

PREDICTORS OF RISK OF EXPERIMENTATION WITH E-CIGARETTES



**DEPARTMENT OF PSYCHOLOGY AND COUNSELING**

**FACULTY OF ARTS AND SOCIAL SCIENCE**

Project Title: Social media use and self-esteem as predictors of the risk of experimentation with e-cigarettes among university students in Malaysia: Resistance to peer influence as mediator.	
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PREDICTORS OF RISK OF EXPERIMENTATION WITH E-CIGARETTES



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SOCIAL MEDIA USE AND SELF-ESTEEM AS PREDICTORS OF THE RISK OF  
EXPERIMENTATION WITH E-CIGARETTES AMONG UNIVERSITY STUDENTS IN  
MALAYSIA: RESISTANCE TO PEER INFLUENCE AS MEDIATOR

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This research project is submitted in partial fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology, Faculty of Arts and Social Science, Universiti Tunku Abdul Rahman. Submitted on November 2022.

# PREDICTORS OF RISK OF EXPERIMENTATION WITH E-CIGARETTES

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# PREDICTORS OF RISK OF EXPERIMENTATION WITH E-CIGARETTES

## 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.

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# PREDICTORS OF RISK OF EXPERIMENTATION WITH E-CIGARETTES

## APPROVAL FORM

This research paper attached hereto, entitled “Social Media Use and Self-Esteem as Predictors of the Risk of Experimentation with E-Cigarettes among University Students in Malaysia: Resistance to Peer Influence as Mediator” prepared and submitted by “Teh Xin Rou, Tam Jing Yi Evelyn, and Yap Xue Li” in partial fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.



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Date: 10/04/2023

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### Abstract

Electronic or e-cigarette usage has become increasingly widespread across all age demographics, with a particular surge among young adults. Nevertheless, there are scarce studies that investigate the possible factors linked to young adults use of e-cigarettes in Malaysia. Therefore, this present study aims to examine a pathway through which social media use (SMU) and self-esteem would influence the risk of experimentation with e-cigarettes with Resistance to Peer Influence (RPI) as the mediator. A total of 143 participants aged 18-24 from higher institutions in Malaysia were recruited using the purposive sampling method. There are 35.7 % participants were males while 64.3% were females. Majority (82.5%) of them were Chinese, followed by Malay (9.8%), and Indian (7.7%). The survey included demographic questions and the instruments, Social Networking Usage Questionnaire, Rosenberg Self-Esteem Scale (RSES), Resistance to Peer Influence Questionnaire (RPIQ), and Susceptibility to Smoking. Based on the findings, SMU use was a significant and positive predictor of the risk of experimentation with e-cigarettes whereas self-esteem was not a significant predictor of the risk of experimentation with e-cigarettes. Also, RPI was a full mediator of the relationship between self-esteem and risk of experimentation. In conclusion, the findings of present study able to benefits Ministry of Higher Education (MoHE) Malaysia, mental health professional, and university counsellor as they can conduct programme or intervention regarding to the harms of e-cigarettes as well as methods to exit from e-cigarettes use. This can aid in hinder the prevalence of the risk of experimentation with e-cigarettes among university students.

*Keywords:* social media use, self-esteem, resistance to peer influence, university students, Malaysia

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## List of Abbreviations

## Abbreviations

CI	Confidence Interval
ENDS	Electronic Nicotine Delivery System
IV	Independent Variable
DV	Dependent Variable
RPI	Resistance to Peer Influence
RPIQ	Resistance to Peer Influence Questionnaire
RSES	Rosenberg Self-Esteem Scale
SMU	Social Media Use
YYAs	Youth and Young Adults

## Chapter I

### Introduction

#### Background of Study

##### *E-cigarettes*

In 1965, Herbert Gilbert designed and patented E-cigarettes as smokeless non-tobacco cigarettes (Marcham & Springston, 2017). E-cigarettes, as known as Electronic Cigarettes, electronic nicotine delivery system (ENDS), or vape, were marketed as a kind of tobacco-free nicotine delivery device (Trtchounian et al., 2010). An e-cigarette is a device consisting of a fluid-filled reservoir containing a tobacco-like liquid vaporized by a mechanism using a battery-powered device. It has been modified since the original schematic was first patented and the devices are now available in a variety of designs, sizes, as well as the strength of fluid tobacco (Kang, 2019). E-cigarettes can be categorized into three types, which are disposable e-cigarettes that can be used one time only (first generation), prefilled or refillable cartridges that are able to use multiple times (second generation), and tanks & mods created to be used repeatedly (third generation) (Centers for Disease Control and Prevention, 2022). According to Zhu et al. (2014), e-cigarettes brands were more than 460 and the flavours were more than 7,700. In addition, study by Czogala et al. (2014) indicated that vapor refers to the nicotine aerosol that was produced by the device, where people typically shorten the term vapor into vape, which describes the act of using an e-cigarette.

People claimed that e-cigarettes were less harmful than conventional or traditional cigarettes because e-cigarette aerosol has fewer toxic chemicals than traditional cigarettes (Centers for Disease Control and Prevention, 2022). This view is supported by Trtchounian et al. (2010) who mentioned that e-cigarettes may not be harmful as conventional cigarettes. This is because e-cigarettes never burn tobacco so they will not deliver the multiple chemicals and toxicants that included in conventional cigarettes. Besides, study also indicated

that e-cigarettes are going viral among youth due to numerous tastes, enticing modern designs, and false perceptions that e-cigarettes are a safer choice than conventional cigarettes (Kang, 2019). However, the author claimed that both conventional cigarettes and e-cigarettes contain hazardous substances that are harmful to human health, including addictive nicotine and other chemicals or toxicants. Moreover, the US Department of Health and Human Services (2016) also indicated that aerosol produced by e-cigarettes are not risk-free as they may contain potentially harmful and harmful substances. For instance, the most common harmful substances that can be found in e-cigarettes was nicotine, volatile organic compounds, cancer-causing agents, and heavy metals like lead.

According to the Consumer Association of Penang, Malaysians using electronic nicotine delivery has a drastic increase from 600 thousand in 2016 to 1.2 million in 2019, noted that the products were only commercially introduced in Malaysia market in early of 2015 (Mohideen Abdul Kader, 2022). A cross-sectional study, which conducted among 1,300 university students across six universities in Malaysia, revealed that 74.9% of the participants are e-cigarettes users (Wan Puteh et al., 2018). Bernama (2022) reported that since the first diagnosis of E-cigarette or Vaping Product Use-Associated Lung Injury (EVALI) in United States in the of 2019, there were also increased cases in Malaysia with 2 cases reported in 2019, 8 cases in 2021, and 4 cases in the past 6 months, involving lung illness and death associated with e-cigarette use. With that, Khairy, the Minister of Health Malaysia, urges that early detection and treatment could reduce the complications of EVALI (Bernama, 2022). As disposable vape pens with nicotine level ranging from 1% to 5% are already sold for RM20 through the open delivery system, it is inevitable that e-cigarettes will play a significant role in the nicotine addiction problem among young Malaysians (Azrul Mohd Khalib, 2022).

### *Social Media Use*

Social media as a virtual platform for people to meet and interact with real-life friends or others who share the same interests on social media (Griffiths et al., 2014; Michikyan & Suárez-Orozco, 2016). The main function of social media is to allow people to share images, videos, important messages and information conveniently without meeting each other. It also helps in strengthening people's relationships since they are able to communicate with each other whenever and wherever they want (Al-Rahmi & Othman, 2013). Nowadays, contemporary young people's daily life is increasingly dominated by social media since social interaction through Internet is more common than face-to-face communication (Buran & Doğan, 2019). As of January 2016, about one-third of the world's population was using social media and this phenomenon caused exponential growth in its use (Hawi & Samaha, 2017). Multiple social media platforms including Instagram, Facebook, LinkedIn, and Twitter facilitated this development.

It is obvious that social media is playing a significant role in a person's way of life and communication, health and well-being, and interest in various aspects. It is undeniable that social media brings a lot of benefits in our daily life, yet it could also lead to some negative impacts if social media is misused. Improper or uncontrolled usage of social media could lead to many negative consequences on daily communication as well as interpersonal behaviour (Mathew, 2020).

A study conducted by Alpert et al. (2019) found that exposure to e-cigarettes on social media may encourage experimentation with it among young adults because the normalization of e-cigarettes on social media, constant exposure to e-cigarette related message, and influential visual appeals of e-cigarettes displayed may alter their perceptions and attitudes towards e-cigarettes. Tan Sri Dr Noor Hisham Abdullah, the Director General of Health Malaysia urges to put out displays of vaping by artists and celebrities in public as their



actions would be observed and watched by society, especially young people (The Star, 2022). Nevertheless, Neo (2022) reported that Malaysia is one of the world's largest manufacturers for e-cigarette products, and companies tend to use youthful design of advertisements on social media to reach and attract those whom non-smokers for the survival of business.

### *Self-Esteem*

Hawi and Samaha (2017) mentioned an individual's positive or negative perception of himself or herself was identified as self-esteem. Self-esteem is a self-subjective sense of overall personal value or worth. It described the self-confidence level in one's abilities and attributes which is similar to self-respect (Cherry, 2022). Relationships, overall well-being, decision-making, and emotional health are all influenced by self-esteem. Self-esteem affects motivation since those who have a positive and healthy self-view are more aware of their potential and may be motivated to tackle new challenges (Cherry, 2022). People with low self-esteem may lack of confidence in their skills and abilities, they will always underestimate themselves because they do not believe that they can accomplish their goals (Cherry, 2022).

Self-esteem, on the other hand, has a social function in influencing how someone behaves and certain behaviours may contribute to the development of the individual (Mathew, 2020). Self-esteem also aids in restoring social inclusion to favourable levels (Leary et al., 1995). DuBois and Silverthorn (2004) found a significant mediation between the association of self-esteem and problem behaviours. The researchers highlighted that young people with lower self-esteem are more susceptible to deviant peer relationships, which are associated with higher levels of problem behaviours.

### **Problem Statement**

The prevalence of electronic or e-cigarette use has been growing viral across all age groups, especially among young adults. Cornelius et al. (2020) indicate that young adults (18-

24 years old) were the largest age group for e-cigarette use (9.3%). In a study done in the Malaysian cities of Selangor and Kuala Lumpur, Wong et al. (2016) found that students in college and university, as well as young professionals and managers used e-cigarettes at rates of 39% and 36%, respectively. E-cigarettes use among college students has grown dramatically from 6.7% in 2017 to 15.5% in 2018, according to Monitoring the Future survey data (Schulenberg et al., 2019). This is because students use smoking, not only traditional cigarettes but also e-cigarettes, as a coping mechanism to help them adjust and fit into a new environment.

Huang et al. (2014) and Pokhrel et al. (2018) have highlighted that the social media e-cigarette exposure is uniquely associated with e-cigarette use to a point where the association goes beyond and above the effects of e-cigarette use in in-person social networks. Social influence for e-cigarette experimentation no longer occurs through offline (the traditional in-person method) only, but also online (the internet and social networks) (Huang et al., 2014). Moreover, Massey et al. (2021) and Vogel et al. (2020) supported that adolescents who use social media more frequently and are exposed to more social media posts are associated with a greater risk of experimentation with e-cigarettes. On the other hand, a cross sectional study conducted by Erinoso et al. (2021) reported that young adults above 18 years old, were more inclined to use e-cigarettes when compared to adolescents between age 15 and 18 among Nigerian, which is consistent with the findings by Cornelius et al. (2020) and Ngaruiya et al. (2018). Researchers explained that the more common use of e-cigarette among young adults may be driven by the affordability (Erinoso et al., 2021) and higher exposure to related advertisement over time among young adults (Ngaruiya et al., 2018). Therefore, it is a need to investigate whether SMU would influence the risk of experimentation with e-cigarette among young adults in Malaysian context.

Apart from that, studies found that there is an association between self-esteem and risk of experimentation with e-cigarettes (Arshad et al., 2015; Grant et al., 2019). Grant et al. (2019) revealed that university students who used e-cigarettes had significantly poorer self-esteem than non-users. However, there is a conflicting result from Arshad et al. (2015) showing that adolescents with high self-esteem may lead to more early sexual activity or drinking, which encourages experimentation although the overall effects are relatively low. While Jha & Kraguljac (2021) found that there was no significant difference in the level of self-esteem between the respondents. The result of these past studies focused on the role of self-esteem in explaining e-cigarettes use was inconsistent. Surprisingly, only limited efforts have been made to examine whether theoretical models of substance use - self-derogation theory are suitable predictors of risk of e-cigarette experimentation except a 2-year longitudinal study of young adults has found an indirect effect of weak self-esteem on early substance use but a direct effect on involvement with substance-use peers (Kaplan et al., 1982). Hence, there is a reason to believe that peer effects will mediate the relationships between self-esteem and risk of experimentation with e-cigarette.

## **Research Objectives**

### ***General Objective***

The present study aims to examine a pathway through which SMU and self-esteem would influence the risk of experimentation with e-cigarette with RPI as the mediator.

### ***Specific Objectives***

The below-mentioned research objectives are designed to be achieved in this study.

1. To examine SMU as a predictor of the risk of experimentation with e-cigarettes among university students in Malaysia.
2. To investigate self-esteem as a predictor of the risk of experimentation with e-cigarettes among university students in Malaysia.

3. To examine RPI as a mediating variable between the association of self-esteem and the risk of experimentation with e-cigarette among university students in Malaysia.

### **Research Questions**

*RQ1:* Does SMU positively predict the risk of experimentation with e-cigarettes among university students in Malaysia?

*RQ2:* Does self-esteem negatively predict the risk of experimentation with e-cigarettes among university students in Malaysia?

*RQ3:* Is the association between self-esteem and the risk of experimentation with e-cigarettes among university students in Malaysia mediated by RPI?

### **Hypotheses**

*H<sub>1</sub>:* SMU positively predicts the risk of experimentation with e-cigarettes among university students in Malaysia.

*H<sub>2</sub>:* Self-esteem negatively predicts the risk of experimentation with e-cigarettes among university students in Malaysia.

*H<sub>3</sub>:* RPI mediates the association between self-esteem and the risk of experimentation with e-cigarette among university students in Malaysia.

### **Significance of Study**

This research serves as an insight to provide a better understanding of what factors predict a higher risk for Malaysian young adults to experiment with e-cigarettes. We hope this study could alert both Malaysian government and related health agencies to pay closer attention to the risk factors of e-cigarette use. Other than that, this study serves as a guideline to utilize social media as a channel wisely in promoting health-related information. Targeted health warning message designed based on age is crucial in preventing experimentation of e-cigarettes, especially among young adult never-users at an early stage.

Besides, this study also provides ideas to counsellors and health psychologists about the interventions to protect young adults from e-cigarettes, for example, cognitive-behavioural therapy that helps to improve self-esteem within individuals to minimize the risk of experimentation with e-cigarettes. We also hope this study could draw attention on the impact of RPI on e-cigarette experimentation, enabling practitioners to bring a positive impact to society in building young adults' RPI and educating them about the effective measures that improve social interactions. Overall, we hope the present study could stimulate ideas on the intervention and programme that lower the intention of experimentation with e-cigarettes among young adults in Malaysia.

### **Conceptual Definitions**

#### ***Social Media Use***

Virtual networking space that is used by individuals for academic, work, entertainment, socialization etc. through sharing, communicating, or establishing and maintaining connection with others (Gupta & Bashir, 2018).

#### ***Self-Esteem***

An individual's positive or negative perception of himself or herself (Hawi & Samaha, 2017). It is a self-subjective sense of overall personal value or worth, describing the self-confidence level in one's abilities and attributes which is like self-respect (Cherry, 2022).

#### ***Resistance to Peer Influence***

An individual's level of propensity to resist the inclination to adopt his or her peers' behaviours (Steinberg & Monahan, 2007).

#### ***The Risk of Experimentation with E-Cigarette***

The likelihood of ever use of an e-cigarette within an individual (Hallingberg et al., 2021).

## **Operational Definitions**

### ***Social Media Use***

SMU is measured by Social Networking Usage Questionnaire. It measures the purpose of social media usage across 5 dimensions, namely academic, socialization, informativeness, and constraints (Gupta & Bashir, 2018). The higher the score in a particular dimension, the higher frequency of social media usage for that particular purpose.

### ***Self-Esteem***

Self-esteem is measured by RSES, a 10-item scale that evaluates an individual's self-worth by accessing both positive and negative feelings about the self (Avison & Rosenberg, 1981). The higher the score, the greater self-esteem.

### ***Resistance to Peer Influence***

RPI is measured by RPIQ, a 10-item scale that measures an individual's propensity to resist peer pressure (Steinberg & Monahan, 2007). The higher the score, the greater RPI.

### ***The Risk of Experimentation with E-Cigarette***

Risk of experimentation with e-cigarette is measured by Susceptibility to Smoking, a 3-questions survey used to examine an individual as susceptible to smoking (Pierce et al., 1996). The higher the score, the greater level of susceptibility to smoking level.

## Chapter II

### Literature Review

#### Social Media Use and the Risk of Experimentation with E-Cigarettes

According to Dixon (2022), the use of social media is one of the most common online activities. Globally, more than 4.26 billion people used social media in 2021, and that number is expected to rise to approximately six billion by 2027. It should be noted that according to the most recent data, more than 75% of the world's eligible population now use social media (DataReportal, 2023). Facebook, YouTube, WhatsApp, Instagram, Twitter, TikTok, Douyin, and Telegram were some of the popular social media platform and these platforms have contributed to a dramatic increase in social media active users. Although the main function of social media is to act as a platform in helping people to interact, create, network, and thrive online; however, there are unexpected dangers when social media is misused as a platform to share and get information regarding e-cigarettes. Obviously, e-cigarette businesses will use this chance to keep up their efforts to advertise using a variety of platforms such as the internet, movies, television, radio, magazines, newspapers, and retail stores (Dai et al., 2022).

Interestingly, the popularity of using electronic cigarettes or e-cigarettes is growing substantially across all age ranges, but primarily among youngsters and teenagers (Pokhrel et al., 2018). Hu et al. (2016) supported that the current e-cigarette usage is highest in young adults aged 18 to 24 years old rather than adults who have been involved in cigarette smoking. According to Emery et al. (2014), young adults frequently receive e-cigarette marketing on social media, which may have an impact on how they perceive e-cigarettes and whether they plan to use e-cigarettes. This can be explained that young adults were the first to adopt social media, and they still use it frequently for communication and socialization (Anderson & Jiang, 2018). Sawdey et al. (2017) indicated a significant risk factor for using electronic cigarettes among college students was the use of social media. In the past six months, almost half of

college students claimed to have seen an advertisement for electronic cigarettes on at least one social media platform, particularly on Facebook, Instagram, and Twitter. Apart from that, numerous studies indicated young adults not only received a lot of advertisements related to nicotine products, but they are also involved frequently in such social media content (Chen-Sankey et al., 2019; Clendennen et al., 2020; Liu et al., 2020). For example, liking and following any brand of cigarettes or ENDS, as well as publishing a link to a vaping item and making comments on the use of ENDS products. Young adults who use social media heavily are more vulnerable to persuasive marketing messages because they are lacking the cognitive ability to defend themselves from meticulously constructed advertisements and they may not be able to distinguish the commercials' real selling objective (Yang et al., 2021). However, by emphasizing the harm reduction aspect of vaping compared to combustible cigarette usage, the excessively pro-e-cigarette information may mislead youth and young adults (YYAs) to underestimate the possible hazards while overestimating the advantages of initiating e-cigarette use (Primack et al., 2015).

