AMERICAN UNIVERSITY OF BEIRUT

PERSONALITY DIMENSIONS AND CIGARETTE DEPENDENCE AMONG LEBANESE YOUNG ADULTS: A DISTRESSED COUNTRY CONTEXT

by
JAAFAR IBRAHIM HOTEIT

A thesis
submitted in partial fulfillment of the requirements
for the degree of Master of Science
to the Master's in Business Analytics Program
of the Suliman S. Olayan School of Business
at the American University of Beirut

Beirut, Lebanon
May 2022

AMERICAN UNIVERSITY OF BEIRUT

PERSONALITY DIMENSIONS AND CIGARETTE DEPENDENCE AMONG LEBANESE YOUNG ADULTS: A DISTRESSED COUNTRY CONTEXT

by

JAAFAR IBRAHIM HOTEIT

Approved by:

	Signature 
Dr. Imad Bou-Hamad, Associate Professor Suliman S. Olayan School of Business	Advisor
	Signature 
Dr. Nadine Yehya	Co-Advisor
	Signature 
Dr. Lilian Ghandour	Member of Committee

Date of thesis defense: May 12, 2022

AMERICAN UNIVERSITY OF BEIRUT

THESIS RELEASE FORM

Student Name: ____HOTEIT_____JAAFAR_____IBRAHIM_____
Last First Middle

I authorize the American University of Beirut, to: (a) reproduce hard or electronic copies of my thesis; (b) include such copies in the archives and digital repositories of the University; and (c) make freely available such copies to third parties for research or educational purposes:

☒ As of the date of submission

☐ One year from the date of submission of my thesis.

☐ Two years from the date of submission of my thesis.

☐ Three years from the date of submission of my thesis.

Jaafar Hoteit _____May 12, 2022_____

Signature Date

ACKNOWLEDGEMENTS

I would like to express my warmest gratitude to my thesis supervisor, Dr. Imad Bou-Hamad for his continuous guidance, support, and encouragement to pursue a thesis. A debt of gratitude to my committee members, Dr. Lilian Ghandour and Dr. Nadine Yehya, for their invaluable recommendations and contributions to my thesis.

I would also like to thank the MSBA coordinator, Dr. Wissam Sammouri for his leadership that sparked in me a passion for analytics.

I am sincerely grateful to my parents, Ibrahim Hoteit and Raeda Sweidan, for their support and the sacrifices they have made to ensure a bright future for our family. To my younger brothers, Hadi and Moustafa, thank you for being the greatest support system.

Finally, I would like to thank the American University of Beirut for helping me grow and for providing me with the means to do so.

ABSTRACT
OF THE THESIS OF

Jaafar Ibrahim Hoteit for Master of Science
Major: Business Analytics

Title: Personality Dimensions and Cigarette Dependence Among Lebanese Young Adults: A Distressed Country Context.

The influence of personality on cigarette smoking behavior has gained growing attention. Nonetheless, the literature remains unclear to which of the young adults' personality dimensions play a major role in smoking behavior. Moreover, there is a lack of studies that examined the relationship between personality dimensions and high cigarette dependence, particularly among young adults. In our study, we examined the association between the personality dimensions adopted from the Five Factor Model (FFM) and high cigarette dependence using the Fagerstrom Test for Cigarette Dependence (FTCD) among young adults. In addition, we further investigated the influence of the young adults' personality dimensions, sociodemographic variables, and lifestyle habits on the behavior of switching to a cheaper cigarette brand because our findings revealed an interesting result that switching to a cheaper cigarette brand during an economic crisis is associated with high cigarette dependence. The current condition in Lebanon offers a unique opportunity to fill the gap in the literature and to study the influence of personality dimensions, sociodemographic characteristics and lifestyle habits on high cigarette dependence and cigarette brand switching behavior of young adults during a severe economic crisis. Using an online survey, 212 university students responded, of which 145 participants were from the private university, and 67 participants were from the public university. The survey was distributed to smokers from one private and one public university to increase the diversity of sociodemographic characteristics in our sample. We find it crucial to diversify our sample because Lebanon is experiencing a severe economic crisis, and thus it is insightful to capture the behavior and responses of smokers of different financial standings and other sociodemographic characteristics. Such diversity in sample's sociodemographic characteristics can be achieved by including students who are not from an expensive private university. The results of this study revealed that lower levels of the personality dimensions Agreeableness and Conscientiousness are associated with high cigarette dependence, while higher levels of Openness to Experience are associated with high cigarette dependence. Interestingly, our study revealed that smokers who switched to a cheaper cigarette brand are more likely to have high cigarette dependence. Furthermore, we found that smokers from the public university are more likely to have high cigarette dependence than smokers from the private university. Additionally, sociodemographic variables which include having more household members and higher income sufficiency have been found to be associated with high cigarette dependence. Additionally, the lifestyle variable of having more close friends who smoke has been found to be associated with high cigarette dependence, while the lifestyle variable of exercising sometimes or a few days per month has been found to be negatively

associated with high cigarette dependence. Moreover, the study revealed that while young adults with higher levels of Extraversion are more likely to switch to a cheaper cigarette brand, young adults with higher levels of Emotional Stability are less likely to switch to a cheaper cigarette brand. Finally, this study revealed that young adults who reported a decrease in daily cigarette consumption since the beginning of the economic crisis are more likely to switch to a cheaper cigarette brand alternative, and young adults that reported higher levels of adverse financial impact by the economic crisis are more likely to switch to a cheaper cigarette brand alternative. Nonetheless, our study found that young adults with higher income sufficiency are less likely to switch to a cheaper cigarette brand. Finally, an interesting result is that young adults who reported excessive social media use are less likely to switch to a cheaper cigarette brand alternative.

