangor Darul Ehsan.
Befrienders Ipoh	(05) 5477933 (05) 5477955	No.8, Jalan Sybil Karthigasu, Fair Park, Perak, 31400 Ipoh.
Lifeline Association of Malaysia	011-3157 1495 016-720 1495 (CMCO Period) 03-4265 7995 (Non-CMCO Period)	No. 1-3, 3rd Floor, Jalan Jelatek 1, Pusat Perniagaan Jelatek, Setiawangsa, 54200 Kuala Lumpur.

Appendix B

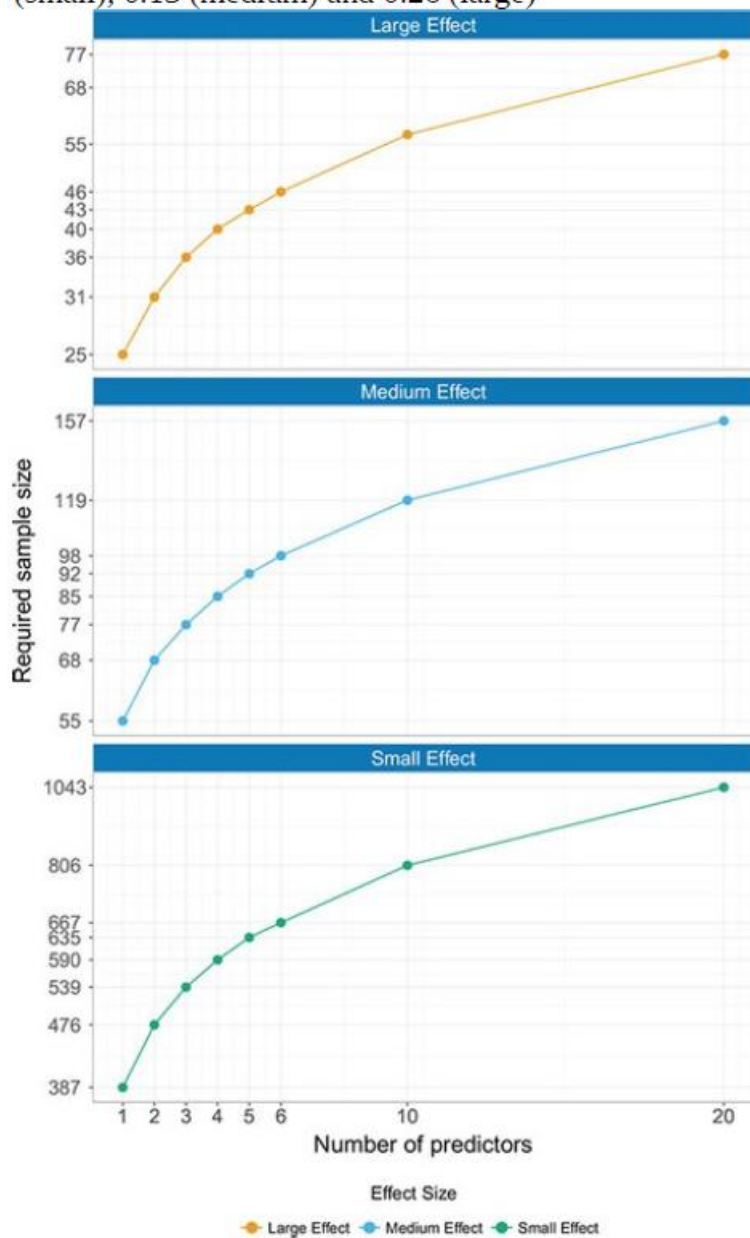
Sample Size Calculation

G*Power



Field (2019)

Figure 9.9 The sample size required to test the overall regression model depending on the number of predictors and the size of expected effect, $R^2 = 0.02$ (small), 0.13 (medium) and 0.26 (large)



Appendix C

Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman Scientific



UNIVERSITI TUNKU ABDUL RAHMAN

Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/212/2020

24 December 2020

Dr Chie Qiu Ting
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 Chie,

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.	Relationship Between Academic Procrastination, Coping and Sense of Coherence Among Undergraduates in Malaysia	1. Leela a/p Murugan 2. Loo Ling Qian 3. Tan Man Ting	Dr Siah Poh Chua	24 December 2020 - 23 December 2021
2.	Perfectionism, Coping Styles and Academic Adjustment: Their Relationships Among UTAR Kampar Undergraduates	1. Ang See Sin 2. Phi Chean Ni 3. Tan Kok Wei		
3.	Perceived Risk, Fear Of COVID-19, And Resilience on Mental Health Among Malaysian Emerging Adults	1. Erika Liew Wye Keet 2. Esther Low Mei Jen 3. Glory Ho Lee Lin	Ms T'ng Soo Ting	
4.	Perceived Threat of Covid-19, Resilience and Coping Strategies as Predictors of Subjective Well-Being Among Emerging Adults in Malaysia	1. Low Yi Lin 2. Siew Yi Hang 3. Wong Chin Leong		
5.	Work-life Balance, Social Connectedness and Mental Health Among Working Adults in Malaysia	1. Esther Ling 2. Ngoo Ee Ling 3. Tan Sin Yuan	Dr Chuang Huei Gau	
6.	The Role of Music on the Levels of Stress and Anxiety Among Malaysian University Students During the COVID-19 Pandemic	1. Loo Jia Qi 2. Venosha a/p Palanimuthu 3. Yong Si Yann		
7.	Exploring the Experiences of Prosociality Among Young Adult Players in Single Player Role-Playing Video Games	1. Chan Hem Dee 2. Mangelaswary a/p Kovindan, 3. Tan Chor Sheng	Dr Kok Jin Kuan	
8.	The Effect of Pet on the Development of Social Relationship Among Pet Owners	1. Chong Pei Yee 2. Chung Pei Rou 3. Ng Shing Sian		