People can easily post images, details, attitudes, experiences, and opinions on risk-taking behaviours, such as using e-cigarettes on social media platforms (Kwon & Park, 2020). E-cigarettes have been aggressively promoted not only through conventional media sources, such as radio, television, retail stores, and publications, but also online, via social media, at music festivals, and at sports activities (Yang et al., 2019). Therefore, interest in the product has been growing. However, the advantage of social media such as freely sharing and getting information may lead to an increase in the appearance of e-cigarettes on social media platforms, which may have increased interest in, approval of, and experimentation among many regular internet users looking for reviews of the actual experience (Duke et al., 2016). This was in line with study of Yang et al. (2019), which demonstrated that aggressive marketing and extensive coverage of e-cigarettes could create a serious threat to public health



since exposure to such information may result in experimentation and regular use.

Alternatively, through the publication and widespread use of information of dubious validity, exposure to e-cigarette content through social media platforms may enhance the risk that a person will use e-cigarettes (Sawdey et al., 2017).

Youth and young adults' use of ENDS goods has been strongly correlated with ENDS product advertising on social media (Clendennen et al., 2020; Pokhrel et al., 2018; Sawdey et al., 2017). Longitudinal studies conducted by Depue et al. (2015) and Chen-Sankey et al. (2019) found that young adults who were exposed to ENDS or tobacco advertisements on social media were more likely to use ENDS or cigarettes five months later. The theory of planned behaviour by Ajzen (1991) can be used to explain that young adults may be misled by the advertising information they are exposed to, which affects their attitudes and normative assumptions toward the usage of ENDS products. This is supported by study of Trumbo and Kim (2015), when young adults were exposed to more cigarette and nicotine marketing messages, they felt less harm. Additionally, Pokhrel et al. (2018) also supported this view, when young adults are exposed to more advertisements of cigarettes and nicotine, they perceived more advantages of using them which positively impacted their intention and behaviour of using ENDS products.

Moreover, one's likelihood to search for and share information about e-cigarettes increased with more time spent on social media and online platforms (Emery et al., 2014). According to Owusu-Acheaw and Larson (2015), it showed that there are 66.3 % of the students indicated that they spent 30 minutes to 1 hour using social media per day. Moreover, 32.2% of students spent 2-3 hours and 1.5% of them spent 4-5 hours per day on social media. Thereby, it is conjectured that the more time spent on social media, the higher the chances for them to be exposed to information about e-cigarettes, which may instil curiosity about ENDS products among young adults. The notion of a product's popularity may cause people to start

actively looking for and disseminating information about it if they have reached a certain threshold of passive exposure to it (Emery et al., 2014). The high prevalence of pro-e-cigarettes content makes it easier to get this information in the public communication environment, which may directly contribute to YYAs' adoption of e-cigarettes. Additionally, it might arouse their interest in vaping, which would prompt them to look for more information. Likewise, YYAs who plan to or already use e-cigarettes may look for facts to support their vaping action. They are more likely to encounter a pro-e-cigarette information environment in both situations, which could encourage them to keep through with their plans and start or continue using e-cigarettes (Yang et al., 2019).

Besides, young adults started to experiment with e-cigarettes may be due to different flavourings or tastes (Ambrose et al., 2015). Manufacturers of e-cigarettes offer consumers a range of flavours that are appealing to young people such as fruit, dessert, spice, candy, beverage, and bakery (Liang et al., 2016). The authors indicated that it is apparent that e-liquid flavours have developed into one of the most effective e-cigarette advertising techniques. When young adults first start using e-cigarettes, they prefer sweet tastes over tobacco ones (Krishnan-Sarin et al., 2015). Soneji et al. (2019) study supported that young adults e-cigarettes users tend to be attracted by fruit and sweet flavours Also, Ambrose et al. (2015) indicated 81.5% of young users said that they experiment with e-cigarettes are found preferred flavours, which makes the experience more gratifying, pleasurable, and appealing with the flavourings (Soule et al., 2016). Besides, the gratifying and relatively reinforcing value of e-cigarettes may also be increased by flavours (Audrain-McGovern et al., 2016). When compared to unflavoured e-cigarettes, sweet-flavoured e-cigarettes improved willingness to continue use, were more attractive, and perceived financial value (Goldenson et al., 2016). Next, young adults may use e-cigarettes more frequently than older adults due to targeted advertising strategies and different perceptions of the relative risk or social

acceptability of these products compared to traditional cigarettes (Hu et al., 2016). In addition, the findings of Luzius et al. (2020) indicated that university students may use e-cigarettes when they believe they are using e-cigarettes for experimentation or exploring their curiosities. The concept of curiosity was the most often mentioned motivation for using any e-cigarette product in this study. Similarly, college students tried e-cigarettes because of curiosity and e-cigarettes were easy to access in the convenience store (Kong et al., 2015). Another point that is worth mentioning was the effect of celebrity-endorsed e-cigarettes on young adults' attitudes toward e-cigarettes and smoking intentions. Celebrities who promote e-cigarettes on social media have a significant impact on attitudes and intentions to use e-cigarettes, especially those who view celebrities as examples and role models (Phua et al., 2018).

However, the majority of research focused on YYAs rather than university students when investigating the relationship between SMU and e-cigarette use. Therefore, this present study aims to examine SMU as the predictor for the risk of experimentation with e-cigarettes among university students in Malaysia.

### **Self-Esteem and the Risk of Experimentation with E-Cigarettes: RPI as Mediator**

Rosenberg (1965) defined self-esteem as an interpretation of one's self-worth, and one's positive or negative views about oneself. Studies found that self-esteem is one of the potential psychological factors associated with substance use in which poorer self-esteem has a predictive effect on smoking behaviour during adulthood (Khosravi et al., 2016; Saari et al., 2015; Wellman et al., 2016). This might be due to the reason that individuals use vaping devices or other substances as the coping mechanism for stressful emotion and to escape from reality. To elaborate more, study revealed that the use of e-cigarette among university students in Malaysia is emerging in which 74.9% of the respondents from Wan Puteh et al.

(2018) smoked e-cigarettes. Interestingly, only a few researchers analyse low self-esteem as a risk factor when assessing the experimentation of e-cigarettes.

Szinay et al. (2019) claimed that individuals with lower self-esteem were associated with a higher risk of being a smoker. This finding is supported by a longitudinal study from Khosravi et al. (2016). The results showed that individuals with weaker self-esteem were more prone to engage in experimentation or to smoke frequently after 1-year follow up. Grant et al. (2019) proved that e-cigarette users were more likely to express low self-esteem, PTSD, ADHD, and gambling disorder using the RSES. Despite that, the claim was refuted by Jha and Kraguljac (2021), who revealed that there is no significant difference in the level of self-esteem among vapers and non-vapers. Instead, the authors discovered that peer pressure and stress alleviation are the main reasons why teens vape at high school. Based on studies reviewed above, research on its connection to the risk of experimentation of e-cigarettes has not been done extensively and there were studies with contradicted findings.

On the other hand, Dishion et al. (2008) found that young people with lower self-esteem were more likely to be susceptible to peer influence. This is because they are sensitive to the perceived threat of being rejected by peers, in turn, were linked to a higher risk of involvement with deviant peer groups (Dmitrieva et al., 2014). Nevertheless, literature about peer influence as a mediating variable between the association of self-esteem and problematic behaviours is quite limited. One significant mediation effect was found in self-esteem and substances use (Kaplan et al., 1982), explained by self-derogation theory, which argues that young people with low self-esteem and frequent self-derogation if they repeatedly receive negative feedback from others, tend to attach to deviant peers in order to defend their egos and boost their self-worth. This theoretical model is supported by a two-year longitudinal study which reported a direct effect of weak self-esteem on involvement with substance-use peers, but an indirect effect on early substance use (Kaplan et al., 1982). Consistent with

Kaplan et al. (1982), DuBois and Silverthorn (2004) also found a significant mediation between the association of self-esteem and problem behaviours, which highlighted that young people with lower self-esteem are more susceptible to affiliate with deviant peers, which in turn, associated with higher risks involving in problem behaviours.

In addition, risk-taking behaviours seem to be significantly influenced by the susceptibility to peer pressure (Smith et al., 2014). Peer influence is then found as a strong contributing factor of cigarette initiation and continuation among young people in various countries (Liu et al., 2017). Jha and Kraguljac (2021) also reported that peer influence was the most influential factor for vaping, and most young people shared vapes among peers (Tsai et al., 2018; Wallace & Roche, 2018). Based on the aforementioned literature, it is reasonable to consider that RPI might be a mediator in the association between self-esteem and the risk of experimentation with e-cigarettes among university students. In short, there is a need to investigate the relationship of self-esteem in predicting the risk of experimentation of e-cigarettes, with RPI as the mediating variable among university students.

### **Theoretical Framework**

In this study, we used Social Learning Theory and Self-Derogation Theory as the roadmap to draw connections and make predictions between the variables.

Social Learning Theory (Bandura & Walters, 1977) places a strong emphasis on the value of observing, modelling, and replicating other people's behaviours, attitudes, reinforcement and punishment, as well as emotional responses (Akers et al., 2021). The interaction of environmental and cognitive influences on human cognition and behaviour is taken into account by the theory. Therefore, people's behaviours are affected by observing and direct experiencing with the environment. Social media provide a platform for individuals to access with different information, in which e-cigarette will be exposed to it through advertisement or movie shows (O'Brien et al., 2020). In the current study, Social

Learning Theory can be used to explain the relationship between SMU and risk of experimentation with e-cigarettes. We hypothesized that a higher usage in social media predicts a higher risk of experimentation with e-cigarettes.

Cho et al. (2019) conducted a study to examine the mediating and moderating mechanisms of motivation for SMU and its impact on e-cigarette use attitudes among adolescents. Based on the findings, the frequency of using social media positively associated with exposure to e-cigarette, and hence, causing a positive attitude toward e-cigarette use. To elaborate more, teens are extremely prone to these social media impacts since they were grown up with social media as a significant medium or source for daily socialization (Best et al., 2014).

However, some studies adapted Social Learning Theory to explain the relationships between peer influence and personal risk perceptions of e-cigarettes, in which the risk of experimenting e-cigarettes is affected when the people surrounding, especially peers were involve in vaping. According to Hoffmann (2021), Social Learning Theory was one of the key predictors of youth in nicotine vaping. Based on the results, with a lower self-control and the influences from social learning, it is accounted for nicotine vaping among adolescents. Moreover, this view is supported by Rocheleau et al. (2020), in which the authors used social learning theory framework in explanations for e-cigarette use. Findings indicate that greater levels of peer e-cigarette use are associated with higher likelihood of personal e-cigarette use.

Moving on to the next theory, Self-Derogation Theory (Kaplan et al., 1982) states that interaction with family, school, and peers that undermine our sense of self will reduce the drive to enhance our self-esteem and the motivation to confront. Self-Derogation Theory outlined two major routes in stating how self-derogation leads to deviant behavior. The first route proposed that individuals come to realize the consequences of current membership-

group experiences that are self-devaluing, whereas the second route postulates the persistence of self-rejecting feelings (Kaplan et al., 1982).

Wells (1989) found that delinquency occasionally has a positive influence on people with exceptionally high self-esteem. This view can be explained by the theory in which Kaplan et al. (1982) mentioned that self-derogation is a result of one's judgements of oneself as lacking desirable characteristics, failing to engage in desirable behaviours, and not being the target of admiring remarks from desirable people. These assumptions are put into practise through the felt-rejection items, valued characteristics, and affiliation with the normative system. It was concluded that increased awareness of self-devaluing importance of family and school as the impact of self-derogation leads to an increase in likelihood of drug use.

Moreover, Petraitis et al. (1995) proved that self-esteem is the key elements in experimental substance use. Self-Derogation Theory, which stated that adolescents with lower self-esteem and higher frequency in self-derogation is due to negative evaluation from others. They are more likely to join with rebellious peers to uphold their self-worth and protect their egos (Kaplan et al., 1982). In other words, self-derogation also leads to increase awareness of substance use among teens, which increase the possibility of substance use. Hence, based on the Self-Derogation theory, we hypothesize that low self-esteem will motivate an individual to experiment with e-cigarette use in an attempt to restore their self-esteem with interactions among substance using peers. In the current study, RPI was used as the mediating factor between self-esteem and risk of experimentation of e-cigarettes.

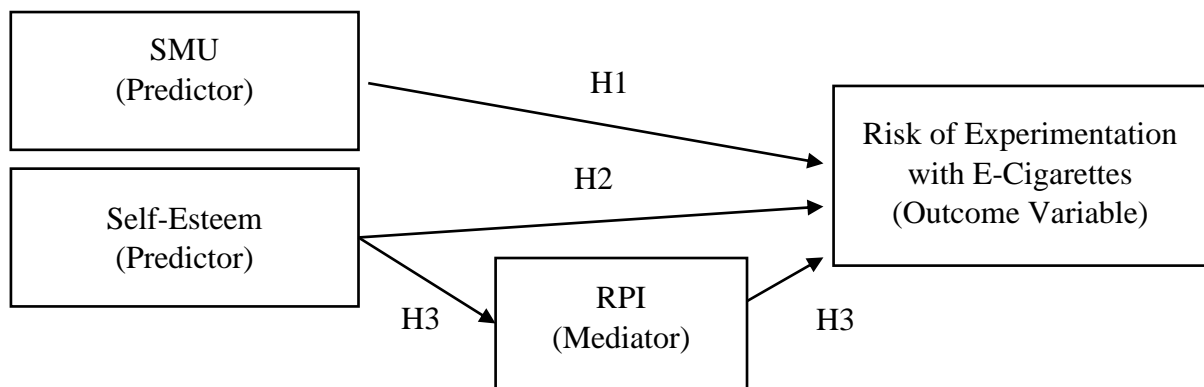
### **Conceptual Framework**

This study was conducted to explore the roles of SMU and self-esteem as predictors of the risk of experimentation with e-cigarettes and RPI as the mediator among university students in Malaysia. The predictors were SMU and self-esteem, the mediator is RPI while the outcome variable was the risk of experimentation with e-cigarettes. In the present study,

Social Learning Theory is used to support the first hypothesis, in which SMU positively predicts the risk of experimentation with e-cigarettes among university students in Malaysia. Next, the second and third hypothesis adapted the Self-Derogation Theory, in which RPI was used as the mediating factor between self-esteem and the risk of experimentation of e-cigarettes.

**Figure 2.1**

*Conceptual framework of SMU, self-esteem, RPI, and the risk of experimentation with E-cigarettes among university students in Malaysia.*





### **Chapter III**

#### **Proposed Methodology**

##### **Research Design**

The research design adopted in the present study was quantitative in nature, a method that aims to collect information in numerical format and then analyse through statistical analysis to describe a research problem (Apuke, 2017). A cross-sectional survey research design was used to investigate SMU and self-esteem as predictors to the risk of experimentation with e-cigarette with RPI as a mediating variable between the association of self-esteem and risk of experimentation with e-cigarette among university students in Malaysia. According to Bhandari (2020), a cross-sectional study is used to concurrently collect data from different individuals. All concerned data and information were collected through self-report questionnaires distributed online. This survey method allows a better outreach to university students through various approaches such as online surveys, and makes sure the intended population is covered fairly (Ponto, 2015). Moreover, it serves as an economic tool for researchers and less-time consuming upon collecting large data (Setia, 2016). More importantly, it measures correlational data which is applied in mediation analysis (Iacobucci, 2008).

##### **Research Sample**

###### ***Participants***

The sample involved local university students aged between 18 to 24 from higher institutions, including both private and public universities and colleges in Malaysia. Participants who do not meet the criteria, such as those aged below 18 or over 24, studying abroad, foreign students studying in Malaysia, or currently pregnant were excluded from this study.

According to the Ministry of Higher Education (2021), there were a total of 1,207,593 university students enrolled in the year of 2021. Since SMU exposed young adult e-cigarette never-users aged 18-24 to subsequent experimentation with e-cigarettes (Alpert et al., 2019; Chen-Sankey et al., 2019; Massey et al., 2021), university students aged between 18-24 were chosen to be the intended population in this study. Besides, they were likely to have higher exposure to e-cigarette related advertisements (Ngaruiya et al., 2018) and more affordable for it (Erinoso et al., 2021). Wan Puteh et al. (2018) also reported that 74.9% of university students were e-cigarettes users among 1,300 participants recruited from 6 local universities.

### ***Sample Size***

Sample size was calculated by using G-power version 3.1. Since there are limited similar past studies, a medium Cohen's effect size ( $f^2=.15$ ) was applied in the formula. The calculated sample size, which is 119, indicated the minimum participants to be recruited for present study, while the detailed output of G-power is attached in Appendix B. Considering several factors such as the difficulty of estimating the true size effect, survey response rates, and potential missing data, the finalized sample size was determined at 143, which is 20 percent larger than the minimum requirement to make sure the results are reliable.

### ***Sampling Method***

Purposive sampling method was applied in the data collection process, which is a non-probability sampling method that only recruits participants based on the sound judgment of researchers (Crossman, 2020). In other words, it helps in recruiting representative samples who fulfil the criteria to be part of the sample (Etikan, 2016). This sampling method is adopted in current study due to its cost effectiveness and time effectiveness. Besides its convenience, purposive sampling method is chosen because it serves as a guideline in identifying and selecting information-rich samples.

In the present study, participants were chosen only if they are not pregnant. Both e-cigarettes never-users and e-cigarette ever-users were included in this study providing that they were not regular e-cigarette users, which was defined as using e-cigarette  $\leq 2$  days in the past 30 days. In other words, those with high e-cigarette dependence were excluded from this study with the reason that they are beyond the experimentation stage of e-cigarettes. On the other hand, dual users of both combustible cigarettes and e-cigarettes were included only if they fulfil the same criteria of not being regular e-cigarette users, having used e-cigarettes for no more than two days within the past 30 days.

Data was collected from participants within this age range through the distribution of survey links via various online channels such as email, Facebook, Microsoft Teams and WhatsApp. Multiple platforms were used to avoid bias towards any particular platform and to reach a diverse audience. Additionally, a diverse set of student organizations from other universities like Universiti Malaya and Universiti Sains Malaysia were approached for survey distribution after explaining the purpose and importance of the study to them. Student organizations from different faculties or departments, as well as those with different interests or backgrounds were considered to ensure that the sample is representative of the larger population. The survey was then promoted on their social media pages. By conducting online surveys, we were able to overcome the geographical obstacles and recruit participants from universities in different areas in Malaysia, which prevents selective bias.