TABLE OF CONTENTS

ILLUSTRATIONS

Figure

TABLES

Table

CHAPTER 1

INTRODUCTION

Lebanon has been suffering from a severe economic crisis. The plunging purchasing power has influenced many households to alter their standard of living and their product selection. This study investigates Lebanon's tobacco cigarette smoking population and how Lebanon's economic crisis influenced smokers' cigarette dependence and cigarette brand switching behavior.

The influence of personality on smoking behavior has gained growing attention (Munafò & Black, 2007). Nonetheless, it remains unclear which of the young adults' personality dimensions play a role in maintaining preference and loyalty to a brand, particularly during an economic crisis. Moreover, there is a lack of studies that examined the relationship between personality dimensions and cigarette dependence during an economic crisis in developing countries. Furthermore, while there is evidence of how cigarette affordability can lead to significant reductions in smoking and changes in brand loyalty, particularly among young persons (Chaloupka et al., 2002), the literature does not provide a consensus on the influence economic crises have on cigarette brand switching behavior.

While unfortunate, the current condition in Lebanon offers a unique opportunity to fill the gap in the literature and to study the influence of personality dimensions on cigarette dependence and cigarette brand switching behavior of Lebanese young adults during a severe economic crisis. The participants of this study are undergraduates and graduates from one private and one public university. The participants have been examined through a questionnaire that assesses their personality dimensions adopted

from the Five Factor Model (FFM), sociodemographic characteristics, lifestyle habits, cigarette dependence adopted from the Fagerstrom Test for Cigarette Dependence (FTCD), and cigarette brand switching behavior. This study will test the hypotheses derived from the literature and will include some exploratory research to explore other variables impacting high cigarette dependence and the behavior of switching to a cheaper brand.

Our current study provides a benchmark on a research level for future studies that aim to further understand the relationship between personality dimensions of the FFM and high cigarette dependence on a larger scale.results The have allowed us to understand how personality dimensions interact with sociodemographic characteristics to influence cigarette dependence and brand switching behavior in the context of a distressed country. The results can provide further significant insight to personality-targeted smoking prevention and cessation programs for young adults.

1.1. Background

During the 20th century, roughly one hundred million people died due to tobacco smoking-related illnesses (World Health Organization, 2008). By 2030, tobacco's death toll will exceed eight million people annually and unless serious action is taken, tobacco smoking could kill up to one billion people during the 21st century (World Health Organization, 2008).

1.1.1. Impact of Personality Dimensions on Smoking Behavior

Research on personality and smoking has provided important, yet inconsistent insight of the strength and direction of the relationship between personality dimensions and

smoking behavior. Such discrepancy can be attributed to the divergent methodological methods adopted by researchers (Zvolensky et al., 2015). (Munafò et al., 2007)However, there are substantial studies that have determined that school-based alcohol prevention programs targeting youth with personality risk factors for addiction and mental health problems have been found to prevent tobacco use, reduce substance use and misuse, and prevent onset of alcohol misuse and dependence in those with elevated personality profiles (Conrod et al., 2008, 2013; Debenham et al., 2021). Moreover, these personality-targeted interventions have been found to have long-term effects (Conrod et al., 2011). Hence, uncovering the personality dimensions of the FFM that are implicated in vulnerability to cigarette dependence among young adults is of major importance to better improve future prevention programs in Lebanon.

1.1.2. Impact of Economic Crises on Smoking Behavior

Economic crises are major external factors known to impact peoples' purchasing behaviors while often raising major public health concerns. However, the current evidence does not provide us with a consensus on the impact economic crises on public health. Some researchers argue that economic crises may improve health (Suhrcke & Stuckler, 2012). There have been numerous studies that examined the impact of economic crises on smoking behavior. Some studies determined that cigarette smoking prevalence decreased during Iceland's and Brazil's economic crises (Ásgeirsdóttir et al., 2014; de Souza et al., 2021; McClure et al., 2012).

Moreover, economic crises impact people's purchasing power and lack of affordability is known to impact cigarette brand loyalty and incentivize the behaviour of

quitting since price changes do not necessarily influence individuals with better purchasing power to quit cigarette use (Krishnamoorthy et al., 2020). Tobacco company documents provide evidence of how cigarette tax and other price increases impact affordability and lead to significant reductions in smoking and brand loyalty, particularly among young persons (Chaloupka et al., 2002).

1.2. Problem Statement

Tobacco is the single most preventable cause of death in the world; however, its use remains widespread (World Health Organization, 2021). While many studies have contributed to understanding the variables influencing smoking behavior, such as personality dimensions, lifestyle habits, and sociodemographic variables, we focus on two gaps that remain in the literature.

First, the lack of research on the influence of personality dimensions on high cigarette dependence among young adults during an economic crisis. Second, the opposing findings on the impact of economic crises on cigarette brand switching behavior. There is evidence that lack of affordability or decrease in purchasing power during economic crises can lead to reduction in smoking (Chaloupka et al., 2002; Krishnamoorthy et al., 2020). Nevertheless, this research will assess the impact of variables beyond affordability in cigarette brand switching behavior to improve future tobacco control efforts.