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia
Tel: (603) 468 8888 Fax: (603) 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



No	Research Title	Student's Name	Supervisor's Name	Approval Validity
9.	The Relationship Between Self-esteem, Social Support and Suicidal Ideation Among Undergraduates in Malaysia	1. Caris Chong Kai Yi 2. Chew Pei San 3. Mah Ming Chun	Dr Pung Pit Wan	24 December 2020 - 23 December 2021
10.	Perceived Stress and Self Control as Predictors of Aggression Among Young Adults in Malaysia	1. Eric Lim 2. Lim Ying Sing 3. Sabrina Lee Yuan Min		
11.	The Impact of Motivation at the Workplace on Employee's Performance During Covid-19 Pandemic: A Qualitative Research	1. Abigail Beh Hui Ci 2. Amirah Fairuz binti Zulkhiplee 3. Anusiyah a/p Simmasalam	Ms Lee Wan Ying	
12.	Young Adults' Opinions of Domestic Violence Against Men in Malaysia: Risk Factors and Barriers in Seeking Help	1. Dharshini a/p Jeyandran 2. Patricia Pereira a/p Patrick Joseph Pereira 3. Uthes Kumar a/l Thana Balan		
13.	The Association Between Flexible Working Arrangements and Well being of Young Working Adults in Malaysia: Moderated by Gender	1. Lou Shi Lin 2. Ruibhini a/p Subramaniam 3. Yashodhana Parthipan		
14.	Self-transcendence, Achievement Goal Orientation, and FLOW as Predictors of Grit Among University Students in Malaysia	1. Lew Yan Cheng 2. Tan Yee Voon	Puan Wirawahida Binti Kamarul Zaman	
15.	A Qualitative Study: The Impact of COVID-19 on Kampar Taxi Drivers	1. Loh Zheng Yan 2. Ng Jia Yin 3. Teo Xiao En		

The conduct of this research is subject to the following:

- (1) The participants' informed consent be obtained prior to the commencement of the research;
- (2) Confidentiality of participants' personal data must be maintained; and
- (3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,



Professor Ts Dr Faidz bin Abd Rahman
Chairman
UTAR Scientific and Ethical Review Committee

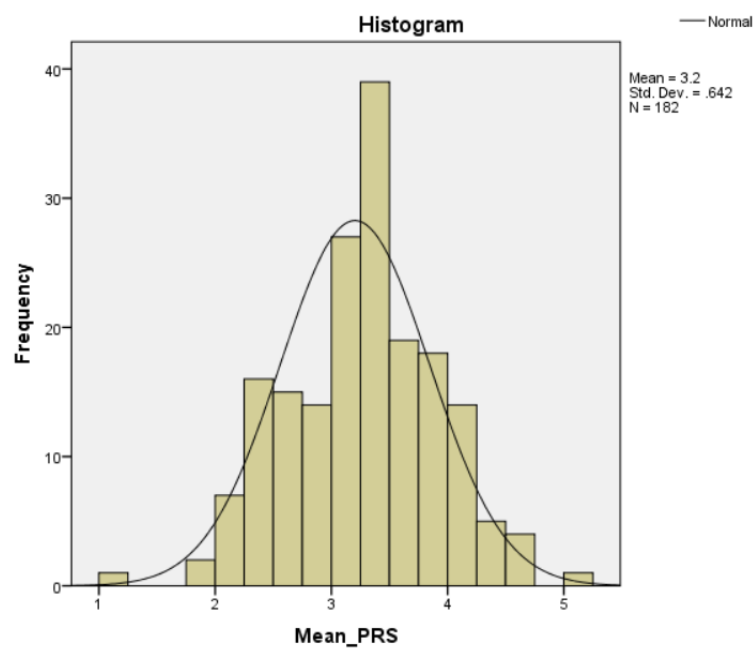
c.c Dean, Faculty of Arts and Social Science
Director, Institute of Postgraduate Studies and Research