## **Instruments**

### ***Social Networking Usage Questionnaire***

SMU is measured by the Social Networking Usage Questionnaire. It measures the purpose of social media usage across five dimensions, including academic, socialization, informativeness, and constraints (Gupta & Bashir, 2018). Social Networking Usage Questionnaire is a 24 items questionnaire that includes five dimensions that relate to social

networking usage which are dimension one refers to academics (7 items), dimension two is socialization (6 items), dimension three is entertainment (4 items), dimension four is informativeness (3 items), and dimension five is constraints (4 items). Each of these statements was aligned to be answered on a five-point Likert scale with the following anchor ratings, (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, 5 = *always*). The higher the score in a particular dimension, the higher frequency of social media usage for that particular purpose. The internal reliability of Social Networking Usage Questionnaire indicated good reliability, with a Cronbach's alpha of .88. In the present study, only one subscale was used, namely Socialization in this study. Example of items in this subscale:

1. I use social networking sites to become more sociable.
2. I use social networking sites to get information regarding current social events.
3. I use social networking sites to create my social identity.

### ***Rosenberg Self-Esteem Scale***

RSES was used to measure the self-esteem of university students in this study. According to Rosenberg (1965), the scale consists of 10 items which measure on a four-point Likert scale which format ranging from strongly agree to strongly disagree (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, 4 = *strongly agree*). The score of items for Items 2, 5, 6, 8, and 9 can be obtained after using the reverse scoring method. The total scores of ten items were then computed a continuous scale. The total scores of this scale can range from 10 to 40. Greater scores imply greater levels of self-esteem. The RSES exhibited excellent levels of internal consistency at .88 as shown in the present study. Example of items in this scale:

1. On the whole, I am satisfied with myself.
2. At times I think I am no good at all.
3. I certainly feel useless at times.

*Resistance to Peer Influence Questionnaire*

RPI is measured by RPIQ, a 10-item scale that measures an individual's propensity to resist peer pressure (Steinberg & Monahan, 2007). Respondents were presented with 10 pairs of statements, and for each pair, they were asked to choose the statement that best describes them as either less or more resistant to peer influence group. After indicating the best descriptor, participants were subsequently requested to indicate the extent to which they identify with this group, whether "Really true" or "Sort of true". Responses are then coded on a 4-point scale, in which the options "Really true" and "Sort of true" for the less peer-resistant statement were given a score of 1 and 2, respectively, while the options "Sort of true" and "Really true" for the more peer-resistant statement are scored as 3 and 4, respectively. The scoring of items 2, 6, and 10 were reversed prior to the analysis of the data. The results of all 10 items are then added together to get an RPI total score, with greater total scores indicating higher RPI. The RPIQ has been found to possess good psychometric properties, with evidence for internal consistency, a Cronbach's alpha of .74 in the present study. Example of items in this scale:

1. Some people go along with their friends just to keep their friends happy BUT Other people refuse to go along with what their friends want to do, even though they know it will make their friends unhappy
2. For some people, it's pretty easy for their friends to get them to change their mind BUT For other people, it's pretty hard for their friends to get them to change their mind
3. Some people take more risks when they are with their friends than they do when they are alone BUT Other people act just as risky when they are alone as when they are with their friends

### ***Susceptibility to Smoking***

Risk of experimentation with e-cigarette is measured by Susceptibility to Smoking, a three-questions survey used to examine an individual as susceptible to smoking (Pierce et al., 1996). Response options provided were “definitely not,” “probably not,” “probably yes,” and “definitely yes.” Participants who answered “definitely not” to all three questions were categorized as “committed never-smokers.” Those who answered “probably yes” or “definitely yes” for at least one of the questions were categorized as “highly susceptible”. Meanwhile, the remaining respondents who did not choose “probably yes” or “definitely yes” for any question and did not answer “definitely not” on all questions were placed in the “susceptible” category. These items have demonstrated a high internal consistency which is Cronbach’s alpha of .93. Example of items in this scale:

1. Do you think that in the future you might experiment with cigarettes?
2. At any time during the next year do you think you will smoke a cigarette?
3. If one of your best friends were to offer you a cigarette, would you smoke it?

### **Research Procedure**

#### ***Ethical Considerations***

Approval from UTAR Scientific and Ethical Review Committee (SERC) was obtained on 10 January 2023 with the reference number of U/SERC/02/2023 (see Appendix C) before the initiation of data collection process due to the present study involving the use of human subjects.

#### ***Pilot Study***

A pilot study of 20 participants was conducted. Van Teijlingen and Hundley (2002) defined a pilot study as a mini version of a feasibility study that involves pre-testing of a specific research instrument, such as a questionnaire or interview schedule, before implementing it on a larger scale. Conducting a pilot study does not ensure the success of a

research study, but it can enhance the likelihood that a feasibility or main study will be successful. This is because a pilot study serves several crucial purposes and can offer significant insights for other researchers.

On the other hand, Qualtrics was utilized as the web-based survey tool to create the questionnaire. Participants were recruited from social media platforms such as Microsoft Team, Email, and WhatsApp. A brief introduction and objective of the study were included in the particular recruiting platforms. In the beginning of the questionnaire, participants were required to read the informed consent on whether their willingness to participate in this present study. Participants were requested to fill in their demographic information if they agree to participate in this study. The scales of Social Networking Usage Questionnaire, RSES, RPIQ and Susceptibility to Smoking were included followed by the demographic information. The questionnaire was designed to take approximately 15-20 minutes to complete, and the responses of the participants were kept confidential and solely for educational purposes.

Lastly, the gathered data were interpreted and analysed by using IBM SPSS version 23. The result showed that good reliability in Social Networking Questionnaire ( $\alpha = .73$ ), similarly, RSES demonstrated good internal consistency ( $\alpha = .77$ ). Meanwhile, RPIQ showed the result of alpha Cronbach's coefficient ( $\alpha = .65$ ). Despite the fact that removing Item 7 from the scale would lead to an increase in the reliability coefficient to .74, it was decided to retain the item. This decision was made because deleting Item 7 could potentially compromise the scale's ability to fully capture the construct of interest, RPI. Additionally, it was supported by (Nunnally & Bernstein, 1994) in which 0.6 and above is considered as an acceptable. Lastly, the Susceptibility to Smoking achieved excellent levels of high reliability ( $\alpha = .97$ ). The reliability results were presented in Table 3.1.

**Table 3.1****Reliability of the Instruments**

Variable	No. of Items	Cronbach Alpha		
		Past study	Pilot study	Actual study
Social Networking Usage Questionnaire	24	.83	.73	.88
RSES	10	.89	.77	.88
RPIQ	10	.70	.65	.74
Susceptibility to Smoking	3	.74	.97	.93

**Data Analysis**

Data analysis was conducted by using IBM SPSS version 23. A data cleaning process was conducted to make sure all recruited participants are qualified, and all questionnaires are completed. Then, the variable data will be transformed and summed up. The assumption of normality was examined in various ways, such as skewness and kurtosis where the acceptable range for both values are within 2 (Čisar & Čisar, 2010). Histogram and Q-Q plots were used to observe the data distribution. Apart from that, Kolmogorov-Smirnov test was also used to examine the normality and ensure absence of potential outliers (Pallant, 2016). The present study conducted descriptive statistics on all the demographic variables, using frequency and percentage distributions, meanwhile the age variable was examined using mean and standard deviation. Additionally, the main variables were analysed with descriptive statistics, including mean and standard deviation. The relationship between the main variables was examined through Pearson Product Moment Correlation (PPMC).

Then, multinomial logistic regression was used to investigate the prediction of SMU and self-esteem on risk of experimentation with e-cigarettes. SMU serves as IVs, while risk of experimentation with e-cigarettes serves as DV. The assumptions of multinomial logistic regression were examined to make sure each variable is independent of each other. In this regression model, DV must be categorical variable with at least one IV classified as



continuous data. Besides, the assumption of multicollinearity will be tested with Variance Inflation Factors (VIF) and tolerance, and the assumption is met if VIF values were below 10 and values of tolerance were more than 0.1 (Keith, 2019). Other than that, the assumption of multivariate normality was analysed using Cook's distance, Mahalanobis distance and Leverage's value. Cook and Weisberg (1982) suggested that the value of Cook's distance below 1 indicates the absence of influential cases, while the cases with p-value of Mahalanobis distance less than .001 are problematic (Penny & Jolliffe, 2001). The cases with values larger than 3 times of Leverage's value would be susceptible as influential cases. Lastly, the assumption of linearity was examined by observing the visual estimation of scatterplot (Muzaffar, 2016). Lastly, mediation analysis was run using PROCESS model 4 (Cucos, 2022; Hayes, 2017) to determine the mediation effect of RPI between the relationship of self-esteem and risk of experimentation with e-cigarettes. The confidence intervals was set at 95% by default. According to Hayes (2017), a mediation effect is statistically supported if the confidence interval (CI) of the indirect effect does not include zero.

## **Chapter IV**

### **Result**

#### **Data Cleaning**

Data cleaning involves multiple stages to identify and eliminate errors within a dataset, leading to an overall improvement in data quality (Müeller & Freytag, 2005). A total of 180 sets of responses were collected.

#### ***Input Error***

The downloaded SAV file was cross-checked against 180 sets of responses recorded in Qualtrics, and no input errors were detected.

#### ***Irrelevant Data***

In the present study, the targeted participants were Malaysian students who claimed themselves as e-cigarette never-users or e-cigarette ever-users with low e-cigarette dependence. 14 sets of responses provided by regular e-cigarette users who use e-cigarette more than 2 days in the past 30 days were dropped. At this point, 166 sets of responses were reserved.

#### ***Missing Data***

If a cross-sectional study has missing data for a main variable, researchers may need to consider excluding the observations that contain missing values, according to Sainani (2015). Out of all the cases, 18 were found to have missing data, out of which 9 cases did not provide any response on any scale. Among the remaining cases, 4 cases only provided demographic information, 1 case only completed demographic information and Social Networking Usage Questionnaires, 2 cases merely completed the demographic section, Social Networking Usage Questionnaires, and RSES, and 1 case completed all sections except for the last section, Susceptibility to Smoking. The remaining 1 respondent disagreed to process

personal data. Listwise deletion was used to handle these missing data. Therefore, 18 cases were removed at this point, and 148 cases were maintained.

### ***Straight-Lining Data***

In order to ensure the quality of the data, it is important to identify and exclude instances of straight-lining, where respondents provide the same or very similar responses to a series of questions in a single scale (Kim et al., 2020). To detect such cases, the variance was calculated for each scale. During this process, it was found that 2 respondents rated only 3 and 5 respectively in response to all items on the Social Networking Usage Questionnaires, 2 respondents rated 2 in response to all items on the RSES scale, and 1 respondent rated only 3 in response to all items on the RPIQ scale. These cases were identified and removed from the dataset, leaving a final sample of 143 complete sets of responses.

### **Normality Assumptions**

Normality assumptions were assessed using several methods, including Q-Q plot, histogram, skewness, kurtosis, and Kolmogorov-Smirnov test, and the results were displayed in Table 4.1.

### ***Q-Q Plot***

The Q-Q plots for each variable indicated that most of the data followed a regular distribution, with data points clustering close to the diagonal line. Therefore, the normality assumption for the Q-Q plot was met.

### ***Histogram***

The histograms for each variable displayed a bell-shaped curve, which suggested that the data was normally distributed. Thus, there was no indication of a violation of the normality assumption.

### *Skewness and Kurtosis*

Table 4.1 demonstrated that there were no violations of the assumptions of skewness and kurtosis. Specifically, the values of skewness and kurtosis observed in this study were located within the standard range of -2 to +2 (Gravetter & Wallnau, 2014).

### *Kolmogorov-Smirnov Test*

Based on the criteria outlined by Ghasemi and Zahediasl (2012), there is a presence of normal distribution when  $p$ -value larger than .05. The normality assumption for Kolmogorov-Smirnov test was met for SMU-Socialization ( $p = .07$ ) and RPI ( $p = .05$ ). However, there were violations of the normality assumptions for self-esteem ( $p < .001$ ).

### *Summary*

Despite not meeting the assumption for the Kolmogorov-Smirnov test, it should be noted that it is not a significant or highly influential indicator of normality according to Ghasemi and Zahediasl (2012). In essence, it was deemed that the dataset was approximately normally distributed with the evidence that four out of five normality assumptions were met.

**Table 4.1**

### **Kolmogorov-Smirnov Test, Skewness and Kurtosis, Histogram, and Q-Q Plots**

Variable	Kolmogorov-Smirnov			Skewness	Kurtosis	Histogram	Q-Q plot
	Statistic	<i>df</i>	Sig.				
SMU-Socialization	.072	143	.068	.065	-.281	Normal	Normal
Self-Esteem	.118	143	<.001**	.529	.703	Normal	Normal
RPI	.074	143	.053	.049	.048	Normal	Normal

\*\*  $p < .01$

### **Univariate Outlier**

Five cases were detected as univariate outliers as shown in boxplots (see Appendix F). Since these cases were not input errors and did not significantly influence the normality distribution (Aguinis et al., 2013), they were not removed.

## Descriptive Statistics

Table 4.2 provides descriptive information on the demographic variables of the 143 participants in this study. The age of the participants fell between 19 and 24 ( $M = 21.7$ ,  $SD = 1.1$ ) with most of the respondents were 22 years old (42.7%,  $n = 61$ ). In term of gender, 64.3% were female ( $n = 92$ ) and the remaining 35.7% were male ( $n = 51$ ). The majority were Chinese (82.5%,  $n = 118$ ), followed by Malay (9.8%,  $n = 14$ ), and Indian (7.7%,  $n = 11$ ). Most participants were undergraduate students (93.0%,  $n = 133$ ), with only a small proportion of participants being foundation or postgraduate students (3.5%,  $n = 5$ ), respectively, with the majority of participants being from Universiti Tunku Abdul Rahman (33.6%,  $n = 48$ ). Among the participants, 29 out of 143 (20.3%) had tried e-cigarettes for 1-2 days in the past 30 days.

**Table 4.2**

### *Sociodemographic Characteristic of Participants*

Sociodemographic characteristic	<i>n</i>	%
Gender		
Female	92	64.3
Male	51	35.7
Ethnicity		
Chinese	118	82.5
Malay	14	9.8
Indian	11	7.7
Highest educational level		
Foundation/A-Level/Diploma	5	3.5
Undergraduate	133	93.0
Postgraduate	5	3.5
Tertiary Institution		
AIMST University	2	1.4
Asia Pacific University of Technology & Innovation	1	.7
Brickfields Asia College	1	.7
HELP University	4	2.8
INTI International University & Colleges	4	2.8
Monash University Malaysia	5	3.5
Multimedia University	6	4.2
Newcastle University Medicine Malaysia	1	.7
Quest International University	7	4.9
Raffles University	1	.7
Sunway University	10	7.0

Taylor's University	5	3.5
Tunku Abdul Rahman University of Management & Technology	4	2.8
UCSI University	2	1.4
Universiti Malaya	12	8.4
Universiti Malaysia Sabah	1	.7
Universiti Malaysia Terengganu	1	.7
Universiti Sains Malaysia	10	7.0
Universiti Teknologi PETRONAS	4	2.8
Universiti Tun Hussein Onn Malaysia	1	.7
Universiti Tunku Abdul Rahman	48	33.6
Universiti Utara Malaysia	5	3.5
University of Malaysia Pahang	1	.7
UOW Malaysia KDU University College	1	.7
Xiamen University Malaysia	6	4.2
Previous e-cigarette experimentation <sup>a</sup>	29	20.3
Currently pregnant <sup>b</sup>	0	0

Note. *N* = 143. Participants were on average 21.7 years old (*SD* = 1.1), and participant age did not differ by condition.

<sup>a</sup> Reflects the number and percentage of participants answering “yes” to this question, among whom, all used e-cigarettes for 1-2 days in the past 30 days.

<sup>b</sup> Reflects the number and percentage of participants answering “no” to this question.

**Frequency Distribution**

Table 4.3 presents the descriptive statistics of all independent and mediation variables: SMU, self-esteem and RPI. The mean and standard deviation of the subdimension of SMU-Socialization (*M* = 21.80, *SD* = 3.90) were reported. Followed by self-esteem (*M* = 21.52, *SD* = 4.71), with minimum score of 10 and maximum score of 36; RPI (*M* = 25.17, *SD* = 4.77), with minimum score of 12 and maximum score of 37.

**Table 4.3**

*Descriptive Statistics and Correlations for Independent Variables*

Variables	<i>M</i>	<i>SD</i>	Min.	Max.	1	2	3
SMU-Socialization	21.80	3.90	11	20	—		
Self-Esteem	21.52	4.71	10	36	-.11	—	
RPI	25.17	4.77	12	37	-.18*	-.02	—

\* *p* < .05.

Table 4.4 demonstrated the descriptive statistics of the dependent variable: risk of experimentation with e-cigarette. Among the participants, 79 out of 143 (55.2%) were categorized as *committed never smoker*, the remaining 29 participants as *susceptible* smoker (20.3%) and 35 were classified as *highly susceptible* (24.5%).

**Table 4.4**

*Frequency Distribution of Dependent Variable*

Variable	<i>M</i>	<i>SD</i>	<i>f</i>	%
Risk of experimentation with e-cigarettes	1.69	.841		
<sup>a</sup> Committed never smoker			79	55.2
Susceptible			29	20.3
Highly susceptible			35	24.5

<sup>a</sup> 1 = committed never smoker, 2 = susceptible and 3 = highly susceptible

**Multinomial Logistic Regression Assumptions**

***Variable Types***

In multinomial logistic regression, the variables used in this study must be independent with each other and the DV must be measured on either nominal or ordinal level, meanwhile there is one or more IVs that can be continuous, ordinal or nominal. These assumptions had been met in the present study as the dependent variable is considered as nominal variable with three categories of susceptibility to smoking i.e. *committed never smoker*, *susceptible* and *highly susceptible*, meanwhile all independent and mediation variables are continuous.

***Multicollinearity***

The present study used the Variance Inflation Factor (VIF) and tolerance indicators to detect multicollinearity in the three independent variables, SMU, self-esteem and RPI. Accounting to Kim (2019), multicollinearity is indicated if the VIF result ranges from five to 10, and the tolerance result ranges from 0.1 to 0.2. Table 4.5 showed that the VIF results for variables were all below five, meanwhile the tolerance values were all above 0.2. Therefore,

the values of VIF and tolerance indicated the absence of multicollinearity, confirming that the assumption was not violated.

**Table 4.5**

*Collinearity Statistics*

Variable	Tolerance	VIF
SMU-Socialization	.988	1.012
Self-Esteem	.988	1.012

*Multivariate Outliers*

In order to eliminate all influential cases, the indicators of Cook's Distance, Mahalanobis Distance and Centered Leverage distances were employed. Cook and Weisberg (1982) recommend excluding cases with a Cook's distance value exceeding 1. All cases had a Cook's distance value less than 1, indicating satisfactory results. As the regression model had two predictor variables, critical value with 2 degrees of freedom was employed to calculate Mahalanobis distances (Tabachnick & Fidell, 2013). A very conservative probability estimate of .001 was suggested as the threshold value for the Mahalanobis Distance to detect potential outliers (Tabachnick & Fidell, 2013). No case was detected with a p-value less than .001 (see Appendix H). The cutoff value for Centered Leverage distance was determined using the formula three times  $k+1/n$ , where  $k$  represents the number of predictors and  $n$  represents the number of cases (Hoaglin and Welsch, 1978). In the current study, the cut-off value for Leverage distance was .063, Case 106 was detected with a leverage greater than .084 (see Appendix H). Therefore, one case of multivariate outliers were dropped from the analysis.