This study will assess and examine the influence of personality dimensions and sociodemographic characteristics, and lifestyle variables on high cigarette dependence and the behavior of switching to a cheaper brand among young adults during a severe economic crisis.

1.3. Objectives of the Study

Our aim is to provide significant insight to aid smoking cessation programs in their treatment of young adults based on personality-targeted interventions and to provide a benchmark on a research level for future studies that aim to further understand the relationship between personality dimensions of the FFM and high cigarette dependence on a larger scale:

RO1: To identify the personality dimensions which have a significant influence on cigarette dependence.

RO2: To identify the personality dimensions which have a significant influence on cigarette brand switching behavior.

RO3: To examine the relationship between lifestyle and sociodemographic variables, and cigarette dependence.

RO4: To examine the relationship between lifestyle and sociodemographic variables, and cigarette brand switching behavior.

1.4. Research Questions

RQ1: Does the economic crisis influence cigarette dependence differently based on the smoker's personality dimensions, demographics, and lifestyle habits?

RQ2: Does the economic crisis influence brand switching behavior differently based on the smoker's personality dimensions, demographics, and lifestyle habits?

1.5 Thesis Organization

Following Chapter one, the remainder of the thesis document will be organized as follows:

Chapter two reviews the literature that covered personality dimensions, cigarette dependence, smoking behavior, and cigarette brand switching behavior.

Chapter three discusses in detail the methodology of the study including data collection, measurements, and analysis methods.

Chapter four provides the results and interpretation of the data analysis along with the accepted and rejected hypotheses.

Chapter five discusses the findings, research outcomes and the limitations of the study.

CHAPTER 2

LITERATURE REVIEW

This chapter provides an overview of Lebanon's current economic condition and a summary of Lebanon's actions towards decreasing the prevalence of cigarette smoking. Furthermore, this chapter brings forwards the term cigarette dependence; a term that describes smoking as a behavioral addiction beyond its nicotine substance. This chapter introduces the concept of personality dimensions, the various models of personality dimensions, the relationship between stimuli and personality, and past research regarding personality dimensions from the Five Factor Model and smoking behavior. Finally, this chapter further discusses the impact of economic crises on smoking behavior and cigarette brand loyalty, in addition to the behavior and perception of young adults towards cigarette brands.

2.1. Lebanon's Economic Condition

Lebanon is a country in distress, suffering from a severe and prolonged economic depression. The World Bank estimates that Lebanon faced a 6.7% contraction in GDP in 2019, followed by a 20.3% contraction in 2020 (World Bank, 2021). Moreover, the average exchange rate depreciated by 129% in 2020, causing a surging inflation on prices (World Bank, 2021). It is estimated that the average exchange rate depreciated by 129% in 2020, causing a surging inflation on prices, averaging 84.3% in 2020. The World Bank estimated a 10.5% contraction in real GDP in 2021 (World Bank, 2022).

With most of the Lebanon's labor force paid in Lebanese Lira; unemployment rate on the rise; and price inflation, it is likely that more than half of the population is below the national poverty line (World Bank, 2021). Furthermore, the plunging purchasing power has influenced many households to alter their standard of living and their product selection. The current economic crisis in Lebanon provides a window to study and assess the influence of personality dimensions and sociodemographic variables on cigarette dependence and cigarette brand switching behavior of Lebanese young adults during a severe economic crisis.

2.2. Tobacco and Cigarette Smoking in Lebanon

During the 20th century, roughly one hundred million people died due to tobacco smoking-related illnesses (World Health Organization, 2008). By the year 2030, tobacco's death toll will exceed eight million people annually and unless serious action is taken, tobacco smoking could kill up to one billion people during the 21st century (World Health Organization, 2008). Tobacco is the single most preventable cause of death in the world; however, its use remains widespread as tobacco companies have been aggressively marketing new products, like heated-tobacco products, and influencing governments to limit their regulation (World Health Organization, 2021).

Tobacco use is increasing globally but unevenly; while it is decreasing in some developed countries, tobacco use is increasing in developing countries (Perez-Warnisher et al., 2018). Moreover, young adults, disadvantaged individuals, and women have experienced smaller declines in tobacco consumption (Perez-Warnisher et al., 2018). As a result of the widespread use of tobacco, government intervention is critical to addressing the tobacco epidemic. Systemic reviews on health-related effects of

government tobacco control policies revealed that smoke-free policies are associated with decreased smoking behavior, second-hand smoke exposure, and adverse health outcomes (Hoffman & Tan, 2015). The systemic reviews also revealed that raising taxes on tobacco products consistently demonstrated reductions in smoking behavior (Hoffman & Tan, 2015). Furthermore, a study simulated the effects of change in price of tobacco under various tax schemes on tobacco consumption using the 2005 national survey of household living conditions in Lebanon. The results revealed that increasing taxes on all tobacco products would lower the consumption of imported cigarettes and domestically produced cigarettes by 7% and 90%, respectively. The study also revealed that young adults (ages 15-30) are more sensitive: their tobacco consumption of imported cigarettes and domestically produced cigarettes would drop by 9% and 100%, respectively (Salti et al., 2015).