Appendix D

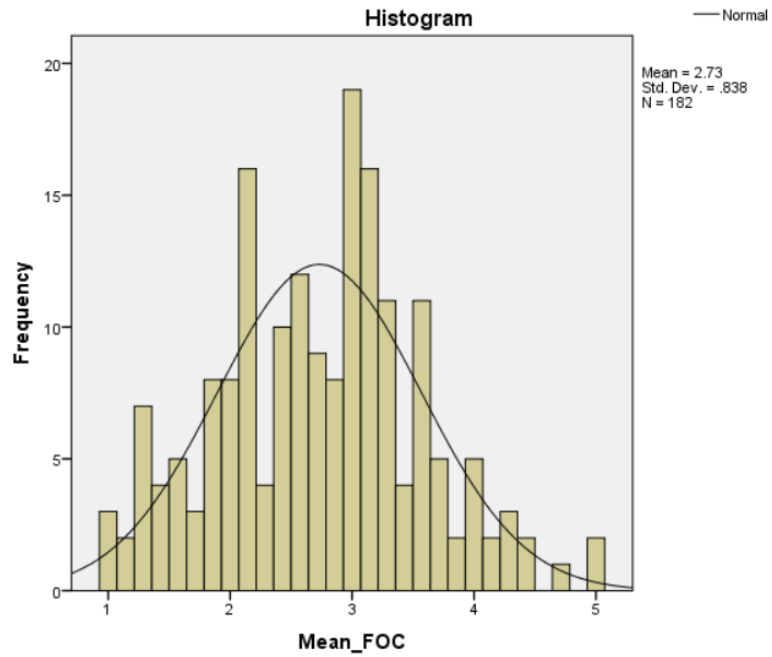
SPSS Output: Normality Assumptions

Histogram for Each Distribution

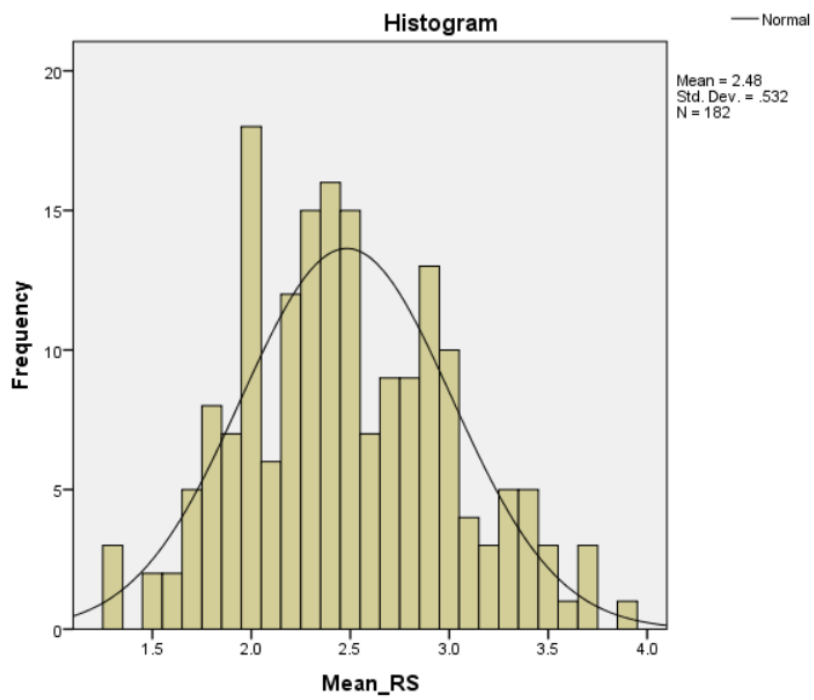
Perceived Risk



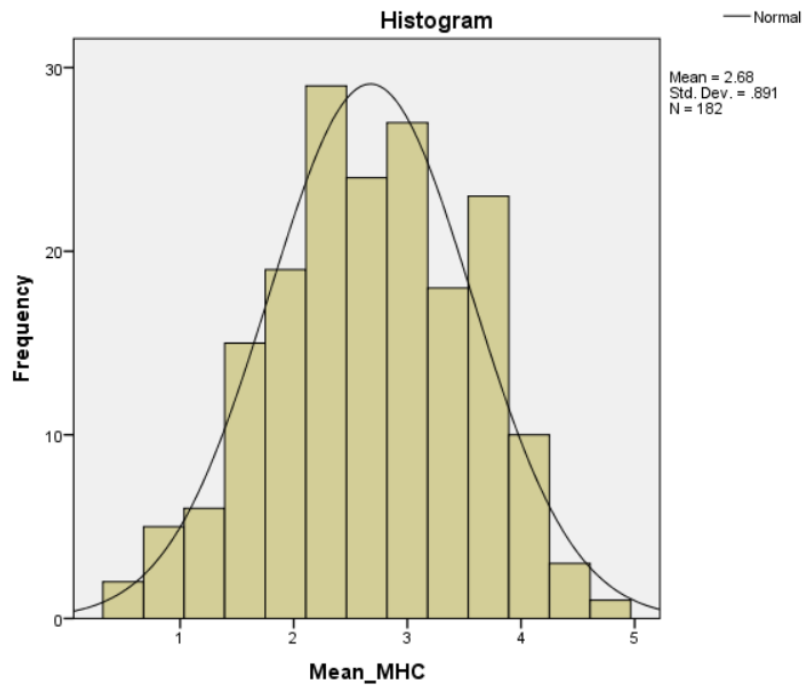
Fear of COVID-19



Resilience

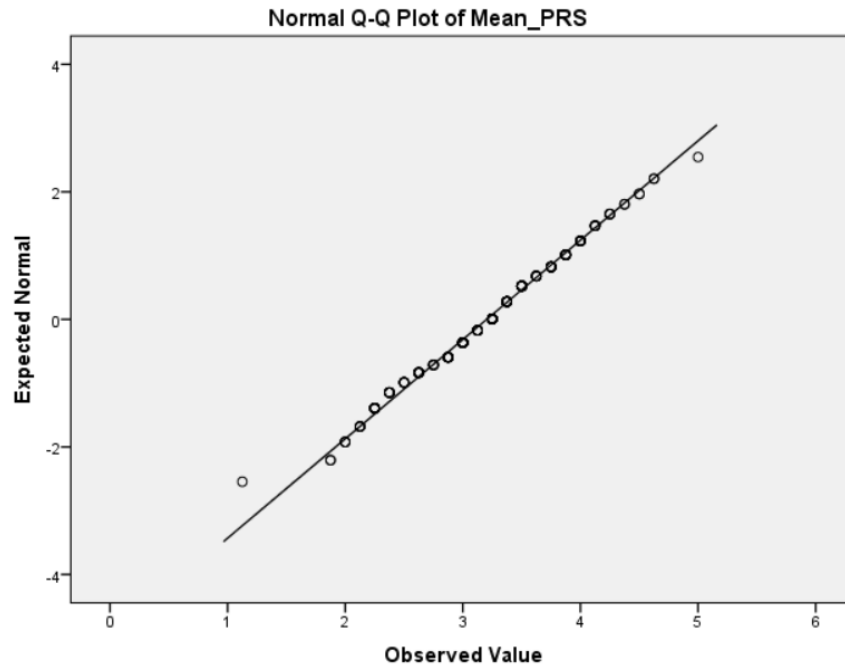


Mental Health

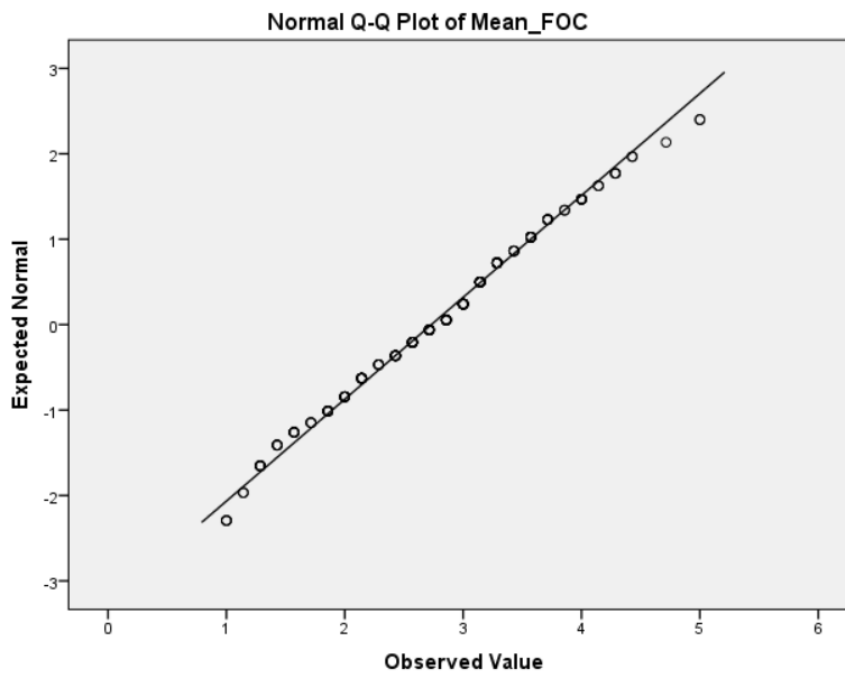


Normal Q-Q Plot for Each Distribution