*Linearity*

The assumption of linearity in a scatterplot can be checked by examining the distribution of the points above and below a straight line. If the points are symmetric and equally spaced out along the line, the assumption of linearity can be assumed (Kutner et al.,



2004). The location of the residuals was distributed symmetrically and equally along the diagonal lines in the scatterplot (see Appendix H), and the assumption was met.

**Multinomial Logistic Regression**

*H*<sub>1</sub>: SMU positively predicts the risk of experimentation with e-cigarettes among university students in Malaysia.

*H*<sub>2</sub>: Self-Esteem negatively predicts the risk of experimentation with e-cigarettes among university students in Malaysia.

Without violation of any assumptions, multinomial logistic regression was carried out to examine if SMU and self-esteem significantly predict the risk of experimentation with e-cigarette among university students in Malaysia. The significance level of .05 was used for all tests. As shown by the Model Fitting Information table (see Appendix H), the final model significantly fit better over the null model,  $\chi^2(8, N = 142) = 43.343$ , Nagelkerke  $R^2 = .077$ ,  $p = .045$ . Significant unique contributions were made by SMU as presented in Table 4.6.

**Table 4.6**

*Predictors' Unique Contributions in the Multinomial Logistic Regression (N = 142)*

Predictor	$\chi^2$	<i>df</i>	<i>p</i>
SMU_ Socialization	9.38	2	.009**
Self-Esteem	1.40	2	.549

*Note:*  $\chi^2$  = amount by which -2 log likelihood increases when predictor is removed from the full model

\*\*  $p < .01$ .

The reference group was students who were committed never smokers. Table 4.7 presented the parameter estimates. Accordingly, each predictor has two set of coefficients, one representing the comparison between *susceptible* category and the reference category, another one representing the comparison between *highly susceptible* category and the reference category, *committed never smoker*.

None of the predictors had significant parameters for comparing the *committed never smoker* category with the *susceptible* category. Only SMU ( $\beta = .167, p = .004$ ) was a significant predictor in this model for comparing the *committed never smoker* category with the *highly susceptible* category. For every one unit increase in SMU, the odds of being in the *highly susceptible* category rather than the *committed never smoker* category were multiplicatively increased by a factor of 1.181. In other words, participants with higher frequency of SMU in the purpose of socialization were more likely to be a highly susceptible smoker than committed never smoker. Self-Esteem was found to be not statistically significant in both sets of coefficients. The results suggested that the first hypothesis was partially accepted, however the second hypothesis was not supported.

**Table 4.7**

*Parameter Estimates Contrasting the Committed Never Smoker Category versus Each of the Other Groups (N = 139)*

Predictor	<i>Committed Never Smoker vs.</i>	$\beta$	OR	p
SMU_Socialization	Susceptible	.015	1.014	.792
	Highly Susceptible	.167	1.181	.004**
Self-Esteem	Susceptible	.014	1.014	.771
	Highly Susceptible	.051	1.052	.275

*Note.* OR = odds ratio associated with the effect of a one standard deviation increase in the predictor.

\*\*  $p < .01$ .

Using the logistic model to make predictions results in overall 54.9% correct prediction (see Appendix H). Committed never smokers were best predicted by the model with correct prediction at 92.3%. Highly susceptible smokers correctly predicted by the model 17.1% of the time. The model was unable to accurately predict for those who were susceptible smokers (0.0%).

**Mediation Analysis**

*H*<sub>3</sub>: RPI mediates the association between self-esteem and the risk of experimentation with e-cigarette among university students in Malaysia.

The path from self-esteem to RPI was found positive and significant ( $b = -.20, s.e. = 1.90, p = .023$ ), indicating that students with higher self-esteem were more resistant to peer influence. The path from RPI to risk of experimentation with e-cigarettes was found significant and negative ( $b = -.08, s.e. = .014, p = <.001$ ), revealing that students scoring higher on RPI were less likely to experiment e-cigarettes.

The indirect effect was examined via non-parametric bootstrapping. The indirect effect is inferred to be 0 if the null of 0 falls between the lower and upper limit of 95% CI. Since 0 fell outside the CI of .001 and .033, the results revealed that there was a significant indirect effect of self-esteem on risk of experimentation with e-cigarettes ( $b = .016$ ), hence the third hypothesis was supported.

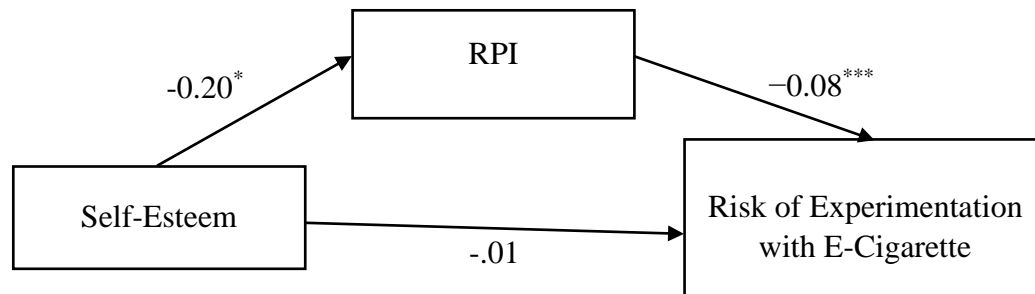
No direct effect of self-esteem on risk of experimentation with e-cigarette was found ( $\beta = -.01, s.e. = .014, p = .64$ ) in the presence of RPI. Therefore, it was regarded as a full mediation.

**Table 4.8**

*Mediation Analysis Summary*

Relationship	Total Effect	Direct Effect	Indirect Effect	CI		Conclusion
				<i>LL</i>	<i>UL</i>	
Self-Esteem -> RPI -> Risk of Experimentation with E-Cigarettes	.010	-.007	.016	.001	.033	Full mediation

*Note.*  $N = 142$ . CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

**Figure 4.1***Mediation Path Analysis Model*

*Note.* The path analysis shows association between self-esteem and risk of experimentation with e-cigarette with RPI as a mediator. Coefficients presented are the effect size.

\*  $p < .05$ . \*\*  $p < .01$  \*\*\*  $p < .001$

## Chapter V

### Discussion

#### **Social Media Use and the Risk of Experimentation with E-cigarettes**

*H<sub>1</sub>: SMU positively predicts the risk of experimentation with e-cigarettes among university students in Malaysia.*

The first objective of this study was to investigate whether SMU positively predicts the risk of experimentation with e-cigarettes among university students in Malaysia. Findings supported the hypothesis with the result indicating that higher frequency of SMU in the purpose of socialization were found more likely to be highly susceptible smoker than committed never smoker. This result showed consistency with study of Sawdey et al. (2017), SMU positively and significantly correlated with e-cigarettes use. Also, the authors indicated that the exposure on the content of e-cigarettes via social media could increase the risk for e-cigarettes use among college students.

According to Alpert et al. (2019), when the young adults were frequently exposed to messages about e-cigarettes from the peer posts in social media, they are more prone to normalize the use of e-cigarettes. As a result, this will affect their positive perceptions and attitudes regarding e-cigarettes and increase the risk of experimentation with e-cigarettes. Results of the current study concluded that higher frequency of SMU in the purpose of socialization occurs a positive relationship with highly susceptible to e-cigarettes. In addition, young adults are more susceptible to use e-cigarettes because of their peers' behaviours rather than the general aspects of e-cigarettes advertisement. To further explain, young adults are more prone to be affected by the e-cigarettes advertisement which is shared by their peers on social media when compared with the social media advertisement that is not shared by their friends. Hence, it will alter young adults' risk perceptions toward e-cigarettes and increase intention on trying e-cigarettes (Krishen et al., 2021).

Other than that, the result of present study was in line with study by Vogel et al. (2020). The participants reported that the more intense SMU is in their daily life, the greater intention and inclination to involve in e-cigarettes use. In this situation, they will have better perceptions of e-cigarettes as normative, more positive e-cigarettes attitudes, and lower perceptions of e-cigarettes as dangerous. Wackowski et al. (2019) supported this point, when youths are exposed to e-cigarettes related news that are portrayed positively, it may cause never-triers which can also be named as non-smokers to increase the odds of e-cigarettes susceptibility. The reason for the development of harm perceptions, interest in the product, and intentions to use it among young people could be attributed to the media's coverage of e-cigarettes, which can portray them as harmful. This coverage may reinforce the pre-existing beliefs of youth regarding e-cigarettes.

Meanwhile, this result can be explained as social media promotes and claims e-cigarettes are less harmful when compared with combustible or conventional cigarettes (Sapru et al., 2020). This view is supported by Thrasher et al. (2016) and Yong et al. (2016), the respondents in both studies reported that e-cigarettes and heated tobacco are less hazardous than conventional cigarettes. Moreover, Wężyk-Caba et al. (2022) also indicated that over the past few years, new nicotine products such as e-cigarettes have been advertised as being less dangerous and less harmful than conventional cigarettes, as well as potentially useful in quitting or cutting down on smoking. However, this perception is harmful for the young adults as they may have lower perceptions of the harm that comes from e-cigarettes, and result in them to have greater likelihood and greater popularity to use e-cigarettes (Wackowski & Delnevo, 2015).

**Self-Esteem and the Risk of Experimentation with E-cigarettes: RPI as Mediator**

*H<sub>2</sub>: Self-esteem negatively predicts the risk of experimentation with e-cigarettes among university students in Malaysia.*

The second objective of the present study was to examine whether self-esteem would predict the risk of experimentation with e-cigarettes among university students in Malaysia. It was expected that lower self-esteem has a predictive effect on the risk of experimentation with e-cigarettes among university students in Malaysia. However, the outcome of the present study did not support the second hypothesis as self-esteem did not predict the risk of experimentation with e-cigarettes among university students in Malaysia.

Present findings are in line with a past study by Jackson (1997) showing that there is a weak association between self-esteem and the initiation stage of tobacco and alcohol use, but no association with the stage of experimentation. Likewise, the findings are consistent with the study from Jha and Kraguljac (2021) indicating that there was no significant difference in the self-esteem level between vapers and non-vapers. Another study by Saari et al. (2015) revealed that the self-esteem level has no statistically significant differences between adulthood smokers and adulthood non-smokers. This might be due to the reasons that poor self-esteem does not directly affect individuals to experiment smoking behaviour, but it will predict smoking behaviour when they grow into adulthood.

Kawabata et al. (1999) also pointed out that it is not compulsory for all components of self-esteem to have an equal influence on teenagers' smoking behaviour or intentions. The authors posited a probable explanation for the fact that adolescents might have a higher level of physical self-esteem (physical ability) due to early development, but lower levels of cognitive self-esteem, family relationship, and overall self-esteem may have a higher chance to experiment with e-cigarettes. Apart from that, the ecological systems theory which is a theoretical framework that emphasized the significance of contextual settings in influencing

an individual's development such as immediate family and community, as well as broader cultural and societal influences could be another possible explanation on why self-esteem has no directly predictive effect on the experimentation of e-cigarette in the present study. This is important that the development within the context of multiple interacting systems might combine with individuals' self-esteem level to influence the intention of experiment a behaviour. Sabiston et al. (2009) explained that social influence such as family members or friends and school connectedness was associated with an increased risk for the risk to experiment with smoking. In other words, with a lower self-esteem, individuals tend to be influenced easily by the surroundings. As a result, self-esteem itself is not the only and main predicting factors in vape initiation among university students, instead, it might predict smoking or vaping behaviour in later years when the individuals grow up to adulthood.

***H<sub>3</sub>: RPI mediates the association between self-esteem and the risk of experimentation with e-cigarettes among university students in Malaysia.***

Based on the findings, the last hypothesis of the present study was supported. Peer influence is considered as a significant mediator between self-esteem and the risk of experimentation with e-cigarettes among university students in Malaysia. Tian et al. (2019) proved that individuals who have lower self-esteem tend to engage in more risky behaviour compared to those with higher self-esteem. To elaborate more, the probability of adolescents with lower self-esteem engaging in risky behaviour becomes greater when they are surrounded with like-minded peers, whereas this effect was not observed among those with higher self-esteem. This is because peers play an important role in adolescent development, causing them to be easily affected by peers during that periods (Steinberg & Monahan, 2007). Looking from the neuroscience perspective, the presence of peers stimulates the reward-processing circuits in the brain, which eventually encourages teenagers to engage in risky behaviour to obtain higher immediate rewards (Smith et al., 2015; Steinberg, 2010; Strang et



al., 2013). In other words, adolescents with a lower self-esteem are more vulnerable to peer pressure influence, leading to a higher risk to engage in negative risk-taking behaviour such as smoking and drug use.

Furthermore, Wallace and Roche (2018) mentioned that the presence of at least one or more friends who used e-cigarettes showed a positive correlation with the possibility of being offered an e-cigarette before, likelihood of individual accepting it in future, and using e-cigarette itself. The authors also found out that those who had at least one friend who vapes rated e-cigarette use as having a positive social impact. A higher perceived social influence was linked to an increased probability of accepting e-cigarettes from peers in the future. Majority of the respondents from Tsai et al.'s (2018) study also supported that having friends or family members using them is the main reasons for using e-cigarette. In short, full mediation model was observed as the findings proved that there is no direct effect of self-esteem on the risk of experimentation with e-cigarettes, but there is indirect effect existing between self-esteem and the risk of experimentation with e-cigarettes when peer influence is present as mediator.

## **Implications**

### ***Theoretical Implications***

Social Learning Theory by Bandura and Walters (1977) was used to investigate the effects of SMU to the risk of experimentation with e-cigarettes in the current study. Based on the results of the study, SMU positively predicts the risk of experimentation with e-cigarettes. The hypothesis has been supported as the greater usage in social media can predict a greater risk of experimentation with e-cigarettes. It is worth to be noticed that SMU are able to contribute to the young adults' intention on trying e-cigarettes because of the messages that they received from social media. Hence, this study serves as a pathway for the future researchers to investigate the risk of experimentation with e-cigarettes on the university

students in Malaysia while there is lack of research on Malaysia context. Study of Hu et al. (2016) supported that young adults aged 18 to 24 had the highest prevalence of e-cigarette use compared to adults. Therefore, future research is significant on implicating prevention programs and raising young adults' awareness on the harm of e-cigarettes. Plus, in future research, Social Learning Theory can be utilized to explore other potential factors that may be associated with the risk of e-cigarette experimentation among university students.

Moving on, the other theory that was used to investigate the relationship between self-esteem and the risk of experimentation with e-cigarettes is Self-Derogation Theory by Kaplan et al. (1982). It was found that there is a small association between self-esteem and risk of experimentation with e-cigarettes. In other words, self-esteem is not statistically significant related to the risk of experimentation with e-cigarettes. However, the relationship between self-esteem and risk of experimentation with e-cigarettes can be increased when the presence of the mediating factor which is RPI. Based on the findings, a positive and significant correlation between self-esteem and RPI was found. In addition, RPI is negatively related with risk of experimentation with e-cigarettes. Hence, this study can serve as a reference for future researchers on investigating the role of RPI in affecting the risk of experimentation among university students in Malaysia context.

### ***Practical Implications***

The findings of the present study reveal several practical applications worthy of future study. Firstly, it allowed people to understand more about the association between SMU, self-esteem, peer influence with the risk of experimentation with e-cigarettes, considering the drastic increase of young adult using e-cigarettes nowadays. Due to the limited research and information regarding the predictors of the risk of experimentation with e-cigarettes among university students in Malaysia, the present findings are able to fill the knowledge gap of e-cigarettes use in Malaysia as most of the studies regarding on the topic were conducted in

Western countries or particularly focus on existing smokers. Thus, this research enriched the literature of future research regarding e-cigarette behaviour in a Malaysian context, allowing future researchers to explore more association between the variables in different directions.

Moreover, our study suggests that usage of SMU in socialization positively predicts the risk of experimentation of e-cigarettes among university students. This findings are able to raise the awareness of the public and authorities such as Ministry of Higher Education and government to take necessary strategies regarding on the issue. For instance, conduct events, workshops, or talks about risk factors of e-cigarettes use and ways to use social media wisely to educate individuals think twice before engaging in risky behaviours. These information should be spread online to reach out to the publics to prevent the prevalence of younger generation in experimenting with e-cigarettes. In addition, policymakers should carefully consider the implications of legalizing vaping in Malaysia. This includes imposing strict rules and regulations on the sale and use of e-cigarettes and vaping products, for instance, update the clean indoor air policies and increase the taxation and other price policies to reduce nicotine products use among public

Besides, peer influence was found associated between self-esteem and risk of experimentation with e-cigarettes. The mediating role of peer influence could bridge the gap between both variables in the present study. Students themselves should know that peer influence might be positive and negative. It is important to select, maintain, and get the right balance between their inner self and fitting in the group. Not to forget, parents or guardians should provide extra concern and social support to their child as parents are acting an essential role for the children's health development and well-being. Effective social support from parents can be a measure to prevent young adults from engaging in risky behaviours as it provides them with the necessary guidance and knowledge of appropriate behaviour. Furthermore, parents have the crucial responsibility to teach and guide their children on the

correct path. For instance, educating them about the harmful effects of e-cigarettes, establish a smoke-free home, and set a good example by quit smoking or vaping. As a result, when children receive positive social support from their parents, they are better able to resist peer pressure and avoid risky behaviours. This can helps them to make more informed decisions and avoid potential negative consequences associated with risky behaviour.

### **Limitations of the Study**

Although the present study sheds new light on the SMU, self-esteem, peer influence as mediator, and the relationships with the risk of experimentation with e-cigarettes, this study is not without limitations. One of the shortcomings of this research is the uneven representation of different racial groups in the sample. Although efforts were made to recruit participants from diverse backgrounds, the majority of the respondents (82.5%) that participated in this study are Chinese. Hence, these findings may not be generalizable to individuals from other racial groups or to represent the whole population in Malaysia.

Apart from that, the other limitation in this study is response bias, which can be explained as the researchers find it hard to determine the participants' response rate due to this study using a self-reporting questionnaire. There were feedbacks from participants that the questionnaire is too lengthy and time-consuming, which may cause them to feel bored or lose focus and eventually exit the online survey midway through. Furthermore, some of them answer the questionnaire based on social desirability. Social desirability bias is the inclination of study participants to select answers that they deem more socially appropriate or acceptable, rather than selecting answers that genuinely reflect their innermost thoughts or emotions (Grimm, 2010). For instance, some participants who are existing vapers may answer "No" for the question regarding on whether they have tried e-cigarettes before because they think this answer is more preferable by society. Hence, it is obvious that this situation increases the risk

for us to get inconsistent or random responses which will lead to incomplete or inaccurate responses as well as affect the data validity and reliability.