Lebanon has made some advances over the years to control cigarette and tobacco smoking prevalence. In August 2011, Lebanon passed the Tobacco Control and Regulation of Tobacco Products' Manufacturing, Packaging and Advertising (Law No. 174) which prohibits the advertising and promotion of tobacco products while mandating that health warnings must occupy 40% of tobacco packaging's surface area. The regulation also includes a ban on smoking in hospitals, schools, and numerous public buildings (World Health Organization, 2013). The latest (2019) estimate of current tobacco smoking in Lebanon is 33.9%, with significantly higher rates in males than females (41.9% and 25.9%, respectively) (*Age-Standardized Estimates of Current Tobacco Use, Tobacco Smoking and Cigarette Smoking (Tobacco Control: Monitor)*, n.d.). While prevalence of tobacco smoking in Lebanon has slightly decreased from 34.8% in 2010 after the advance of Law 174, Lebanon still has one of the highest

cigarettes smoking prevalence in the region (*Age-Standardized Estimates of Current Tobacco Use, Tobacco Smoking and Cigarette Smoking (Tobacco Control: Monitor)*, n.d.; Akiki et al., 2020). Middle Eastern countries such as Saudi Arabia, Qatar, Iraq, and Jordan as of 2019 are estimated to have tobacco smoking prevalence of 12.7%, 10.2%, 18.8%, and 34.6%, respectively (*Age-Standardized Estimates of Current Tobacco Use, Tobacco Smoking and Cigarette Smoking (Tobacco Control: Monitor)*, n.d.). As such, when compared to regional and international estimates, tobacco smoking prevalence estimates are considerably high, with percentages among women being the highest (Sibai et al., 2016).

2.3. Cigarette Dependence and Smoking as a Behavioral Addiction

The role of nicotine in cigarette addiction was established in 1988, a development which caused researchers to lose sight of the prospect that other cigarette determinants might be leading to cigarette addiction. Lately, it has been recognized that nicotine is not the sole ingredient involved in cigarette addiction and that other elements are involved (Fowler et al., 2003), bringing forth the term cigarette dependence.

Cigarette smoking is a behavioral procedure; the cigarette is first placed on the mouth, an inhalation follows that gives a sensory effect in the throat and lungs, and finally an exhalation through the mouth. This procedure can be a comforting habit difficult to discontinue (McClernon et al., 2004). Although this behavioral procedure is combined with nicotine and tobacco, it is not difficult to imagine that once it becomes a habit, irrespective of the substance, it would be difficult to discontinue. In fact, behavior such as betting and computer gaming, which do not contain addictive substances, can be difficult to discontinue and can be associated with withdrawal symptoms once dropped

(Walther et al., 2012). Additionally, pathological gambling (PG), a non-substance addiction, and substance use disorders (SUDS) share numerous similarities in terms of neurocognitive task performance, brain function and neurotransmitter activity (Leeman & Potenza, 2012). In other words, addictions can occur without addictive substance, and behavior can be a major contributor.

2.4. Personality Dimensions

The influence of personality on behavior has gained growing attention, especially of its role on smoking behavior (Munafò & Black, 2007). In 1995, David G. Gilbert brought forward the Situation – Trait Adaptive Response model of smoking which proposes that situations, such as stressors, interact with responses, such as negative emotions, leading to smoking. Gilbert determined that smoking was linked to extraversion, neuroticism, and psychoticism; all three personality dimensions of Eysenck's theory of personality (Gilbert, 1995). One of the earliest supporters of the biological basis of personality and the association between personality and stimuli (excitation and inhibition) was Han Eysenck. He introduced Eysenck's Personality Theory, which consisted of three super-factors: Psychoticism, Extraversion, and Neuroticism. (Revelle, 2016).

Further research exploring personality dimensions brought about various personality models, most notably the Five Factor Model (FFM), as it remains the most dominant model for personality dimensions (Zvolensky et al., 2015). In fact, the personality dimensions in the FFM are measurable in different social contexts, making them consistent and reliable (Costa & McCrae, 1997). The Five Factor Model of personality is a hierarchical organization of personality traits described in five

dimensions; extraversion (sociability and assertiveness); agreeableness (compliance); conscientiousness (self-discipline); neuroticism (tendency to experience negative emotions); and openness to experience (creativity and receptiveness). In the 1980s, a consensus among researchers from different traditions advanced, emphasizing the validity of the five personality dimensions in the FFM (Mccrae & John, 1992).

Despite the consensus of researchers during the late 20th century favoring the Five Factor Model as the optimal structural framework for personality characteristics, an alternative model known as the HEXACO model was proposed during the early 2000s (Ashton et al., 2014). The HEXACO model added a sixth dimension to the FFM: Honest – humility, which exemplifies sincerity, greed avoidance, and modesty.

In this study, we will be utilizing the personality dimensions proposed by the Five Factor Model (The Big Five) and its questionnaire measure to study their association with cigarette dependence. The reasoning behind the decision is based upon the abundance of personality research that utilized the Five Factor Model in various cultures and languages, an advantage this model maintains over other personality models including the HEXACO (McCrae & Allik, 2002). In fact, results of cross-cultural research of the FFM, represented in 16 cultures, evidently presented cross-cultural generalizability of Neuroticism, Openness and Conscientiousness. However, Extraversion and Agreeableness appear to be more sensitive to cultural context. The consensus is that the Five Factor Model provides a sustainable common denominator for cross-cultural research (McCrae & Allik, 2002).