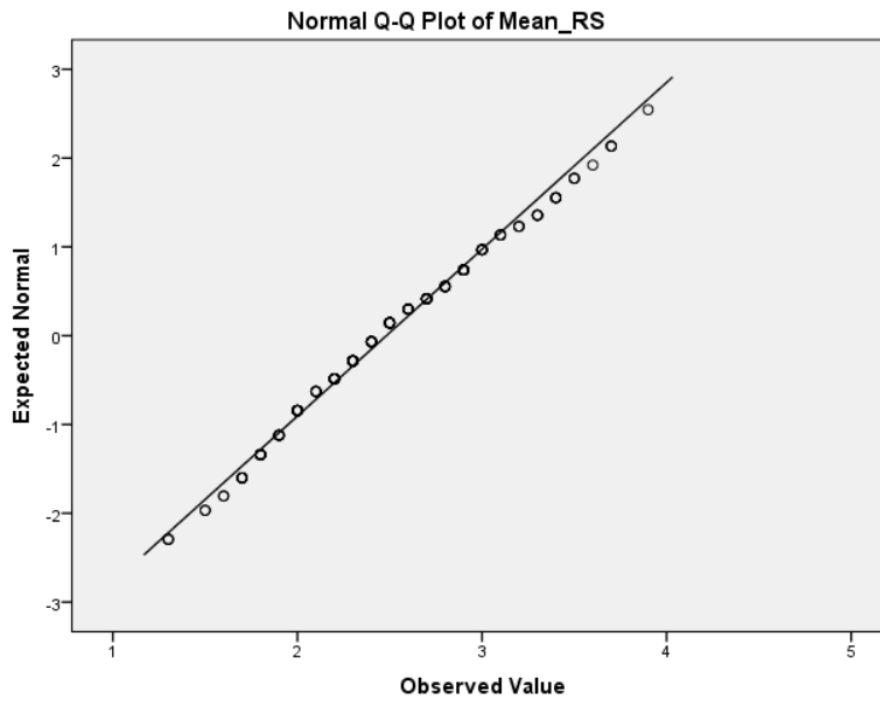
Perceived Risk



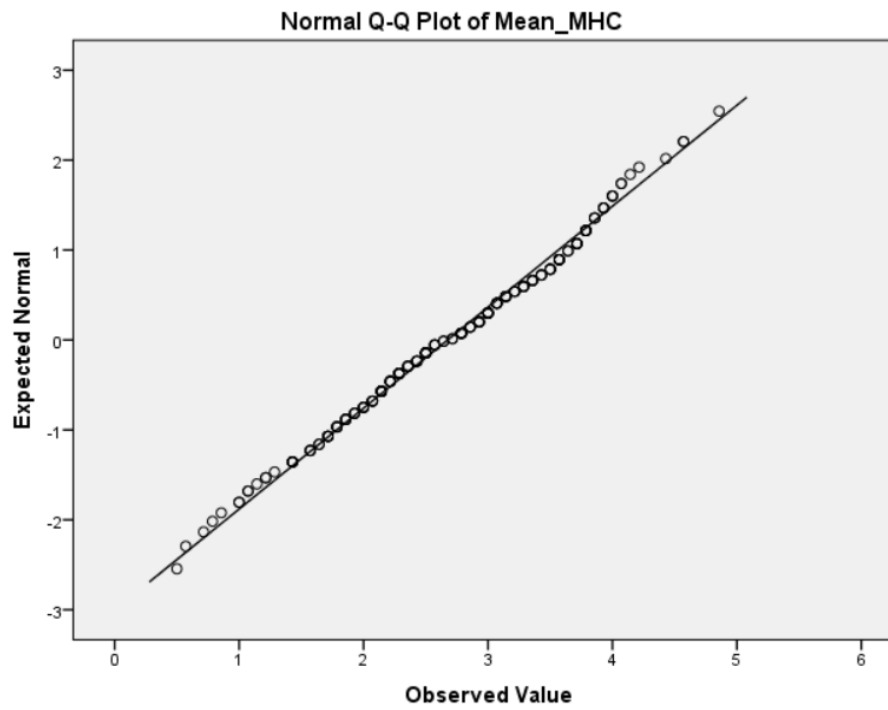
Fear of COVID-19



Resilience



Mental Health



Kolmogorov-Smirnov Test for Each Distribution

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Mean_PRS	.079	182	.008	.991	182	.300
Mean_FOC	.082	182	.005	.987	182	.105
Mean_RS	.085	182	.003	.986	182	.066
Mean_MHC	.049	182	.200 [*]	.991	182	.334