Lastly, another limitation that was discovered in the current study is the medium effect size. When using a medium effect size, it is assumed that the phenomenon being studied has an effect size that is not excessively small or large. However, if the actual effect size is very small or large, relying on a medium effect size may lead to an overestimation or underestimation of the necessary sample size, respectively. Unless there is no effect at all, a sufficient large sample can contribute to the statistical test that will typically show a significant difference (Sullivan & Feinn, 2012). For instance, large effects size (ES=2.21) were discovered in Burrow-Sánchez and Ratcliff's study (2021) for students who often used e-cigarettes and also reported that their peers used substances. Moreover, medium effect size may lead to measurement error, which can create bias and decrease the reliability of the study's findings. Therefore, in order to improve the study's robustness and reliability, this limitation must be addressed.

### **Recommendations of the Study**

It is important for researchers to recognize and address the limitations of their studies, including racial ratio unevenness, in order to ensure that their findings are as accurate and generalizable as possible. To mitigate the first limitation, future research should recruit a more diverse sample, involving individuals from different ethnic backgrounds to ensure the sample are able to represent the population they are studying. This can be done by using appropriate sampling techniques or recruiting a larger sample size. Researchers should also consider collecting data from each major ethnic group or specifically focus the study on a specific minority to ensure the validity of the results. By taking these steps, the findings can be more accurate and able to generalize to the populations.

To address the response bias, researchers should reduce the length of the questionnaire by keeping it short and precise. For instance, adopting a shorter and trustworthy questionnaire by removing non-essential questions or breaking the questionnaire into shorter sections aids in optimizing the response rates of the respondents. Other than that, it is suggested to use shorter abbreviations and reduce confusing questions in the questionnaire. In this sense, a shorter questionnaire will make it more convenient for participants to answer and they are able to finish the questionnaire in a shorter time frame. In addition, it is essential to ensure anonymity and confidentiality as this can help in increasing the reliability of the study. This is because when the self-reporting questionnaire does not require to collect any identity information can increase the participants' trust and they are more likely to provide an honest and genuine response. Also, analyse non-response can be the effective way to obtain a more accurate result as it can identify the potential biases in the study sample.

Next, considering a different study design might be feasible to overcome the problem of medium effect size. It may be useful to evaluate alternative study designs based on the research question being investigated to enhance the capacity to detect small or medium effects. For instance, a longitudinal study design might be more capable of identifying small changes over time that a cross-sectional study may overlook. Also, considering mixed methods such as qualitative or experimental design with quantitative would be the effective ways to obtain richer data as well as determine cause-effect relationships, which are still lacking in this field. Next, increasing sample size may be feasible as it can help to increase statistical power (Lenth, 2001), which in turn can help to increase the possibility of spotting small effects that might otherwise go undetected.

## **Conclusion**

The usage of e-cigarettes has become increasingly common in Malaysia nowadays. Although the products were only commercially introduced in Malaysia since early 2015, data

showed that 1.2 million Malaysians used e-cigarettes in 2019. Among those e-cigarette users, young adults aged 18 to 24 years old were the largest age group for e-cigarette use (Cornelius et al., 2020). Hence, study regarding on the topic of e-cigarettes were conducted to identify the possible predictors of the risk of experimentation with e-cigarettes among university students. The present study aims to examine the pathway through which SMU and self-esteem would influence the risk of experimentation with e-cigarettes among university students in Malaysia with peer influence as the mediator.

Social Learning Theory and Self-Derogation Theory were used to draw the connections and make predictions between the variables. The relationship between SMU and the risk of experimentation with e-cigarettes was explained by the first theory in which a higher frequency of SMU increases the exposure to e-cigarettes related information, which causes a positive attitude towards the usage. Social Learning Theory also proved that individuals with lower self-control easily get influenced by social learning. This supported the statement that peer e-cigarette use was associated with higher likelihood of personal e-cigarette use as individuals tend to observe and replicate others' behaviour when they were exposed to it. For the second theory, a lower self-esteem will motivate individuals to initiate e-cigarettes use in an attempt to restore their self-esteem with interactions among substance using peers. Individuals become aware of the self-devaluing experienced by the current membership group, leading to the persistence of self-denial.

The sample size was obtained by using purposive sampling method. 143 university students, including 51 males and 92 females, aged 19 to 24 years old participated in the study. The questionnaire consisted of the demographic part, and three scales which are Social Networking Usage Questionnaire, RSES, and RPIQ was distributed through online platform. A pilot study was conducted to increase the likelihood that a feasibility or main study will be successful.

In short, the present study has successfully investigated the relationships between SMU, self-esteem, and the risk of experimentation with e-cigarettes, with peer influence as mediator among university students in Malaysia. Results proved that SMU positively and significantly correlated with e-cigarettes use among university students in Malaysia. In other words, individuals who have a higher frequency of using social media are more likely to be exposed to information about e-cigarette and arouse their interest in using it. This is because individuals will have a lower perceived danger of e-cigarette use and have a greater willingness and intention to try e-cigarettes. Moreover, self-esteem has no association with the experimentation stage of e-cigarettes use. It does not match with the initial hypothesis, which stated that self-esteem negatively predicts the risk of experimentation with e-cigarettes among university students in Malaysia. This can be explained by the findings from Kawabata et al. (1999) who stated that different components of self-esteem do not necessarily have equal impact on adolescents' behaviour. Interestingly, with the existing of the peer influence as mediator, self-esteem indirectly predicts the risk of experimentation with e-cigarettes among university students in Malaysia. The possible explanation of this finding is that peers play an essential role during the teens' development and university students easily get influenced by their peers to be able to fit into the groups (Steinberg & Monahan, 2007).



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## **Appendixes**

### **Appendix A**

#### **Questionnaires**



Wholly owned by UTAR Education Foundation  
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DU012(A)

**Department of Psychology and Counselling  
Faculty of Arts and Social Science  
Universiti Tunku Abdul Rahman**

**Social media use and self-esteem as predictors of the risk of experimentation with e-cigarettes among university students in Malaysia: Peer influence as mediator.**

#### **Introduction**

We are a group of Year 3 UTAR students from the Bachelor of Social Science (Honours) Psychology programme and are conducting a research study as part of the requirements for the course UAPZ3023 Final Year Project II. The title of our research is “Social media use and self-esteem as predictors of the risk of experimentation with e-cigarettes among university students in Malaysia: Peer influence as mediator.”

#### **Procedures and Confidentiality**

The following questionnaire will require approximately 20 minutes to complete. All information provided will remain as private and confidential. The information given will only be reported as group data with no identifying information and only use for academic

purpose. All data collected are protected in a secured database with Transport Layer Security (TLS) encryption (also known as HTTPS). The data is only accessible to the researchers in this study and are password protected.

**Participation**

All the information gathered will remain anonymous and confidential. Your information will not be disclosed to any unauthorized person and would be accessible only by group members. Participant in this study is voluntary, you are free to withdraw with consent and discontinue participation in anytime without prejudice. Your responses will be coded numerically in the research assignment for the research interpretation. Your cooperation would be greatly appreciated. If you choose to participate in this project, please answer all the questions as honestly as possible and return the completed questionnaire promptly.

Please feel free to contact the researchers via

xinrou1010@1utar.my (Teh Xin Rou), tamjingyi26@1utar.my (Tam Jing Yi Evelyn),

xueli.121601@1utar.my (Yap Xue Li) if you have any inquires.

**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.

1. Personal data refers to any information which may directly or indirectly identify a person which could include sensitive personal data and expression of opinion. Among others it includes:

- a) Name
- b) Identity card
- c) Place of Birth
- d) Address

- e) Education History
- f) Employment History
- g) Medical History
- h) Blood type
- i) Race
- j) Religion
- k) Photo
- l) Personal Information and Associated Research Data

**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 Form for Research Participation and Personal Data Protection**

Title of Project: Social media use and self-esteem as predictors of the risk of experimentation with e-cigarettes among university students in Malaysia: Peer influence as mediator.

**NOTE: This consent form will remain with the UTAR researchers for their records.**

I understand I have been asked to take part in the research project specified above by UTAR students for the purpose of their Assignment for UAPZ3023 Final Year Project II, I have had the project explained to me, and I have read the Explanatory Statement, which I keep for my records.

I understand that:

	Yes	No
I will be asked to complete a questionnaire about social media use, self-esteem, resistance towards peer influence and risk of experimenting with e-cigarettes	<input type="radio"/>	<input type="radio"/>
My participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalized or disadvantaged in any	<input type="radio"/>	<input type="radio"/>

I may ask at any time for my data to be withdrawn from the project



No information I have provided that could lead to the identification of any other individual will be disclosed in any reports on the project, or to any other party



I will remain anonymous at all times in any reports or publications from the project



It is my sole responsibility to look after my own safety for the above project. In the event of any misfortune or accidental injury involving me, whether or not due solely to personal negligence or otherwise, I hereby declare that UTAR shall not be held responsible.



Acknowledgment of Personal Data Protection 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.



Age (Years)

Gender

Male

Female

Prefer not to say

Ethnicity

Chinese

Malay

Indian

Others:

## Religions

 Buddha Islam Christian Others:

## Current Education Level

 Foundation/ A-level/ Diploma Undergraduate Postgraduate

Name of Educational Institution (Full name, eg: Univeristi Tunku Abdul Rahman)

Have you ever tried e-cigarettes?

 Yes No

During the past 30 days, how many days did you use e-cigarettes?

1-2 days

3-5 days

6-9 days

10-19 days

20-29 days

Every day

Are you pregnant?

Yes

No



**Section A: Social Networking Usage Questionnaire**

In this section, you are required to read the statements and select only ONE option of each statements.

Please choose from the following alternative:

Dimension One: Academic

	Never	Rarely	Sometimes	Often	Always
I use social networking sites to solve my academic problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites to do research work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites for online academic group discussion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I communicate with my friends via social networking sites for preparation of exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites for collaborative learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites to learn about my	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I use social networking sites to learn about my curricular aspect.

I use social networking sites to seek help from my teachers.

Dimension Two: Socialization

	Never	Rarely	Sometimes	Often	Always
I use social networking sites to become more sociable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites to create my social identity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer using social networking sites to attending social gathering.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites for strengthening interpersonal relationships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I use social networking sites to keep in touch with my relatives.

I use social networking sites to get information regarding current social events.

Dimension Three: Entertainment

	Never	Rarely	Sometimes	Often	Always
I use social networking sites for sharing pictures.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites to look at funny sharing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites for watching movies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites to get relief from academic stress.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Dimension Four: Informativeness

	Never	Rarely	Sometimes	Often	Always
I use social networking sites for reading news.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites to share new ideas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use social networking sites for getting jobs related information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Dimension Five: Constraints

	Never	Rarely	Sometimes	Often	Always
I face difficulty in finding exact information for academic via social networking sites.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compulsive usage of social networking sites is a problematic issue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I usually postpone my academic task for spending more time on the social networking sites.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
While using social networking sites it is difficult for me to concentrate on my studies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Section B: Rosenberg Self-Esteem Scale**

In this section, you are required to read the statements and select only ONE option of each statements.

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement from the following alternative:

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. On the whole, I am satisfied with myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. At times I think I am no good at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I feel that I have a number of good qualities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I am able to do things as well as most other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I feel I do not have much to be proud of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I certainly feel useless at times.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I feel that I'm a person of worth, at least on an equal plane with others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I wish I could have more respect for myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. All in all, I am inclined to feel that I am a failure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I take a positive attitude toward myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





**Section C: Resistance to Peer Influence Questionnaire**

For each question, decide which sort of person you are most like — Statement 1 or Statement 2. Then decide if that is “sort of true” or “really true” for you and mark that choice.

Q1\_Statement 1: Some people go along with their friends just to keep their friends happy.

Q1\_Statement 2: Other people refuse to go along with what their friends want to do, even though they know it will make their friends unhappy.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q2\_Statement 1: Some people think it's more important to be an individual than to fit in with the crowd.

Q2\_Statement 2: Other people think it is more important to fit in with the crowd than to stand out as an individual.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q3\_Statement 1: For some people, it's pretty easy for their friends to get them to change their mind.

Q3\_Statement 2: For other people, it's pretty hard for their friends to get them to change their mind.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q4\_Statement 1: Some people would do something that they knew was wrong just to stay on their friends' good side.

Q4\_Statement 2: Other people would not do something they knew was wrong just to stay on their friends' good side.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q5\_Statement 1: Some people hide their true opinion from their friends if they think their friends will make fun of them because of it.

Q5\_Statement 2: Other people will say their true opinion in front of their friends, even if they know their friends will make fun of them because of it.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q6\_Statement 1: Some people will not break the law just because their friends say that they would.

Q6\_Statement 2: Other people would break the law if their friends said that they would break it.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q7\_Statement 1: Some people change the way they act so much when they are with their friends that they wonder who they “really are”.

Q7\_Statement 2: Other people act the same way when they are alone as they do when they are with their friends.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q8\_Statement 1: Some people take more risks when they are with their friends than they do when they are alone.

Q8\_Statement 2: Other people act just as risky when they are alone as when they are with their friends.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q9\_Statement 1: Some people say things they don't really believe, because they think it will make their friends respect them more.

Q9\_Statement 2: Other people would not say things they didn't really believe just to get their friends to respect them more.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me

Q10\_Statement 1: Some people think it's better to be an individual, even if people will be angry at you for going against the crowd.

Q10\_Statement 2: Other people think it's better to go along with the crowd than to make people angry at you.

Statement 1 - Really true for me

Statement 1 - Sort of true for me

Statement 2 - Sort of true for me

Statement 2 - Really true for me



**Section D: Susceptibility to Smoking**

From each question, choose only ONE from the following alternative

	Definitely Not	Probably not	Probably yes	Definitely Yes
1. Do you think that in the future you might experiment with e-cigarettes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. At any time during the next year do you think you will smoke an e-cigarette?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. If one of your best friends were to offer you an e-cigarette, would you smoke it?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



We thank you for your time spent taking this survey.  
Your response has been recorded.

## Appendix B

### The calculation of G-power

[1] -- *Thursday, November 24, 2022 -- 12:03:28*

F tests - Linear multiple regression: Fixed model, R<sup>2</sup> deviation from zero

Analysis: A priori: Compute required sample size

Input:	Effect size $f^2$	= 0.15
	$\alpha$ err prob	= 0.05
	Power (1- $\beta$ err prob)	= 0.95
	Number of predictors	= 3
Output:	Noncentrality parameter $\lambda$	= 17.8500000
	Critical F	= 2.6834991
	Numerator df	= 3
	Denominator df	= 115
	Total sample size	= 119
	Actual power	= 0.9509602

## Appendix C

### Ethical Approval for Research Project



**UNIVERSITI TUNKU ABDUL RAHMAN** DU012(A)  
Wholly owned by UTAR Education Foundation Co. No. 578227-M

Re: U/SERC/02/2023

10 January 2023

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

Dear Dr Pung,

#### Ethical Approval For Research Project/Protocol

We refer to the application for ethical approval for your students' research project from Bachelor of Social Science (Honours) 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.	Personality Traits and Masculinity as Predictors of Homophobia Among Malaysian Young Man	1. Chiew Yee Kuan 2. Esther Ching Qian Han 3. Ling Chui Hong	Dr Chie Qiu Ting	10 January 2023 – 9 January 2024
2.	Social Media Use and Self-esteem as Predictors of the Risk of Experimentation with e-cigarettes Among University Students in Malaysia: Peer Influence as Mediator	1. The Xin Rou 2. Tam Jing Yi Evelyn 3. Yap Xue Li		
3.	"The Soft Things That We Hold Onto" – A Study on the Association Between Attachment Styles, Presence of Transitional Objects and Psychological Security Among Malaysian Young Adults	1. Poon Ying Ying 2. Chow Yu Ying 3. Sam Hei Man		
4.	The Predicting Effects of Attitudes, Subjective Norms, Perceived Behavioral Control on the Intention Towards Food Waste Reduction Behavior Among Malaysian Young Adults	1. Chan Hooi Mui 2. Shirley Lok Xiao Rui 3. Tee Hui Lin	Dr Gan Su Wan	
5.	Parent-Child Relationship, Perceived Social Support, and Perceived Discrimination as Predictors of Well-Being Among LGBTQ Emerging Adults in Malaysia	1. Haw Ying Huei 2. Lee Nie 3. Yashnevathy a/p Govindasamy		
6.	Personal Growth Initiative, Self-efficacy and Social Support as Predictors of Life Satisfaction Among Undergraduate Students in Malaysia	1. Diu Jia Suan 2. Chow Wen Chung 3. Tneh Sin Lin	Dr T'ng Soo Ting	
7.	Self-esteem, Locus of Control and Hopelessness as Predictors of Depression Among University Students in Malaysia	1. Cheang Yen Thung 2. Chuah Yue Xuan 3. Kelvin Goh Wei Jin		

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Tel: (603) 9086 0288 Fax: (603) 9019 8868  
**Website:** www.utar.edu.my





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.
- (4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

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 Faiz 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**

**Pilot Study: Reliability Statistics**

**Social Networking Usage Questionnaire**

<b>Reliability Statistics</b>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.733	.732	24

**Rosenberg Self-Esteem Scale**

<b>Reliability Statistics</b>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.774	.763	10

**Resistance to Peer Influence Questionnaire**

<b>Reliability Statistics</b>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.651	.636	10

**Susceptibility to Smoking**

<b>Reliability Statistics</b>		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.967	.967	3

## Appendix E

### Actual Study: Reliability Statistics

#### Social Networking Usage Questionnaire

##### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.876	.878	24

#### Rosenberg Self-Esteem Scale

##### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.877	.880	10

#### Resistance to Peer Influence Questionnaire

##### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.744	.742	10

#### Susceptibility to Smoking

##### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.933	.938	3

**Appendix F**

**Normality Assumption**

			Statistic	Std. Error
SNU_Socializati on	Mean		21.80	.326
	95% Confidence Interval for Mean	Lower Bound	21.16	
		Upper Bound	22.45	
	5% Trimmed Mean		21.77	
	Median		22.00	
	Variance		15.187	
	Std. Deviation		3.897	
	Minimum		11	
	Maximum		30	
	Range		19	
	Interquartile Range		5	
	Skewness		.065	.203
	Kurtosis		-.281	.403
	Total_RSES	Mean		21.52
95% Confidence Interval for Mean		Lower Bound	20.75	
		Upper Bound	22.30	
5% Trimmed Mean			21.39	
Median			21.00	
Variance			22.167	
Std. Deviation			4.708	
Minimum			10	
Maximum			36	
Range			26	
Interquartile Range			6	
Skewness			.529	.203
Kurtosis			.703	.403
Total_RPI		Mean		25.17
	95% Confidence Interval for Mean	Lower Bound	24.39	
		Upper Bound	25.96	
	5% Trimmed Mean		25.18	

Median	25.00	
Variance	22.765	
Std. Deviation	4.771	
Minimum	12	
Maximum	37	
Range	25	
Interquartile Range	6	
Skewness	.049	.203
Kurtosis	-.048	.403

**Extreme Values**

			Case Number	No	Value
SNU_Socializati on	Highest	1	6	114	30
		2	7	13	30
		3	16	19	30
		4	26	80	30
		5	31	9	30
	Lowest	1	1	121	11
		2	18	123	12
		3	34	62	15
		4	22	57	15
		5	87	71	16 <sup>a</sup>
Total_RSES	Highest	1	4	106	36
		2	10	102	35
		3	11	29	35
		4	27	35	32
		5	19	85	31
	Lowest	1	5	96	10
		2	3	32	10
		3	14	49	13
		4	81	129	14
		5	48	46	14 <sup>b</sup>
Total_RPI	Highest	1	3	32	37
		2	15	94	35
		3	25	3	35
		4	38	63	35
		5	55	33	35
	Lowest	1	8	45	12