2.4.1 Personality Dimensions and Smoking Behavior

Research on personality and smoking has provided important, yet inconsistent findings in terms of the strength and direction of the relationship between personality dimensions and smoking behavior. Such discrepancy can be attributed to the divergent methodological methods adopted by researchers (Zvolensky et al., 2015).

However, the literature does provide significant converging insights on personality dimensions and smoking behavior. A 2015 meta-analysis of nine cohort studies concluded that current smoking and smoking initiation was associated with higher extraversion and lower conscientiousness. In addition, higher neuroticism predicted smoking relapse among ex-smokers and among smokers smoking cessation was negatively associated with neuroticism. Hence, adult smokers have elevated levels of extraversion, neuroticism, and lower levels of conscientiousness than non-smokers (Hakulinen et al., 2015).

Moreover, a 10-year study examined the association between the personality dimensions of the Five Factor Model and smoking behavior. The results revealed that elevated levels of openness to experience and neuroticism were significantly linked with increased risk of any lifetime cigarette use, and elevated levels of conscientiousness were associated with decreased risk of lifetime cigarette use (Zvolensky et al., 2015). Additionally, and while inconsistent, other studies revealed that smokers have higher levels of neuroticism, extraversion, and openness to experience (Kahler et al., 2009; Leung et al., 2013; Munafò & Black, 2007).

2.4.2 Personality Dimensions and Cigarette Dependence

A 2017 study aimed at uncovering the association between the big five personality dimensions and nicotine dependence revealed that among African American

and European-American participants, lower levels of neuroticism and higher levels of conscientiousness were associated with higher severity of nicotine dependence (Choi et al., 2017). Nevertheless, no differential association was detected between male and female smokers of both African American and European American samples. This study utilized the Fagerstrom's Test for Nicotine Dependence (FTND) to measure participant's nicotine Dependence. It should be noted that the Fagerstrom Test for Nicotine Dependence (FTND) was renamed to the Fagerstrom Test for Cigarette Dependence (FTCD) (Fagerström, 2012). The 2017 study and this study are utilizing the same scale to measure participants' cigarette dependence. While the association between personality dimensions and cigarette dependence has been tested on the general population, we are interested in validating the finding on young adults, and thus we hypothesize the following:

H1: Young adults with high levels of conscientiousness are more likely have high cigarette dependence.

H2: Young adults with low levels of emotional stability are more likely to have high cigarette dependence.

H3: Young adults with high levels of extraversion are more likely to have high cigarette dependence.

H4: Young adults with high levels of openness to experience are more likely to have high cigarette dependence.

2.4.3 Personality-Targeted Prevention for Tobacco and Substance Use

There are substantial studies that have determined that school-based alcohol prevention programs targeting youth with personality risk factors for addiction and mental health problems have been found to prevent tobacco use, reduce substance use and misuse, and prevent onset of alcohol misuse and dependence in those with elevated personality profiles (Conrod et al., 2008, 2013; Debenham et al., 2021). Moreover, these personality-targeted interventions have been found to have long-term effects (Conrod et al., 2011). Hence, uncovering the personality dimensions of the FFM that are implicated in vulnerability to cigarette dependence is of major importance to better improve future prevention programs in Lebanon.

2.5. Cigarette Smoking Among Young Adults

Smoking prevention endeavors aimed at adolescents are essential because the process of smoking initiation takes some years (Ling et al., 2009). However, young adults (aged 18 – 25) have been of higher importance for the tobacco industry due to their vulnerability to tobacco industry marketing (Biener & B. Albers, 2004; Chassin et al., 1996; Ling & Glantz, 2002).

Cigarette marketing encourage smoking by incorporating smoking into activities and locations where young adults' lives change (e.g., leaving home, college, jobs, bars) (Ling & Glantz, 2002). Furthermore, cigarette marketing involve branding and designing packages which identify personal characteristics, social identity, and status (Scheffels, 2008). Earlier and more recent studies have revealed an association between receptiveness to branded cigarette marketing and successive use of that brand among young adults (Moran et al., 2020; R. DiFranza et al., 1994; Scheffels, 2008). In addition,

cigarette brand loyalty is often established with the first cigarette and thus there is a financial benefit to a tobacco company if the first brand smoked by a young individual is one of its own (R. DiFranza et al., 1994).

Prior studies have provided evidence that receptivity to branded cigarette advertising is associated with preference for those advertised cigarette brands, especially among young adults (Moran et al., 2020). Nonetheless, it remains unclear which of the young adults' personality dimensions play a major role in maintaining cigarette dependence and certain cigarette brand preference and loyalty, particularly during an economic crisis. Such understanding has the potential to improve smoking prevention targeting among young adults.

2.6. Cigarette Consumption and Brand Loyalty During an Economic Crisis

2.6.1 Cigarette Consumption During Economic Crises

Economic crises are major external factors known to impact peoples' purchasing behaviors while often raising major public health concerns due to the decrease in public health spending. However, the current evidence does not provide us with a consensus on the impact economic crises on public health, yet some researchers argue that economic crises may improve health (Suhrcke & Stuckler, 2012). There have been numerous studies that examined the impact of economic crises on smoking behavior. One study aimed to investigate the impact of the 2008 economic crisis on smoking prevalence in the U.S. found that the crisis had a weak impact on smoking prevalence (Gallus et al., 2015). Other studies determined that cigarette smoking prevalence decreased during Iceland's and Brazil's economic crises (Ásgeirsdóttir et al., 2014; de Souza et al., 2021; McClure et al., 2012).