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

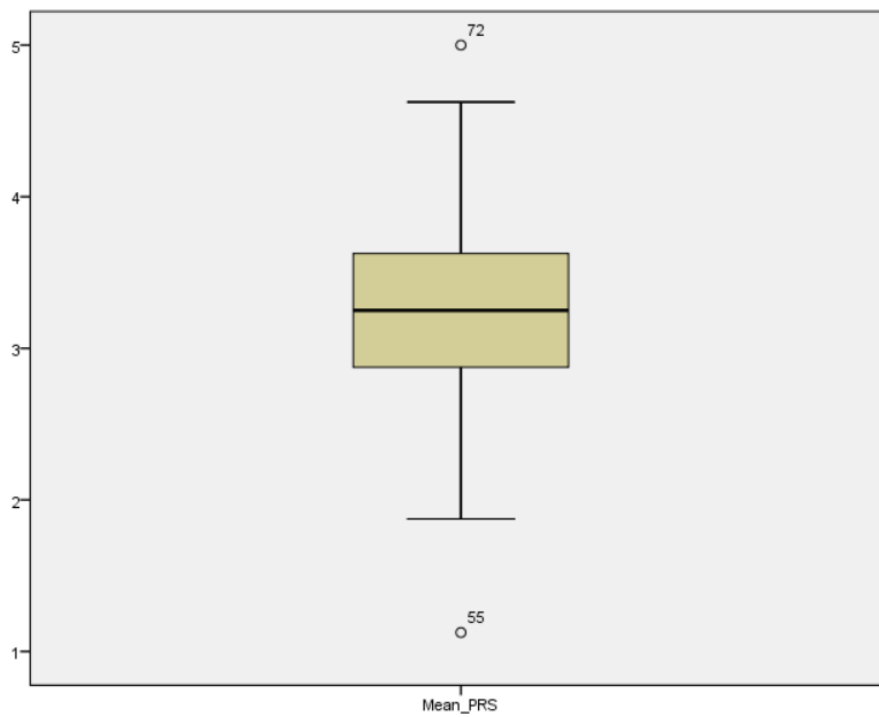
a. Lilliefors Significance Correction

Appendix E

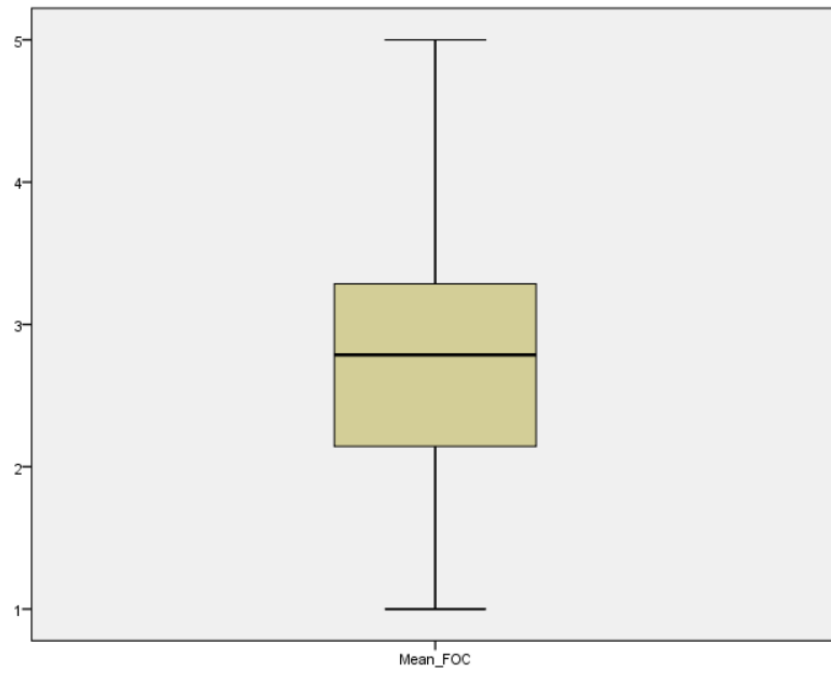
SPSS Output: Outliers

Boxplot for Each Variable

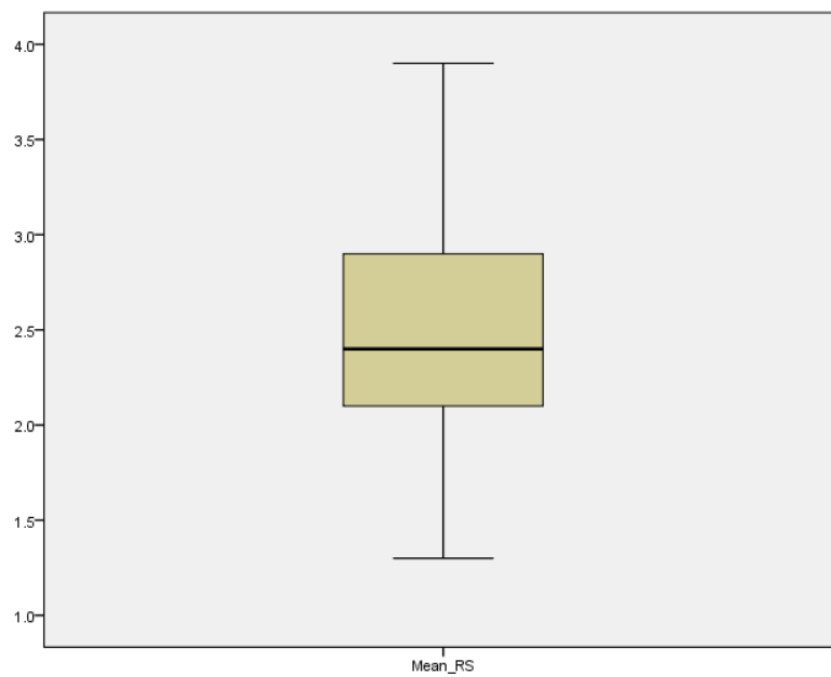
Perceived Risk



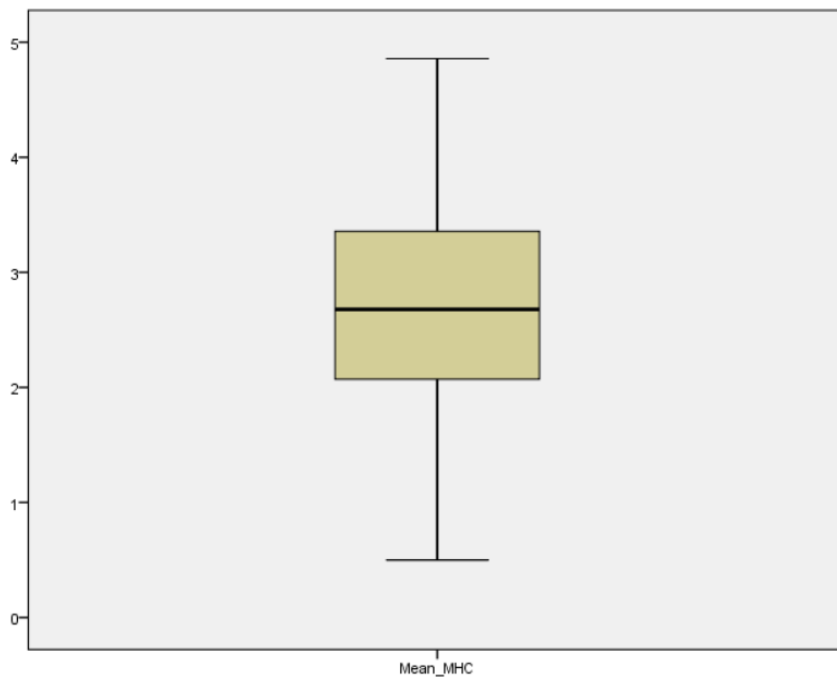
Fear of COVID-19



Resilience



Mental Health



Appendix F

SPSS Output: Descriptive Statistics

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
COVID-19 Perceived Risk				
1. What is the likelihood that you would acquire the COVID-19?				
	19	10.4		
Negligible	49	26.9		
Small	77	42.3		
Medium	31	17.0		
Large	06	03.3		
Very large				
2. What is the likelihood that you would acquire the COVID-19 compared to other persons?				
	22	12.1		
Negligible	60	33.0		
Small	70	38.5		
Medium	23	12.6		
Large	07	03.8		
Very large				
3. What is the likelihood that you would catch other diseases (e.g., diabetes/asthma)?				
	48	26.4		
Negligible	49	26.9		
Small	61	33.5		
Medium	19	10.4		
Large	05	02.7		
Very large				
4. What is the likelihood that you would die from the COVID-19?				
	56	30.8		
Negligible	63	34.6		
Small	47	25.8		
Medium	09	04.9		
Large	07	03.8		
Very large				
5. How worried are you about contracting the COVID-19?				
	06	03.3		
Negligible	28	15.4		
Small	50	27.5		
Medium	50	27.5		
Large	48	26.4		
Very large				

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
6. How worried are you about a family member contracting the COVID-19?				
Negligible	02	01.1		
Small	09	04.9		
Medium	25	13.7		
Large	58	31.9		
Very large	88	48.4		
7. How worried are you about the COVID-19 occurring in your region?				
Negligible	05	02.7		
Small	18	09.9		
Medium	40	22.0		
Large	65	35.7		
Very large	54	29.7		
8. How worried are you about the COVID-19 emerging as a health issue?				