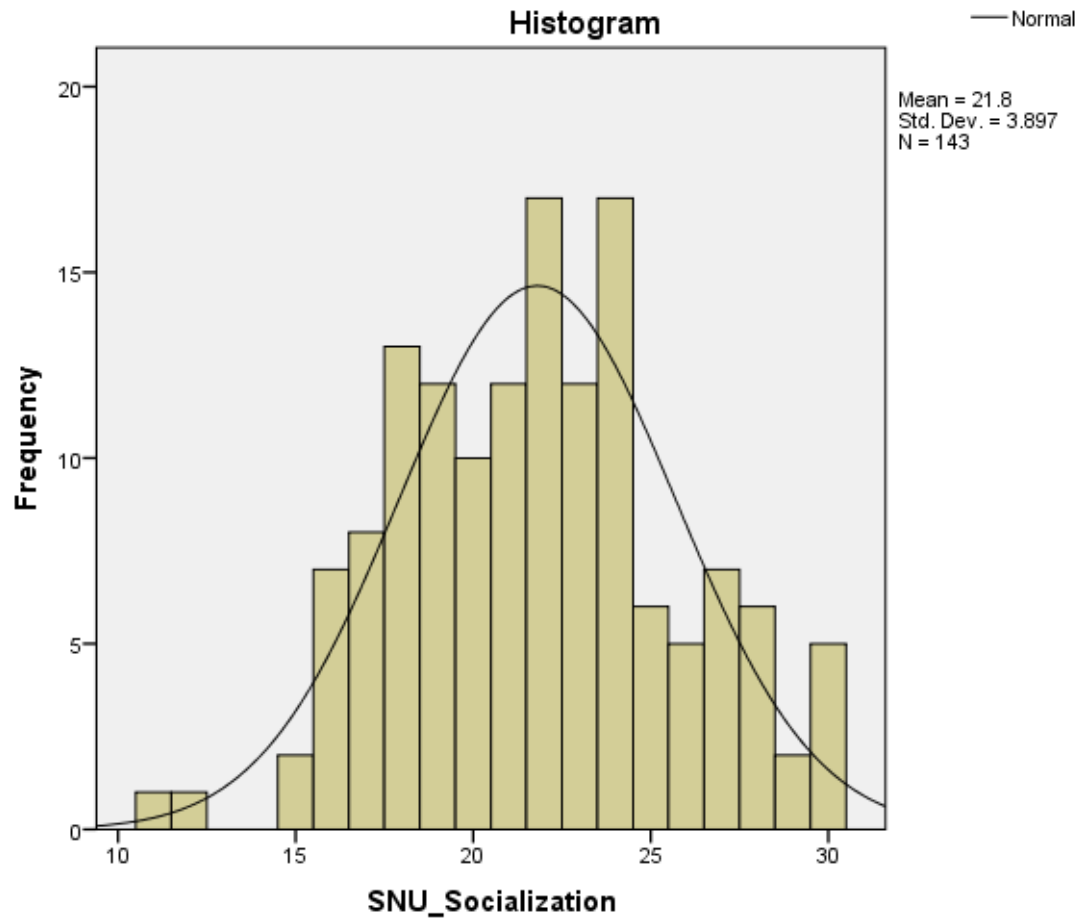
2	7	13	13
3	9	72	14
4	33	5	17
5	30	115	17 <sup>c</sup>

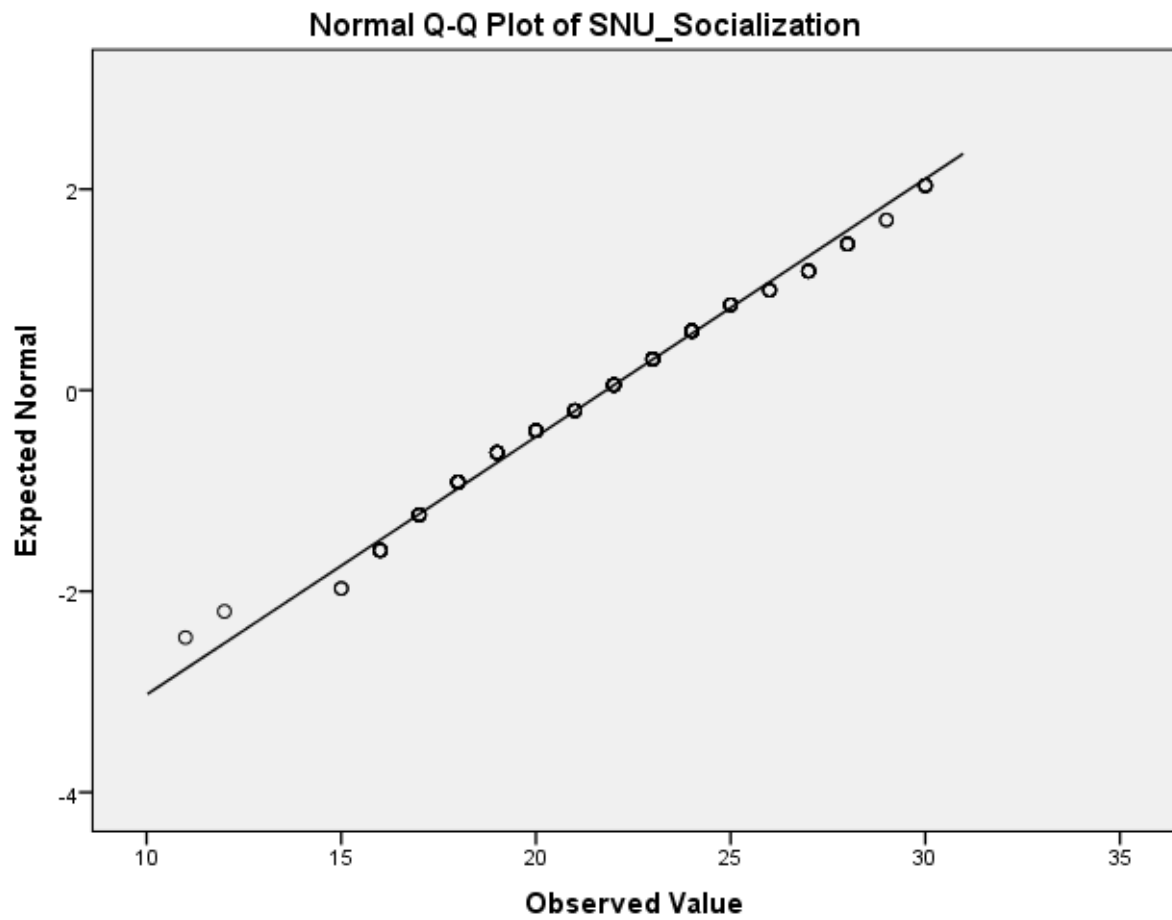
- a. Only a partial list of cases with the value 16 are shown in the table of lower extremes.
- b. Only a partial list of cases with the value 14 are shown in the table of lower extremes.
- c. Only a partial list of cases with the value 17 are shown in the table of lower extremes.

**Tests of Normality**

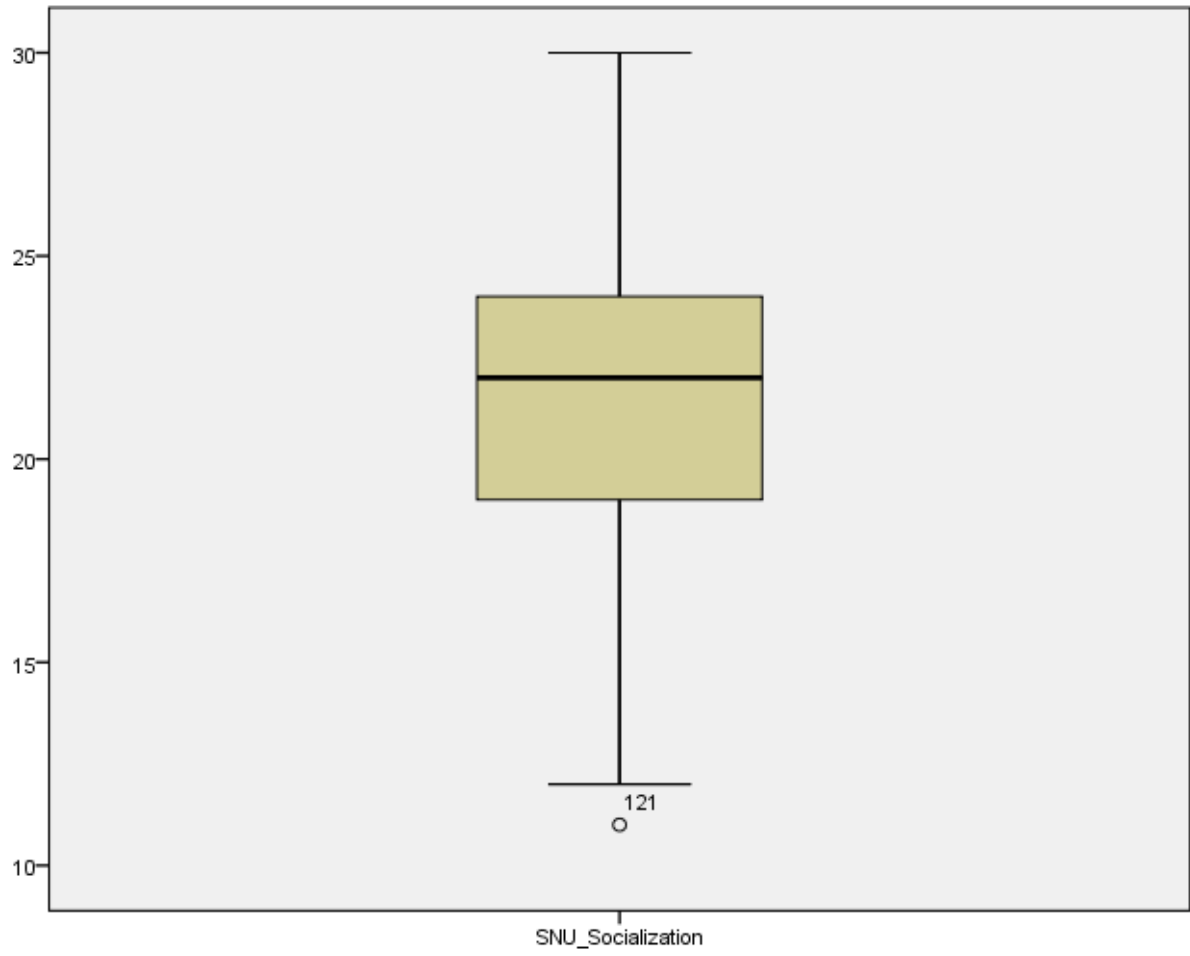
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SNU_Socialization	.072	143	.068	.983	143	.076
Total_RSES	.118	143	.000	.969	143	.003
Total_RPI	.074	143	.053	.989	143	.357