2.6.2 Cigarette Consumption Among Young Adults During Economic Crises

While some may suggest that young adults consume less cigarettes during weak economic periods or economic crises due to lack of money or affordability, there are studies that indicate an increase in cigarette consumption among young adults during economic crises. A study that sampled 30,000 young adults indicates that teenagers and young adults increase cigarette use during weak economic periods (Arkes, 2012). Studies also indicate a worsening in physical and mental health in addition to the increase in alcohol and cigarette consumption among young adults during weak economic periods and unemployment (Lee et al., 2015; Thern et al., 2017). Moreover, a cross-sectional analysis of the Spanish National Health Surveys 2006 and 2011/12 in people 16–24 years old revealed that male unemployment is associated with mental disorders and tobacco consumption (Aguilar-Palacio et al., 2015).

2.6.3 Affordability and Cigarette Brand Loyalty

Economic crises tend to impact the purchasing power of people and ultimately their product selection and loyalty. Consumer behavior research during the 1990s established that loyalty is a key factor in long term profitability (Reichheld, 1993; Reichheld et al., 2000). A recent study determined that the major cigarette brand attribute adversely impacting loyalty and incentivizing the behavior of quitting is lack of affordability since price changes do not necessarily influence individuals with better purchasing power to quit cigarette use (Krishnamoorthy et al., 2020). Additionally, Tobacco company documents provide evidence of how cigarette tax and other price increases impact affordability and lead to significant reductions in smoking and brand

loyalty, particularly among young persons (Chaloupka et al., 2002). Moreover, systemic reviews on health-related effects of government control policies related to smoke-free policies revealed that raising taxes on tobacco products consistently demonstrated reductions in smoking behaviour (Hoffman & Tan, 2015). While the contexts of the systemic reviews were not that of an economic crisis, however, increasing cigarettes prices using taxes and losing purchasing power during an economic crisis have achieved the same goal of reducing brand loyalty and smoking behaviour. As such, we hypothesize the following:

H5: Young adults with higher income sufficiency are less likely to switch to a cheaper cigarette brand alternative during an economic crisis.

H6: Young adults who report higher levels of adverse financial impact are more likely to switch to a cheaper cigarette brand alternative during an economic crisis.

CHAPTER 3

RESEARCH METHODOLOGY

The research methodology chapter discusses the research design, data collection and sampling method, the measures and constructs utilized, and methods of analysis in this study

3.1. Research Design and Data Collection

This study received approval from the Institutional Review Board (IRB) at the American University of Beirut. The aim of this research is to understand how participants' personality dimensions, sociodemographic characteristics, and lifestyle habits impact their cigarette dependence and cigarette brand switching behavior during an economic crisis The survey was distributed to students from one private (AUB) and one public university (LU) to increase the diversity of sociodemographic characteristics in our sample. We find it crucial to diversify our sample because Lebanon is experiencing a severe economic crisis, and thus it is insightful to capture the behavior and responses of smokers from different financial standings and other sociodemographic characteristics. Moreover, our study only includes AUB and LU smokers between the ages of 18 and 30 that have smoked at least one cigarette in the past month. The survey was distributed by email to AUB students using AUB Lime Survey. Through the IRB, AUB granted us access to 1,499 students, using random sampling regardless of their undergraduate or graduate status. The 1,499 students were then sent an email containing the Lime Survey link, study details and consent form. The reasoning behind the 1,499 students chosen (randomly) to be contacted is that we

expected a very low response rate since it is likely that a large portion of the 1,499 were not smokers. As for LU participants, head of departments were contacted, and they agreed to distribute the Lime Survey to their graduate and undergraduate students.

Studies have indicated that as a rule of thumb logistic regression models should have a minimum of 10 events per predictor variable (EPV) (Concato et al., 1995; Peduzzi et al., 1996; Vittinghoff & McCulloch, 2007). While our survey contained 25 variables, only some those variables were used in our logistic regression models. The logistic regression model with the highest number of variables contained 16 variables, while the other logistic regression models contained less. Since our study collected data from 212 participants, we have reached the required number of EPV, since a minimum of 160 observations are required for a logistic regression model of 16 variables.

Data was collected from February 25 to March. Furthermore, 354 participants from the private university and 268 from the public university agreed to participate in the study through an AUB Lime Survey. However, only 145 participants from the private university fully completed the survey, while only 67 from the public university fully completed the survey. Only the participants who fully completed the survey were included in this study, adding up to 212 participants.

Participants were provided with the objectives, details, and consent form of this study through e-mail and on the first page of the survey. Participants were required to agree to the consent form before moving to the survey. The consent form included the benefits and minimal potential risks of participating in the survey. Moreover, the consent form assured participants that their responses will be anonymized to guarantee confidentiality and that they could withdraw from the survey.

3.2. Measures

The survey included 25 variables which incorporated constructs that explored the participant's personality dimensions using the brief measure of the Big-Five personality dimensions (Five Factor Model), cigarette dependence using Fagerstrom Test for Cigarette Dependence (FTCD), smoking behavior, and cigarette brand switching behavior.