Negligible	01	05.0		
Small	09	04.9		
Medium	30	16.5		
Large	71	39.0		
Very large	71	39.0		
Fear of COVID-19 Scale				
1. I am most afraid of coronavirus-19.				
Strongly disagree	07	03.8		
Disagree	24	13.2		
Neutral	50	27.5		
Agree	70	38.5		
Strongly agree	31	17.0		
2. It makes me uncomfortable to think about coronavirus-19.				
Strongly disagree	14	07.7		
Disagree	34	18.7		
Neutral	59	32.4		
Agree	53	29.1		
Strongly agree	22	12.1		
3. My hands become clammy when I think about coronavirus-19.				
Strongly disagree	47	25.8		
Disagree	63	34.6		
Neutral	51	28.0		
Agree	15	08.2		
Strongly agree	06	03.3		

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
4. I am afraid of losing my life because of coronavirus-19.				
Strongly disagree	23	12.6		
Disagree	41	22.5		
Neutral	41	22.5		
Agree	55	30.2		
Strongly agree	22	12.1		
5. When I watch news and stories about coronavirus-19 on social media, I become nervous or anxious.				
Strongly disagree	22	12.1		
Disagree	36	19.8		
Neutral	63	34.6		
Agree	46	25.3		
Strongly agree	15	08.2		
6. I cannot sleep because I'm worrying about getting coronavirus-19.				
Strongly disagree	77	42.3		
Disagree	58	31.9		
Neutral	37	20.3		
Agree	07	03.8		
Strongly agree	03	01.6		
7. My heart races or palpitates when I think about getting coronavirus-19.				
Strongly disagree	58	31.9		
Disagree	60	33.0		
Neutral	43	23.6		
Agree	16	08.8		
Strongly agree	05	02.7		
Connor Davidson Resilience Scale				
1. I am able to adapt when changes occur.				
Not true at all	00	0		
Rarely true	04	02.2		
Sometimes true	70	38.5		
Often true	90	49.5		
True nearly all the time	18	09.9		
2. I can deal with whatever comes my way.				
Not true at all	00	0		
Rarely true	08	04.4		
Sometimes true	81	44.5		
Often true	83	45.6		
True nearly all the time	10	05.5		