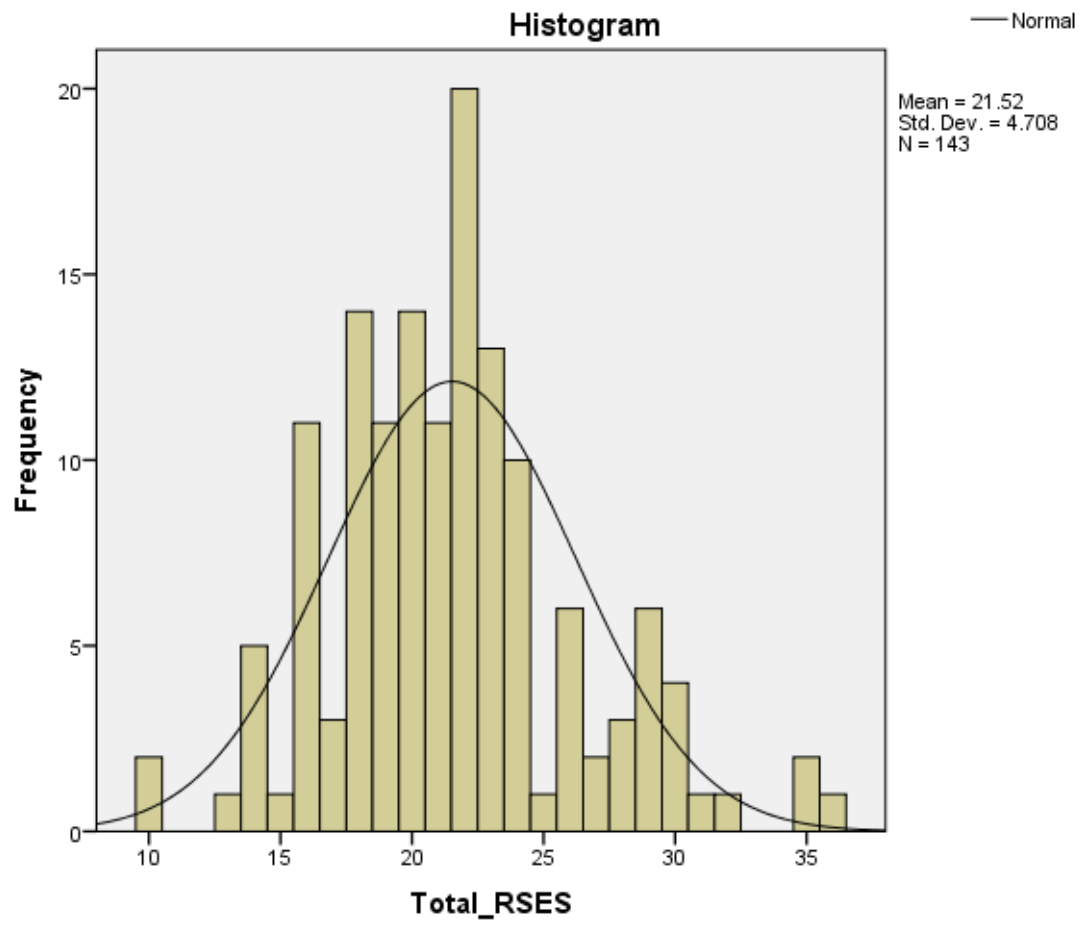
- a. Lilliefors Significance Correction

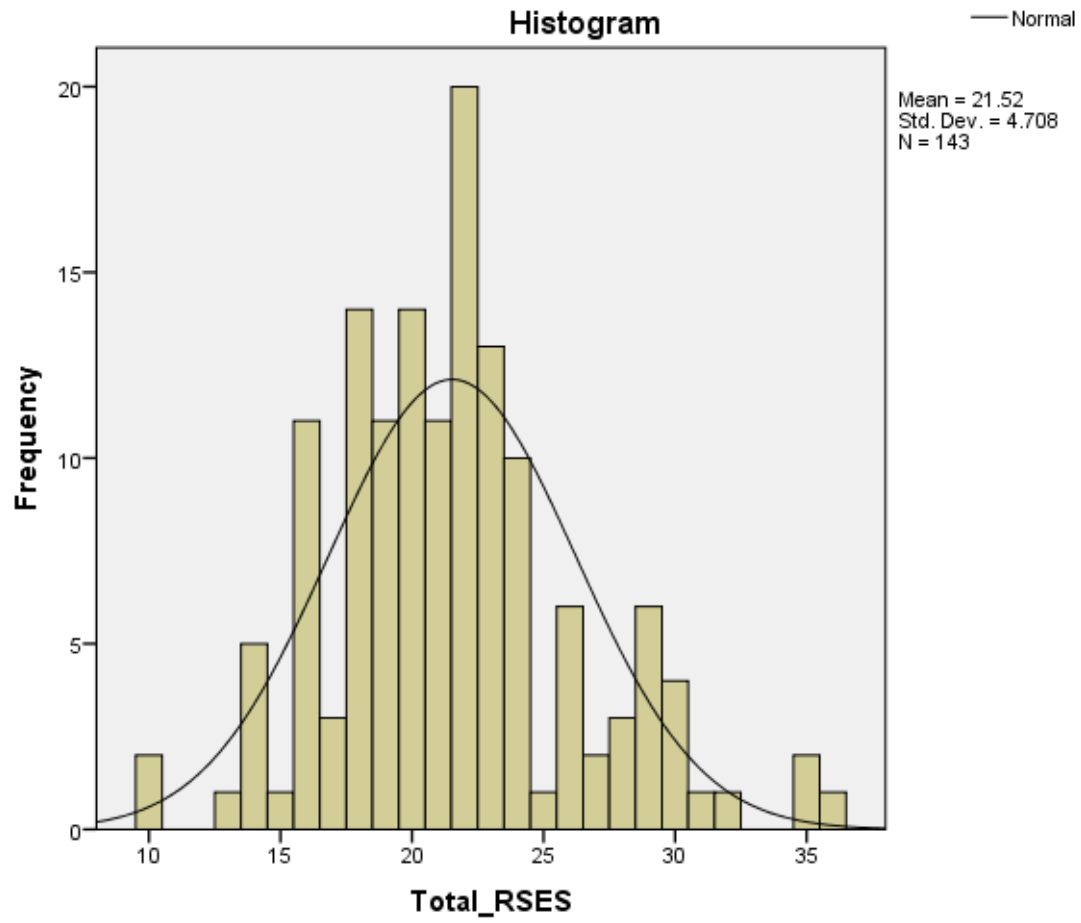


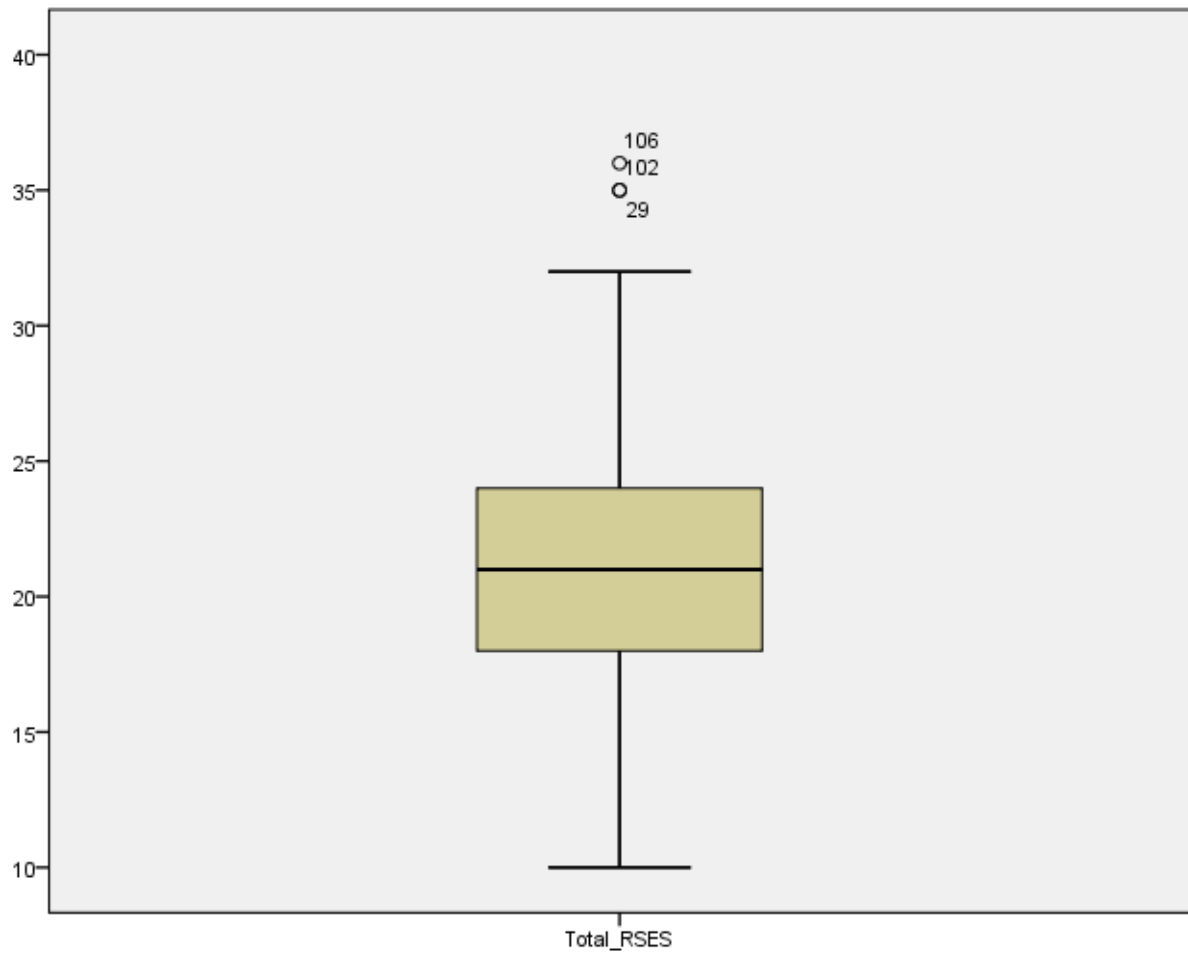


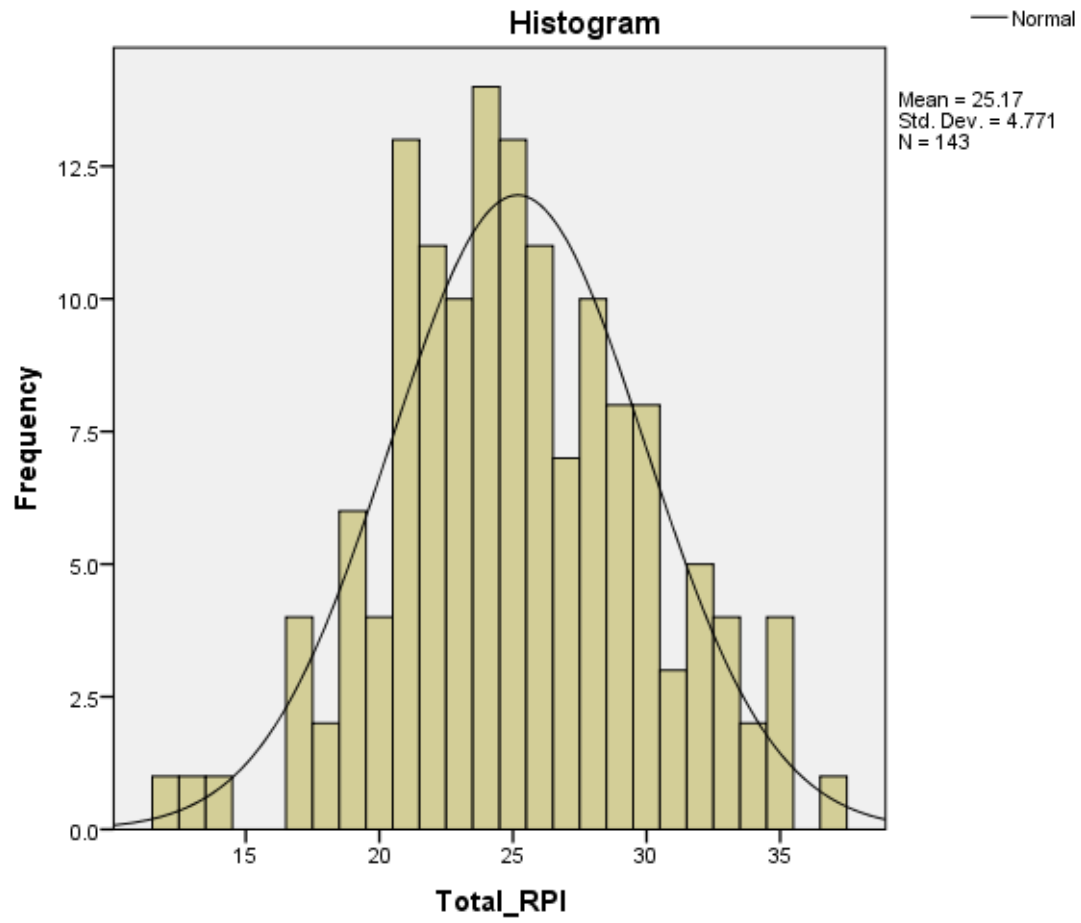


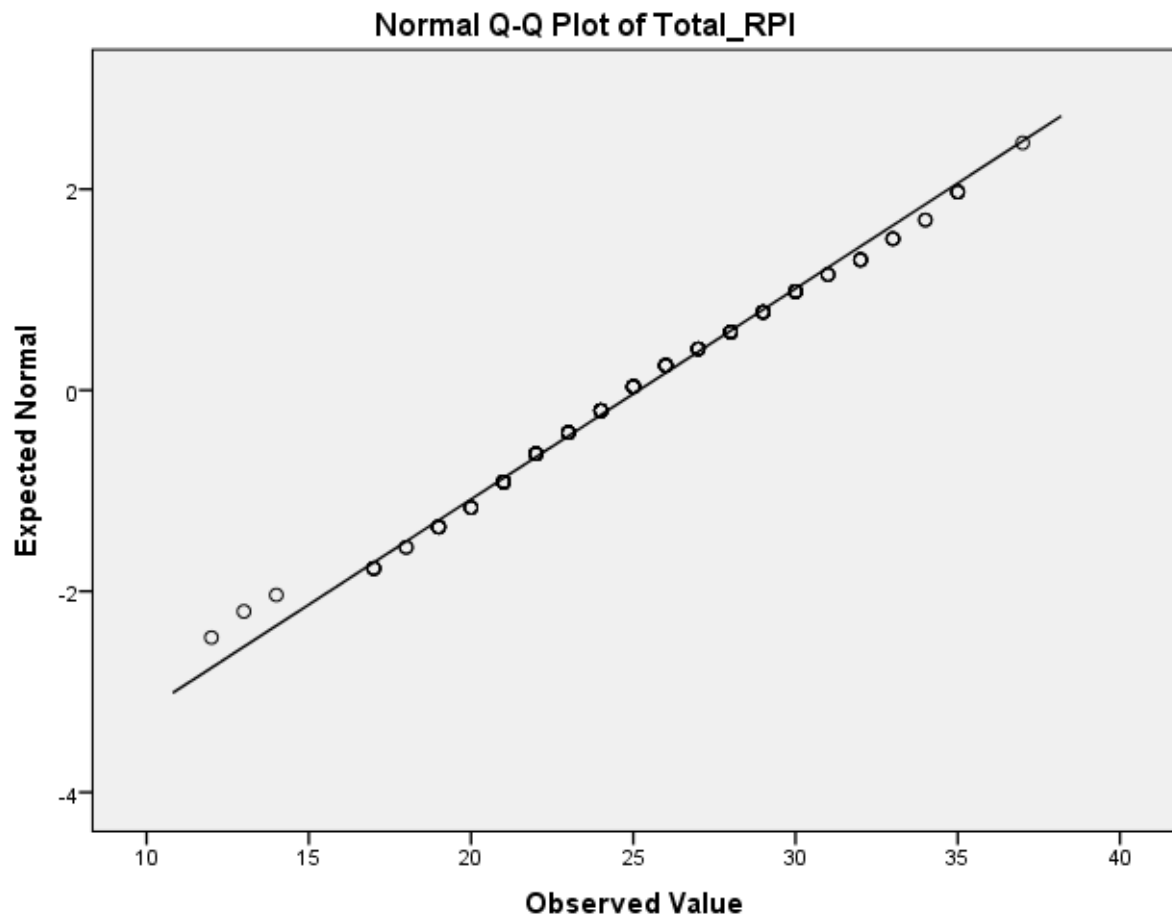


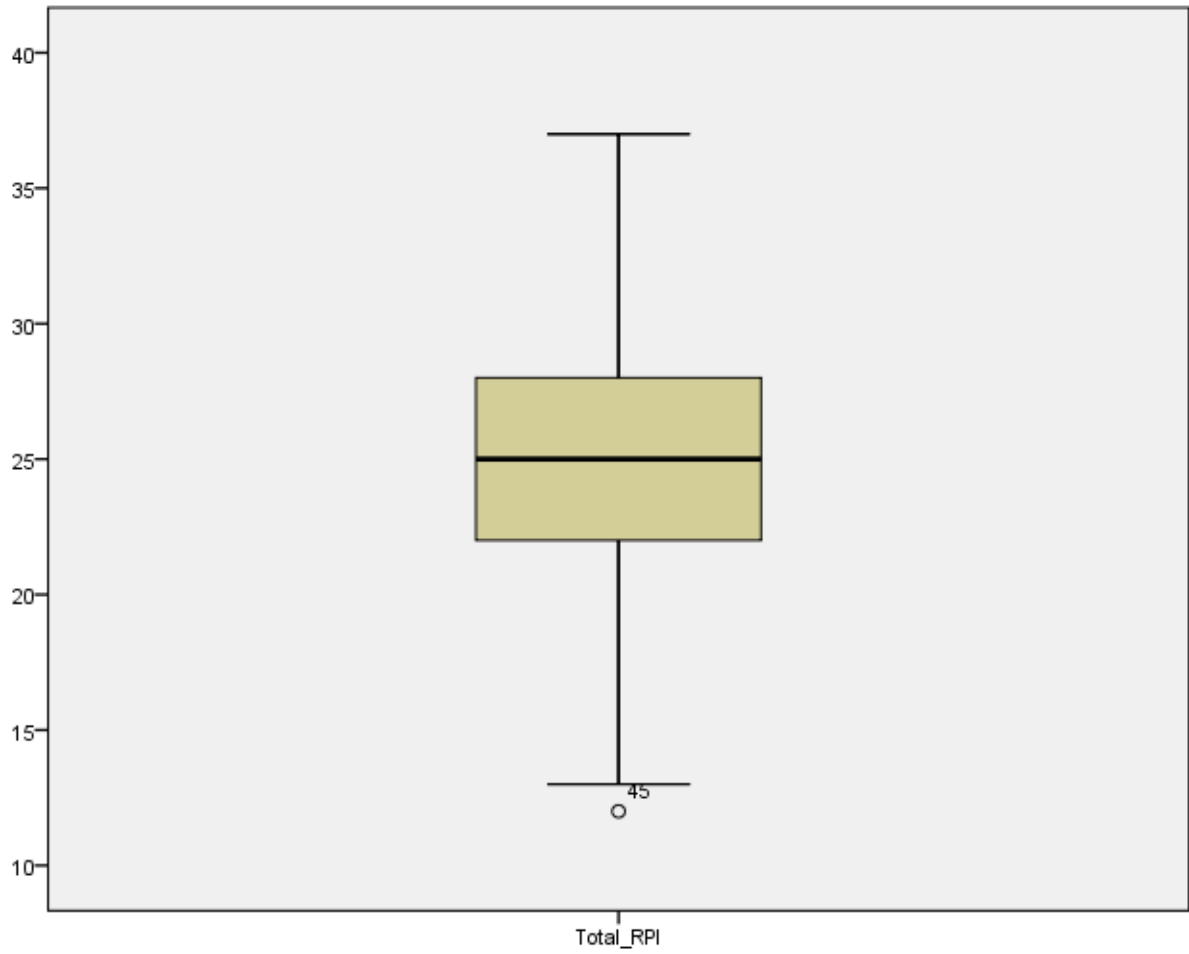












**Appendix G**

**Descriptives**

**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	143	19	24	21.70	1.101
Gender	143	1	2	1.64	.481
Ethnicity - Selected Choice	143	1	3	1.25	.587
Religions - Selected Choice	143	1	4	1.45	.845
Current Education Level	143	1	3	2.00	.265
Have you ever tried e-cigarettes?	143	1	2	1.80	.403
During the past 30 days, how many days did you use e-cigarettes?	29	1	1	1.00	.000
Are you pregnant?	92	2	2	2.00	.000
Valid N (listwise)	15				

**Statistics**

	Age (Years)	Gender	Ethnicity - Selected Choice	Ethnicity - Others: - Text	Religions - Selected Choice	Religions - Others: - Text	Current Education Level	Name of Educational Institution (Full name, eg: Universiti Tunku Abdul Rahman)	Have you ever tried e-cigarettes?	During the past 30 days, how many days did you use e-cigarettes?	Are you pregnant?
N	Valid 143	143	143	143	143	143	143	143	143	29	92
	Missing 0	0	0	0	0	0	0	0	0	114	51
Mean	21.70	1.64	1.25		1.45		2.00		1.80	1.00	2.00
Std. Deviation	1.101	.481	.587		.845		.265		.403	.000	.000
Minimum	19	1	1		1		1		1	1	2
Maximum	24	2	3		4		3		2	1	2
Percentiles											
25	21.00	1.00	1.00		1.00		2.00		2.00	1.00	2.00
50	22.00	2.00	1.00		1.00		2.00		2.00	1.00	2.00
75	22.00	2.00	1.00		2.00		2.00		2.00	1.00	2.00



**Age (Years)**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19	5	3.5	3.5	3.5
	20	13	9.1	9.1	12.6
	21	37	25.9	25.9	38.5
	22	61	42.7	42.7	81.1
	23	19	13.3	13.3	94.4
	24	8	5.6	5.6	100.0
	Total	143	100.0	100.0	

**Gender**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	51	35.7	35.7	35.7
	Female	92	64.3	64.3	100.0
	Total	143	100.0	100.0	

**Ethnicity - Selected Choice**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chinese	118	82.5	82.5	82.5
	Malay	14	9.8	9.8	92.3
	Indian	11	7.7	7.7	100.0
	Total	143	100.0	100.0	

**Religions - Selected Choice**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Buddha	106	74.1	74.1	74.1
	Islam	16	11.2	11.2	85.3
	Christian	15	10.5	10.5	95.8
	Others:	6	4.2	4.2	100.0
	Total	143	100.0	100.0	

**Religions - Others: - Text**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	138	96.5	96.5	96.5
hindu	2	1.4	1.4	97.9
Hindu	2	1.4	1.4	99.3
Hinduism	1	.7	.7	100.0
Total	143	100.0	100.0	

**Current Education Level**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Foundation/ A-level/ Diploma	5	3.5	3.5	3.5
Undergraduate	133	93.0	93.0	96.5
Postgraduate	5	3.5	3.5	100.0
Total	143	100.0	100.0	

**Q6**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Universiti Tunku Abdul Rahman	1	.7	.7	.7
Aimst	1	.7	.7	1.4
Aimst University	1	.7	.7	2.1
APU University	1	.7	.7	2.8
Brickfields Asia College	1	.7	.7	3.5
HELP	1	.7	.7	4.2
HELP Univeristy	1	.7	.7	4.9
Help university	1	.7	.7	5.6
HELP University	1	.7	.7	6.3
Inti	1	.7	.7	7.0
INTI International University	1	.7	.7	7.7
Inti Nilai	1	.7	.7	8.4
Inti university	1	.7	.7	9.1

Monash University	2	1.4	1.4	10.5
Monash University Malaysia	3	2.1	2.1	12.6
Multimedia University	5	3.5	3.5	16.1
Multimedia University, Malacca	1	.7	.7	16.8
Newcastle University	1	.7	.7	17.5
Quest International University	5	3.5	3.5	21.0
Quest International University (QIU)	2	1.4	1.4	22.4
Raffles University	1	.7	.7	23.1
Sunway College	2	1.4	1.4	24.5
Sunway College Johor Bahru	2	1.4	1.4	25.9
Sunway university	1	.7	.7	26.6
Sunway University	5	3.5	3.5	30.1
TAR UMT	1	.7	.7	30.8
Taylor	1	.7	.7	31.5
Taylor University	2	1.4	1.4	32.9
Taylors	2	1.4	1.4	34.3
Tunku Abdul Rahman University of Management & Technology	1	.7	.7	35.0
Tunku Abdul Rahman University of Management and Technology	2	1.4	1.4	36.4
UCSI University	2	1.4	1.4	37.8
Univeristi Tunku Abdul Rahman	9	6.3	6.3	44.1
Universiti Malaya	8	5.6	5.6	49.7
Universiti Malaya (UM)	1	.7	.7	50.3
Universiti Malaysia Sabah	1	.7	.7	51.0
Universiti Malaysia Terengganu	1	.7	.7	51.7
Universiti Sains Malaysia	7	4.9	4.9	56.6
Universiti Teknologi Malaysia	3	2.1	2.1	58.7
Universiti Teknologi PETRONAS	1	.7	.7	59.4

UNIVERSITI TUN HUSSEIN ONN	1	.7	.7	60.1
universiti tunku abdul rahman	1	.7	.7	60.8
Universiti Tunku Abdul rahman	1	.7	.7	61.5
Universiti Tunku Abdul Rahman	25	17.5	17.5	79.0
UNIVERSITI TUNKU ABDUL RAHMAN	1	.7	.7	79.7
UNIVERSITI TUNKU ADBUL RAHMAN	1	.7	.7	80.4
Universiti Utara Malaysia	5	3.5	3.5	83.9
University Malaya	2	1.4	1.4	85.3
University of Malaya	1	.7	.7	86.0
University of Pahang	1	.7	.7	86.7
University of Science Malaysia	2	1.4	1.4	88.1
University Tunku Abdul Rahman	3	2.1	2.1	90.2
Unversiti Tunku Abdul Rahman	1	.7	.7	90.9
UOW Malaysia KDU University	1	.7	.7	91.6
USM	1	.7	.7	92.3
Utar	1	.7	.7	93.0
UTAR	4	2.8	2.8	95.8
Xiamen University	5	3.5	3.5	99.3
Xiamen University Malaysia	1	.7	.7	100.0
Total	143	100.0	100.0	

**Have you ever tried e-cigarettes?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	29	20.3	20.3	20.3
	No	114	79.7	79.7	100.0
	Total	143	100.0	100.0	

**During the past 30 days, how many days did you use e-cigarettes?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-2 days	29	20.3	100.0	100.0
Missing	System	114	79.7		
Total		143	100.0		

**Are you pregnant?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	92	64.3	100.0	100.0
Missing	System	51	35.7		
Total		143	100.0		