In this research, the Ten Item Personality Inventory (TIPI) was used to assess the personality dimensions/constructs of the participants. The TIPI is a brief measure of the big five personality dimensions (Five Factor Model) containing ten items, whereas the original questionnaire contains 60 items. Each personality dimension/construct (extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience) is assessed using 2 variables. The TIPI has reached adequate levels of convergence with the widely used Big Five measures in test-retest reliability and patterns of predicted external correlates (Gosling et al., 2003).

The Fagerstrom Test for Cigarette Dependence (FTCD) was validated on the Lebanese population (Salameh et al., 2013, 2014). It should be noted that the Fagerstrom Test for Nicotine Dependence (FTND) was renamed to the Fagerstrom Test for Cigarette Dependence (FTCD) (Fagerström, 2012).

At the end of the survey, participants were asked about their lifestyle habits and demographic characteristics, which explored their age, financial standing, employment status, etc. The scales utilized to measure constructs in this study were chosen from previous research to ensure reliability and validity. **Table 1** states the sources of the scales.

Table 1: Scales Used to Measure Constructs

Variable	Scale	Source
Extraversion (2 items)	7-point scale, ranges from strongly disagree (1) to strongly agree (7)	Gosling et al., 2003
Agreeableness (2 items)	7-point scale, ranges from strongly disagree (1) to strongly agree (7)	Gosling et al., 2003
Conscientiousness (2 items)	7-point scale, ranges from strongly disagree (1) to strongly agree (7)	Gosling et al., 2003
Emotional Stability (2 items)	7-point scale, ranges from strongly disagree (1) to strongly agree (7)	Gosling et al., 2003
Openness to Experience (2 items)	7-point scale, ranges from strongly disagree (1) to strongly agree (7)	Gosling et al., 2003
Fagerstrom Test for Cigarette Dependence (6 items)	Range varies per question.	Fagertröm, 2012

3.3. Methods of Analysis

First, Cronbach alpha was used to test the reliability of the constructs. Four logistic regression models were employed; the first model tested the hypotheses related to the association of the personality dimensions (extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience) with high cigarette dependence (assessed using Fagerstrom Test for Cigarette Dependence or FTCD); the second model explored the association of significant sociodemographic and lifestyle predictors with high cigarette dependence; the third model explored the association of personality dimensions with behavior of switching to a cheaper cigarette brand; the

fourth and final model tested the hypotheses related to the association of sociodemographic and lifestyle variables with switching to a cheaper cigarette brand.

Two items on the FTCD were on a 4-point Likert scale, and four items were on a 2-point Liker scale as presented in **Table 6**. To calculate the cigarette dependence for each participant, the six items in FTCD were added up to provide us with a score between 0 and 10 (Heatherton et al., 1991). Participants scored below 6 were considered to have low to moderate cigarette dependence, while those who scored 6 and above were considered to have high cigarette dependence. Cigarette dependence was binarized because our main goal is to assess associations with high cigarette dependence.

As for the personality dimensions, each of the dimensions is assessed using two items, each on a 7-point Likert scale. To calculate the score for each of the five personality dimensions, the average of the two items were calculated to provide us with a score between 1 and 7. Finally, cigarette brand switching behavior was dichotomized with those who switched to a cheaper cigarette brand due to the economic collapse and those who did not switch to a cheaper cigarette brand.

CHAPTER 4

DATA ANALYSIS

The data analysis chapter provides descriptive statistics of the available data and tests validity of the hypotheses.

4.1. Descriptive Statistical Analysis

The questionnaire was answered fully by 212 participants between the ages of 18 to 30. The responses of participants who answered the questionnaire partially were removed from the data set. Of the participants, 59% were male while 41% were female. Furthermore, 68% were private university undergraduates or graduates, while 32% were public university undergraduates or graduates. Because young adults were targeted in this study, it should come to no surprise that 81% of the participants were single. However, 48% of the participants were employed. Moreover, of the 145 participants from the private university, 46% reported their household receives financial support/income in both US dollars and Lebanese pound, while 26% fully in US dollars. On the other hand, of the 67 participants from the public university, 21% reported their household receives financial support/income in both US dollars and Lebanese Lira, while 66% fully in Lebanese Lira. It is important to note that of the 145 participants from the private university, 37% and 42% reported having a medium and high-income sufficiency, respectively. Alternatively, of the 67 participants from the public university, 25% and 48% reported having low- and medium-income sufficiency, respectively.

Table 2: Descriptive Statistics of Sociodemographic Variables

Variable	Breakdown	Private	Public	Total	Percent Total
Gender	Male	79	47	126	59%
	Female	66	20	86	41%
Age	18 – 24	125	42	167	79%
	25 – 30	20	25	45	21%
Sector	Private	145	0	145	68%
	Public	0	67	67	32%
Governorate	Beirut	114	46	160	75%
	Mount Lebanon	18	7	25	12%
	South Lebanon	2	10	12	6%
	Keserwan – Jbeil	3	1	4	2%
	North Lebanon	3	0	3	1%
	Beqaa	1	2	3	1%
	Baalbeck – Hermel	3	0	3	1%
	Nabatieh	1	1	2	1%
Employment Status	Unemployed	78	33	111	52%
	Employed	67	34	101	48%
Marital Status	Single	127	45	172	81%
	Engaged	7	6	13	6%
	Married	2	8	10	5%
	Divorced / Separated	0	4	4	2%
	Other	9	4	13	6%
Main Source of Income	Parents	85	30	115	54%
	Job	45	25	70	33%
	Own Business	3	7	10	5%
	Investment	4	1	5	2%
	Other	8	4	12	6%
Type of Financial Income	Mixed	66	14	80	38%
	Fully in USD	37	8	45	21%
	Fully in Lebanese Lira	34	44	78	37%
	Other	8	1	9	4%
Income Sufficiency	Very Low	2	8	10	5%
	Low	24	17	41	19%
	Medium	53	32	85	40%
	High	61	10	71	33%
	Extremely High	5	0	5	2%