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
3. I try to see the humorous side of things when I am faced with problems.				
Not true at all	02	01.1		
Rarely true	23	12.6		
Sometimes true	80	44.0		
Often true	66	36.3		
True nearly all the time	11	06.0		
4. Having to cope with stress can make me stronger.				
Not true at all	0	0		
Rarely true	13	07.1		
Sometimes true	69	37.9		
Often true	72	39.6		
True nearly all the time	28	15.4		
5. I tend to bounce back after illness, injury, or other hardships.				
Not true at all	01	05.0		
Rarely true	15	08.2		
Sometimes true	89	48.9		
Often true	60	33.0		
True nearly all the time	17	09.3		
6. I believe I can achieve my goals, even if there are obstacles.				
Not true at all	00	0		
Rarely true	09	04.9		
Sometimes true	53	29.1		
Often true	93	51.1		
True nearly all the time	27	14.8		
7. Under pressure, I stay focused and think clearly.				
Not true at all	02	01.1		
Rarely true	29	15.9		
Sometimes true	68	37.4		
Often true	71	09.0		
True nearly all the time	12	06.6		
8. I am not easily discouraged by failure.				
Not true at all	01	00.5		
Rarely true	32	17.6		
Sometimes true	78	42.9		
Often true	61	33.5		
True nearly all the time	10	05.5		

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
9. I think of myself as a strong person when dealing with life's challenges and difficulties.				
Not true at all	03	01.6		
Rarely true	20	11.0		
Sometimes true	67	36.8		
Often true	78	42.9		
True nearly all the time	14	07.7		
10. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.				
Not true at all	01	00.5		
Rarely true	23	12.6		
Sometimes true	69	37.9		
Often true	73	40.1		
True nearly all the time	16	08.8		
Mental Health Continuum Short Form: During the past month, how often you have experienced or felt:				
1. Happy.				
Never	02	01.1		
Once or twice	11	06.0		
About once a week	33	18.1		
About two or three times a week	65	35.7		
Almost everyday	62	34.1		
Everyday	09	04.9		
2. Interested in life.				
Never	04	02.2		
Once or twice	19	10.4		
About once a week	37	20.3		
About two or three times a week	69	37.9		
Almost everyday	43	23.6		
Everyday	10	05.5		
3. Satisfied with life.				
Never	06	03.3		
Once or twice	22	12.1		
About once a week	39	21.4		
About two or three times a week	56	30.8		
Almost everyday	48	26.4		
Everyday	11	06.0		
4. That you had something important to contribute to society.				
Never	18	09.9		
Once or twice	46	25.3		
About once a week	48	26.4		
About two or three times a week	36	19.8		
Almost everyday	26	14.3		
Everyday	08	04.4		

	<i>n</i>	%	<i>M</i>	<i>SD</i>
5. That you belonged to a community (like a social group, or your neighborhood).				
Never	22	12.1		
Once or twice	31	17.0		
About once a week	38	20.9		
About two or three times a week	48	26.4		
Almost everyday	27	14.8		
Everyday	16	08.8		
6. That our society is a good place, or is becoming a better place, for all people.				
Never	24	13.2		
Once or twice	44	24.2		
About once a week	39	21.4		
About two or three times a week	43	23.6		
Almost everyday	27	14.8		
Everyday	05	02.7		
7. That people are basically good.				
Never	05	02.7		
Once or twice	40	22.0		
About once a week	43	23.6		
About two or three times a week	50	27.5		
Almost everyday	36	19.5		
Everyday	08	04.4		
8. That the way our society works makes sense to you.				
Never	16	08.8		
Once or twice	43	23.6		
About once a week	47	25.8		
About two or three times a week	47	25.8		
Almost everyday	25	13.7		
Everyday	04	02.2		
9. That you liked most parts of your personality.				
Never	02	01.1		
Once or twice	30	16.5		
About once a week	43	23.6		
About two or three times a week	62	34.1		
Almost everyday	41	22.5		
Everyday	04	02.2		

	<i>n</i>	<i>%</i>	<i>M</i>	<i>SD</i>
10. Good at managing the responsibilities of your daily life.				
Never	04	02.2		
Once or twice	22	12.1		
About once a week	36	19.8		
About two or three times a week	56	30.8		
Almost everyday	55	30.2		
Everyday	09	04.9		
11. That you had warm and trusting relationships with others.				
Never	10	05.5		
Once or twice	17	09.3		
About once a week	34	18.7		
About two or three times a week	48	26.4		
Almost everyday	54	29.7		
Everyday	19	10.4		
12. That you had experiences that challenged you to grow and become a better person.				
Never	05	02.7		
Once or twice	22	12.1		
About once a week	34	18.7		
About two or three times a week	54	29.7		
Almost everyday	49	26.9		
Everyday	18	09.9		
13. Confident to think or express your own ideas and opinions.				
Never	02	01.1		
Once or twice	28	15.4		
About once a week	37	20.3		
About two or three times a week	51	28.0		
Almost everyday	48	26.4		
Everyday	16	08.8		
14. That your life has a sense of direction or meaning to it.				
Never	07	03.8		
Once or twice	21	11.5		
About once a week	44	24.2		
About two or three times a week	47	25.8		
Almost everyday	44	24.2		
Everyday	19	10.4		