		C_SS	SNU_Socialization	Total_SNU	Total_RSES	Total_RPI
N	Valid	143	143	143	143	143
	Missing	0	0	0	0	0
Mean		1.69	21.80	88.62	21.52	25.17
Std. Deviation		.841	3.897	10.916	4.708	4.771
Minimum		1	11	61	10	12
Maximum		3	30	118	36	37

**C\_SS**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Committed never smoker	79	55.2	55.2	55.2
	Susceptible	29	20.3	20.3	75.5
	Highly susceptible	35	24.5	24.5	100.0
Total		143	100.0	100.0	

**SNU\_Socialization**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11	1	.7	.7	.7
	12	1	.7	.7	1.4

15	2	1.4	1.4	2.8
16	7	4.9	4.9	7.7
17	8	5.6	5.6	13.3
18	13	9.1	9.1	22.4
19	12	8.4	8.4	30.8
20	10	7.0	7.0	37.8
21	12	8.4	8.4	46.2
22	17	11.9	11.9	58.0
23	12	8.4	8.4	66.4
24	17	11.9	11.9	78.3
25	6	4.2	4.2	82.5
26	5	3.5	3.5	86.0
27	7	4.9	4.9	90.9
28	6	4.2	4.2	95.1
29	2	1.4	1.4	96.5
30	5	3.5	3.5	100.0
Total	143	100.0	100.0	

Total\_RSES

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 10	2	1.4	1.4	1.4
13	1	.7	.7	2.1
14	5	3.5	3.5	5.6
15	1	.7	.7	6.3
16	11	7.7	7.7	14.0
17	3	2.1	2.1	16.1
18	14	9.8	9.8	25.9
19	11	7.7	7.7	33.6
20	14	9.8	9.8	43.4
21	11	7.7	7.7	51.0
22	20	14.0	14.0	65.0
23	13	9.1	9.1	74.1
24	10	7.0	7.0	81.1
25	1	.7	.7	81.8
26	6	4.2	4.2	86.0
27	2	1.4	1.4	87.4

28	3	2.1	2.1	89.5
29	6	4.2	4.2	93.7
30	4	2.8	2.8	96.5
31	1	.7	.7	97.2
32	1	.7	.7	97.9
35	2	1.4	1.4	99.3
36	1	.7	.7	100.0
Total	143	100.0	100.0	

**Total\_RPI**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 12	1	.7	.7	.7
13	1	.7	.7	1.4
14	1	.7	.7	2.1
17	4	2.8	2.8	4.9
18	2	1.4	1.4	6.3
19	6	4.2	4.2	10.5
20	4	2.8	2.8	13.3
21	13	9.1	9.1	22.4
22	11	7.7	7.7	30.1
23	10	7.0	7.0	37.1
24	14	9.8	9.8	46.9
25	13	9.1	9.1	55.9
26	11	7.7	7.7	63.6
27	7	4.9	4.9	68.5
28	10	7.0	7.0	75.5
29	8	5.6	5.6	81.1
30	8	5.6	5.6	86.7
31	3	2.1	2.1	88.8
32	5	3.5	3.5	92.3
33	4	2.8	2.8	95.1
34	2	1.4	1.4	96.5
35	4	2.8	2.8	99.3
37	1	.7	.7	100.0
Total	143	100.0	100.0	

**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
SNU_Socialization	143	11	30	21.80	3.897
Total_RSES	143	10	36	21.52	4.708
Total_RPI	143	12	37	25.17	4.771
Valid N (listwise)	143				

**Correlations**

		SNU_Socialization	Total_RSES	Total_RPI
SNU_Socialization	Pearson Correlation	1	-.109	-.175*
	Sig. (2-tailed)		.194	.037
	N	143	143	143
Total_RSES	Pearson Correlation	-.109	1	-.203*
	Sig. (2-tailed)	.194		.015
	N	143	143	143
Total_RPI	Pearson Correlation	-.175*	-.203*	1
	Sig. (2-tailed)	.037	.015	
	N	143	143	143

\*. Correlation is significant at the 0.05 level (2-tailed).



**Appendix H**

**Regression**

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	.421	.534		.787	.432		
SNU_Socialization	.048	.018	.224	2.704	.008	.988	1.012
Total_RSES	.010	.015	.057	.683	.496	.988	1.012

a. Dependent Variable: C\_SS

**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.11	2.13	1.69	.189	143
Std. Predicted Value	-3.056	2.291	.000	1.000	143
Standard Error of Predicted Value	.070	.238	.114	.038	143
Adjusted Predicted Value	1.12	2.13	1.69	.190	143
Residual	-1.083	1.591	.000	.820	143
Std. Residual	-1.312	1.928	.000	.993	143
Stud. Residual	-1.338	1.960	.000	1.003	143
Deleted Residual	-1.126	1.645	-.001	.836	143
Stud. Deleted Residual	-1.342	1.981	.001	1.005	143
Mahal. Distance	.014	10.804	1.986	2.146	143
Cook's Distance	.000	.048	.007	.008	143
Centered Leverage Value	.000	.076	.014	.015	143

a. Dependent Variable: C\_SS

**Case Summaries<sup>a</sup>**

	Case Number	Mahalanobis Distance	Probability	Cook's Distance	Centered Leverage Value
1	1	1.99075	.36958	.00985	.01402
2	2	.35851	.83589	.00187	.00252
3	3	2.28757	.31861	.00031	.01611

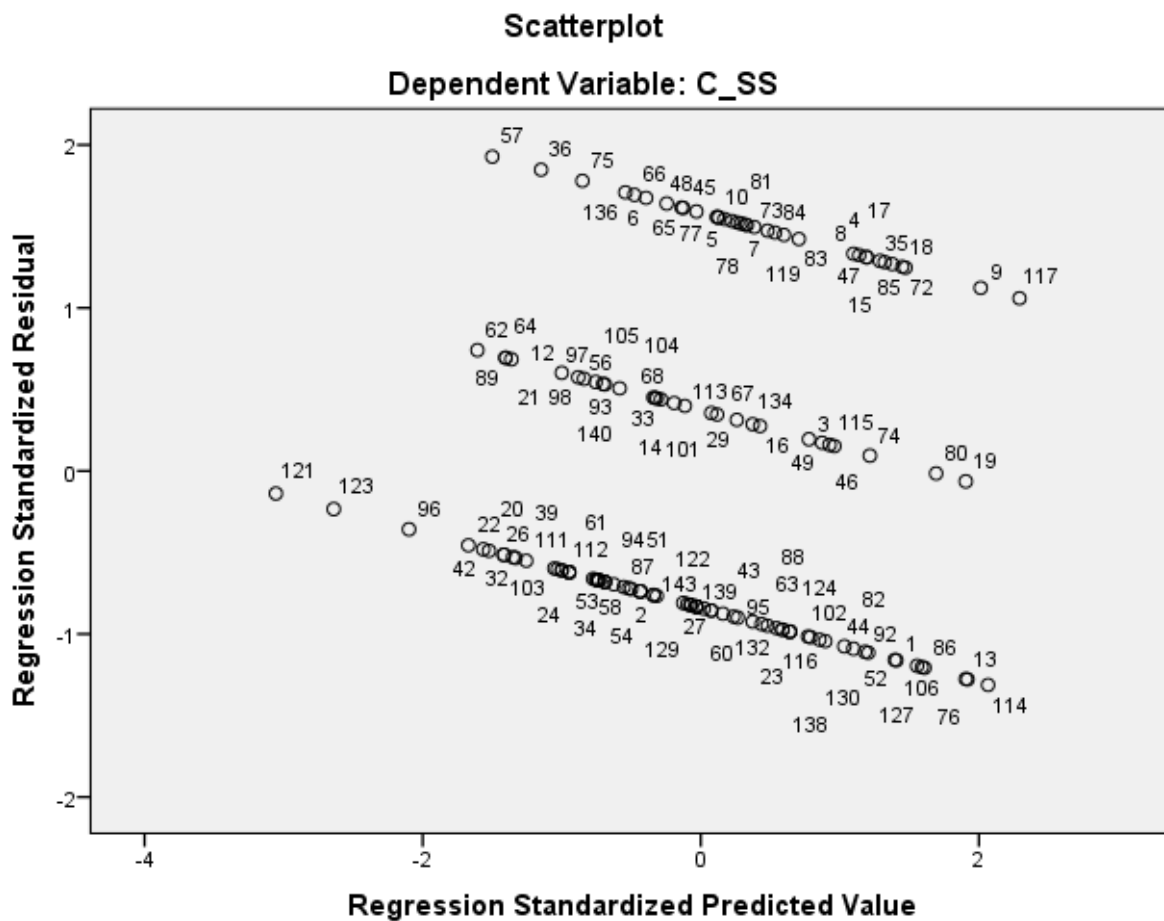
4	4	1.93211	.38058	.01230	.01361
5	5	.34992	.83949	.00767	.00246
6	6	.64436	.72457	.01103	.00454
7	7	.21594	.89766	.00646	.00152
8	8	1.20753	.54675	.00947	.00850
9	9	4.43201	.10904	.01736	.03121
10	10	.61170	.73650	.00935	.00431
11	11	.17945	.91418	.00658	.00126
12	12	1.00099	.60623	.00175	.00705
13	13	4.69572	.09557	.02358	.03307
14	14	2.82311	.24376	.00188	.01988
15	15	3.53956	.17037	.01887	.02493
16	16	.54555	.76127	.00028	.00384
17	17	2.14574	.34203	.01349	.01511
18	18	2.66086	.26436	.01417	.01874
19	19	4.69572	.09557	.00006	.03307
20	20	3.25103	.19681	.00254	.02289
21	21	1.97506	.37250	.00341	.01391
22	22	3.05845	.21670	.00209	.02154
23	23	.45972	.79465	.00338	.00324
24	24	1.14034	.56543	.00184	.00803
25	25	.61170	.73650	.00935	.00431
26	26	2.30907	.31520	.00215	.01626
27	27	.29893	.86117	.00209	.00211
28	28	.01400	.99302	.00176	.00010
29	29	8.21499	.01645	.00243	.05785
30	30	.10507	.94882	.00181	.00074
31	31	.55429	.75794	.00166	.00390
32	32	6.97688	.03055	.00597	.04913
33	33	.16396	.92129	.00053	.00115
34	34	4.32760	.11489	.00589	.03048
35	35	6.09383	.04751	.02967	.04291
36	36	1.55215	.46021	.02115	.01093
37	37	.12822	.93790	.00175	.00090
38	38	.01388	.99309	.00171	.00010
39	39	1.58098	.45362	.00190	.01113
40	40	1.00099	.60623	.00179	.00705
41	41	2.30907	.31520	.00215	.01626
42	42	2.45766	.29263	.00196	.01731
43	43	.56224	.75494	.00297	.00396
44	44	2.84692	.24088	.01101	.02005
45	45	.56139	.75526	.00974	.00395
46	46	3.91336	.14133	.00032	.02756

47	47	1.93211	.38058	.01230	.01361
48	48	1.38296	.50083	.01553	.00974
49	49	4.58355	.10109	.00042	.03228
50	50	1.49001	.47473	.00316	.01049
51	51	.21692	.89722	.00158	.00153
52	52	2.86245	.23902	.01283	.02016
53	53	1.67396	.43302	.00293	.01179
54	54	.21692	.89722	.00158	.00153
55	55	.10507	.94882	.00181	.00074
56	56	1.73034	.42098	.00198	.01219
57	57	3.63317	.16258	.04313	.02559
58	58	3.85597	.14544	.00632	.02715
59	59	.29893	.86117	.00209	.00211
60	60	2.70737	.25829	.00701	.01907
61	61	1.73034	.42098	.00294	.01219
62	62	3.16227	.20574	.00568	.02227
63	63	.38712	.82402	.00297	.00273
64	64	2.24133	.32606	.00384	.01578
65	65	.12822	.93790	.00696	.00090
66	66	1.28745	.52533	.01586	.00907
67	67	.61170	.73650	.00046	.00431
68	68	.35851	.83589	.00066	.00252
69	69	.95296	.62097	.00182	.00671
70	70	.01400	.99302	.00176	.00010
71	71	2.35185	.30853	.00231	.01656
72	72	4.10224	.12859	.02001	.02889
73	73	.38712	.82402	.00718	.00273
74	74	3.51966	.17207	.00010	.02479
75	75	.90022	.63756	.01446	.00634
76	76	3.67784	.15899	.01916	.02590
77	77	.10507	.94882	.00663	.00074
78	78	.11246	.94532	.00600	.00079
79	79	.10507	.94882	.00181	.00074
80	80	6.31888	.04245	.00000	.04450
81	81	1.56870	.45642	.01447	.01105
82	82	1.20753	.54675	.00634	.00850
83	83	2.75435	.25229	.01878	.01940
84	84	.32001	.85214	.00671	.00225
85	85	5.14446	.07637	.02583	.03623
86	86	2.60399	.27199	.01296	.01834
87	87	2.04981	.35883	.00378	.01444
88	88	.45972	.79465	.00338	.00324
89	89	2.24133	.32606	.00384	.01578

90	90	1.00099	.60623	.00179	.00705
91	91	.92652	.62923	.00080	.00652
92	92	4.58192	.10117	.01745	.03227
93	93	.51830	.77171	.00102	.00365
94	94	2.58234	.27495	.00427	.01819
95	95	1.56870	.45642	.00505	.01105
96	96	9.11411	.01049	.00352	.06418
97	97	1.13084	.56812	.00164	.00796
98	98	3.07805	.21459	.00335	.02168
99	99	.95296	.62097	.00182	.00671
100	100	.29893	.86117	.00209	.00211
101	101	1.99076	.36958	.00116	.01402
102	102	8.32508	.01557	.02583	.05863
103	103	4.93252	.08490	.00550	.03474
104	104	.44295	.80134	.00069	.00312
105	105	1.24982	.53531	.00155	.00880
106	106	10.80443	.00451	.04769	.07609
107	107	.21692	.89722	.00158	.00153
108	108	1.67396	.43302	.00293	.01179
109	109	.51830	.77171	.00168	.00365
110	110	.51830	.77171	.00168	.00365
111	111	.95296	.62097	.00182	.00671
112	112	.95296	.62097	.00182	.00671
113	113	.01400	.99302	.00030	.00010
114	114	4.43713	.10876	.02374	.03125
115	115	3.07037	.21542	.00024	.02162
116	116	.83678	.65811	.00480	.00589
117	117	7.46455	.02394	.02518	.05257
118	118	.79528	.67190	.00368	.00560
119	119	1.54296	.46233	.01293	.01087
120	120	.51830	.77171	.00168	.00365
121	121	9.89098	.00712	.00057	.06965
122	122	2.82311	.24376	.00555	.01988
123	123	6.99457	.03028	.00115	.04926
124	124	1.83490	.39954	.00740	.01292
125	125	.55429	.75794	.00166	.00390
126	126	.34421	.84189	.00303	.00242
127	127	2.53163	.28201	.01243	.01783
128	128	.41072	.81435	.00296	.00289
129	129	2.57194	.27638	.00587	.01811
130	130	1.57803	.45429	.00778	.01111
131	131	.45972	.79465	.00338	.00324
132	132	1.07424	.58443	.00464	.00757

133	133	.10544	.94865	.00633	.00074
134	134	.79528	.67190	.00036	.00560
135	135	1.13634	.56656	.01176	.00800
136	136	.35614	.83688	.00942	.00251
137	137	.92762	.62888	.01068	.00653
138	138	.67299	.71427	.00416	.00474
139	139	.10507	.94882	.00181	.00074
140	140	.72025	.69759	.00106	.00507
141	141	.34421	.84189	.00303	.00242
142	142	.35851	.83589	.00187	.00252
143	143	.10507	.94882	.00181	.00074
Total	N	143	143	143	143

a. Limited to first 150 cases.



**Model Fitting Information**

Model	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC	BIC	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	261.395	267.307	257.395			
Final	259.632	277.367	247.632	9.763	4	.045

**Goodness-of-Fit**

	Chi-Square	df	Sig.
Pearson	225.858	200	.101
Deviance	226.505	200	.096

**Likelihood Ratio Tests**

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	266.250	278.074	258.250	10.618	2	.005
SNU_Socialization	265.012	276.835	257.012	9.380	2	.009
Total_RSES	256.832	268.655	248.832	1.200	2	.549

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

**Parameter Estimates**

C_SS <sup>a</sup>	B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
							Lower Bound	Upper Bound
Susceptible	Intercept	-1.621	1.743	.864	1	.353		
	SNU_Socialization	.015	.058	.070	1	.792	1.015	.906 1.138
	Total_RSES	.014	.049	.085	1	.771	1.014	.922 1.116
Highly susceptible	Intercept	-5.618	1.829	9.431	1	.002		

SNU_Socialization	.167	.058	8.249	1	.004	1.181	1.054	1.324
Total_RSES	.051	.047	1.194	1	.275	1.052	.960	1.153

a. The reference category is: Committed never smoker.

**Classification**

Observed	Predicted			Percent Correct
	Committed never smoker	Susceptible	Highly susceptible	
Committed never smoker	72	0	6	92.3%
Susceptible	26	0	3	0.0%
Highly susceptible	29	0	6	17.1%
Overall Percentage	89.4%	0.0%	10.6%	54.9%

**Appendix I**

**Mediation**

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 4.2 beta \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
 Documentation available in Hayes (2022). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model : 4  
 Y : SS  
 X : RSES  
 M : RPI

Sample  
 Size: 142

\*\*\*\*\*

OUTCOME VARIABLE:  
 RPI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.1914	.0367	22.1232	5.3264	1.0000	140.0000	.0225

Model

	coeff	se	t	p	LLCI	ULCI
constant	29.4955	1.9008	15.5173	.0000	25.7375	33.2535
RSES	-.2003	.0868	-2.3079	.0225	-.3719	-.0287

Standardized coefficients

	coeff
RSES	-.1914

\*\*\*\*\*

OUTCOME VARIABLE:  
 SS

Model Summary

R	R-sq	MSE	F	df1	df2	p
.4569	.2087	.5691	18.3321	2.0000	139.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.8970	.5028	7.7504	.0000	2.9029	4.8912
RSES	-.0067	.0142	-.4754	.6352	-.0348	.0213



RPI      -.0815    .0136  -6.0158    .0000  -.1084  -.0547

Standardized coefficients

    coeff  
RSES   -.0365  
RPI    -.4624

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

OUTCOME VARIABLE:  
SS

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0520	.0027	.7122	.3794	1.0000	140.0000	.5389

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.4917	.3411	4.3738	.0000	.8174	2.1660
RSES	.0096	.0156	.6159	.5389	-.0212	.0404

Standardized coefficients

    coeff  
RSES   .0520

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

Total effect of X on Y

Effect	se	t	p	LLCI	ULCI	c_cs
.0096	.0156	.6159	.5389	-.0212	.0404	.0520

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI	c'_cs
-.0067	.0142	-.4754	.6352	-.0348	.0213	-.0365

Indirect effect(s) of X on Y:

Effect	BootSE	BootLLCI	BootULCI
RPI	.0163	.0081	.0012

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

Effect	BootSE	BootLLCI	BootULCI
RPI	.0885	.0443	.0063

\*\*\*\*\* 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 -----