Appendix G

SPSS Output: Multiple Linear Regression

Variance Inflation Factor (VIF) Values and Tolerance Values

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.604	.414		1.459	.146	-.213	1.420		
	Mean_PRS	.065	.105	.047	.620	.536	-.142	.272	.774	1.292
	Mean_FOC	-.016	.080	-.015	-.197	.844	-.175	.143	.773	1.294
	Mean_RS	.768	.111	.459	6.889	.000	.548	.988	.998	1.002

a. Dependent Variable: Mean_MHC

Durbin-Watson Test

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.460 ^a	.212	.198	.798	2.152

a. Predictors: (Constant), Mean_RS, Mean_PRS, Mean_FOC

b. Dependent Variable: Mean_MHC

Regression Model

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.386	3	10.129	15.921	.000 ^b
	Residual	113.242	178	.636		
	Total	143.628	181			

a. Dependent Variable: Mean_MHC

b. Predictors: (Constant), Mean_RS, Mean_PRS, Mean_FOC

Regression Coefficient

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.604	.414		1.459	.146	-.213	1.420
	Mean_PRS	.065	.105	.047	.620	.536	-.142	.272
	Mean_FOC	-.016	.080	-.015	-.197	.844	-.175	.143
	Mean_RS	.768	.111	.459	6.889	.000	.548	.988

a. Dependent Variable: Mean_MHC

Appendix H

SPSS Output: Mediation Analysis

The Mediating Effects of Fear of COVID-19 on Perceived Risk-Mental Health Association

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.5.2 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 4
Y : Mean_MHC
X : Mean_PRS
M : Mean_FOC

Sample
Size: 182

OUTCOME VARIABLE:

Mean_FOC

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.4748	.2254	.5472	52.3839	1.0000	180.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7468	.2797	2.6703	.0083	.1949	1.2986
Mean_PRS	.6197	.0856	7.2377	.0000	.4508	.7887

Standardized coefficients

	coeff
Mean_PRS	.4748

OUTCOME VARIABLE:

Mean_MHC

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.0365	.0013	.8013	.1193	2.0000	179.0000	.8876

Model

	coeff	se	t	p	LLCI	ULCI
constant	2.5097	.3450	7.2734	.0000	1.8288	3.1905
Mean_PRS	.0435	.1177	.3695	.7122	-.1888	.2758

Mean_FOC	.0095	.0902	.1058	.9159	-.1684	.1875
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Standardized coefficients

	coeff
Mean_PRS	.0314
Mean_FOC	.0090

***** TOTAL EFFECT MODEL *****

OUTCOME VARIABLE:

Mean_MHC

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.0356	.0013	.7969	.2287	1.0000	180.0000	.6331

Model

	coeff	se	t	p	LLCI	ULCI
constant	2.5168	.3375	7.4576	.0000	1.8509	3.1827
Mean_PRS	.0494	.1033	.4782	.6331	-.1545	.2533

Standardized coefficients

	coeff
Mean_PRS	.0356

***** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y *****

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_ps	c_cs
.0494	.1033	.4782	.6331	-.1545	.2533	.0555	.0356

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_ps	c'_cs
.0435	.1177	.3695	.7122	-.1888	.2758	.0488	.0314

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
Mean_FOC	.0059	.0570	-.1052	.1184

Partially standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
Mean_FOC	.0066	.0640	-.1201	.1303

Completely standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
Mean_FOC	.0043	.0411	-.0759	.0856

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

----- END MATRIX -----

The Mediating Effects of Resilience on Perceived Risk-Mental Health Association

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.5.2 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 4
Y : Mean_MHC
X : Mean_PRS
M : Mean_RS

Sample
Size: 182

OUTCOME VARIABLE:

Mean_RS

Model Summary

	R	R-sq	MSE	F	df1	df2	p
Model	.0092	.0001	.2849	.0152	1.0000	180.0000	.9020

	coeff	se	t	p	LLCI	ULCI
constant	2.5063	.2018	12.4202	.0000	2.1081	2.9045
Mean_PRS	-.0076	.0618	-.1234	.9020	-.1295	.1143

Standardized coefficients

	coeff
Mean_PRS	-.0092

OUTCOME VARIABLE:

Mean_MHC

Model Summary

	R	R-sq	MSE	F	df1	df2	p
Model	.4598	.2114	.6328	23.9905	2.0000	179.0000	.0000

	coeff	se	t	p	LLCI	ULCI
constant	.5942	.4098	1.4500	.1488	-.2144	1.4029
Mean_PRS	.0553	.0921	.6002	.5492	-.1264	.2370
Mean_RS	.7671	.1111	6.9060	.0000	.5479	.9863

Standardized coefficients

	coeff
Mean_PRS	.0398

Mean_RS .4584

***** TOTAL EFFECT MODEL *****

OUTCOME VARIABLE:

Mean_MHC

Model Summary

	R	R-sq	MSE	F	df1	df2	p
Model	.0356	.0013	.7969	.2287	1.0000	180.0000	.6331

Model

	coeff	se	t	p	LLCI	ULCI
constant	2.5168	.3375	7.4576	.0000	1.8509	3.1827
Mean_PRS	.0494	.1033	.4782	.6331	-.1545	.2533

Standardized coefficients

	coeff
Mean_PRS	.0356

***** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y *****

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_ps	c'_cs
.0494	.1033	.4782	.6331	-.1545	.2533	.0555	.0356

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_ps	c'_cs
.0553	.0921	.6002	.5492	-.1264	.2370	.0620	.0398

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
Mean_RS	-.0058	.0504	-.1110	.0899

Partially standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
Mean_RS	-.0066	.0569	-.1271	.1020

Completely standardized indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
Mean_RS	-.0042	.0361	-.0797	.0654

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

----- END MATRIX -----