Table 3 presents the mean, median, and standard deviation of the personality dimensions' scores. The minimum and maximum scores for each personality dimension are 1 and 7, respectively.

Table 3: Descriptive Statistics of the Ten Item Personality Inventory (TIPI)

Dimension	Mean	Median	Standard Deviation
Extraversion	4.62	5	1.43
Agreeableness	4.60	4.5	1.08
Conscientiousness	5.14	5.5	1.33
Emotional Stability	3.98	4	1.46
Openness to Experience	5.69	6	1.07

Table 4 presents the gender breakdown of the descriptive statistics of the personality dimensions' scores.

Table 4: Gender Breakdown of Descriptive Statistics of TIPI

Dimension	Gender	Mean	Median	Standard Deviation
Extraversion	Male	4.78	5	1.37
	Female	4.38	4.5	1.49
Agreeableness	Male	4.53	4.5	1.11
	Female	4.70	5	1.04
Conscientiousness	Male	5.08	5.5	1.35
	Female	5.22	5.5	1.30

Emotional Stability	Male	4.31	4	1.48
	Female	3.49	3.5	1.30
Openness to Experience	Male	5.77	6	1.07
	Female	5.56	6	1.06

Figure 1: Mean Scores of Personality Dimensions by Gender

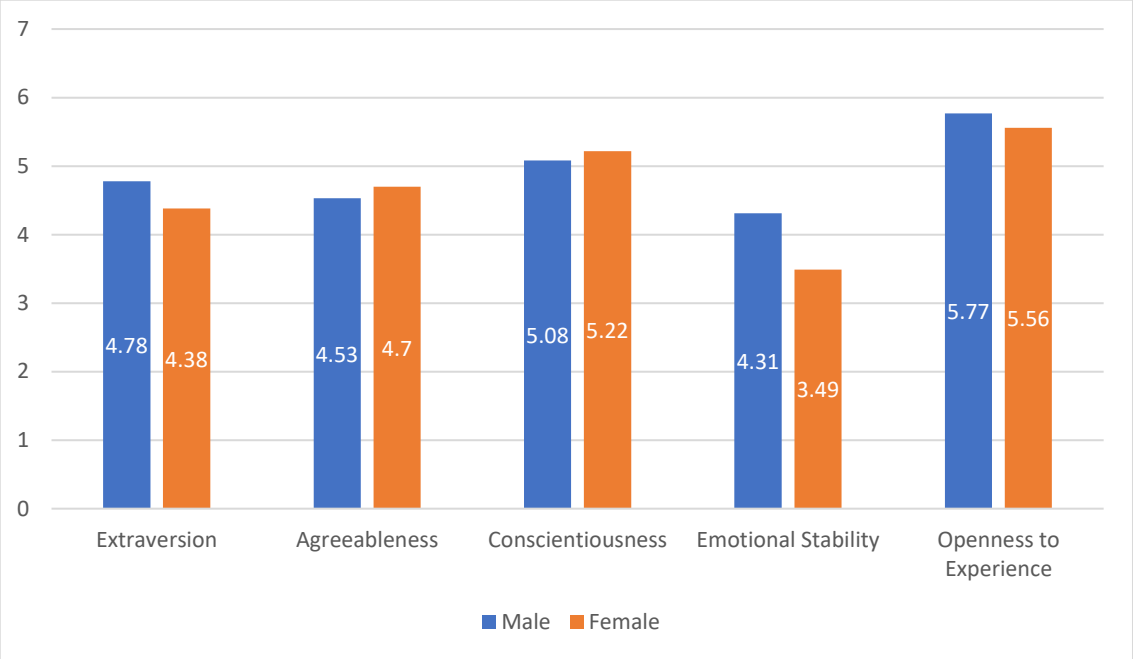


Table 5 presents the breakdown of cigarette dependence levels. Participants are asked 6 questions to test their cigarette dependence levels. The minimum and maximum scores are 0 and 10. Those who score 5 or below, have low to moderate dependence; and those who score 6 or above have high dependence. According to the data, 64.7% of the participants have low to moderate dependence, while 35.3% have high dependence. Furthermore, 34.8% of female participants have high dependence while 35.7% of the male participants have high dependence. **Table 6** presents the breakdown of the FTCD Questionnaire.

Table 5: Cigarette Dependence Breakdown

Dependence Level	Male	Female	Total
Low to Moderate Dependence	81 (64.3%)	56 (65.2%)	137 (64.7%)
High Dependence	45 (35.7%)	30 (34.8%)	75 (35.3%)

Figure 2: Cigarette Dependence Count by Gender

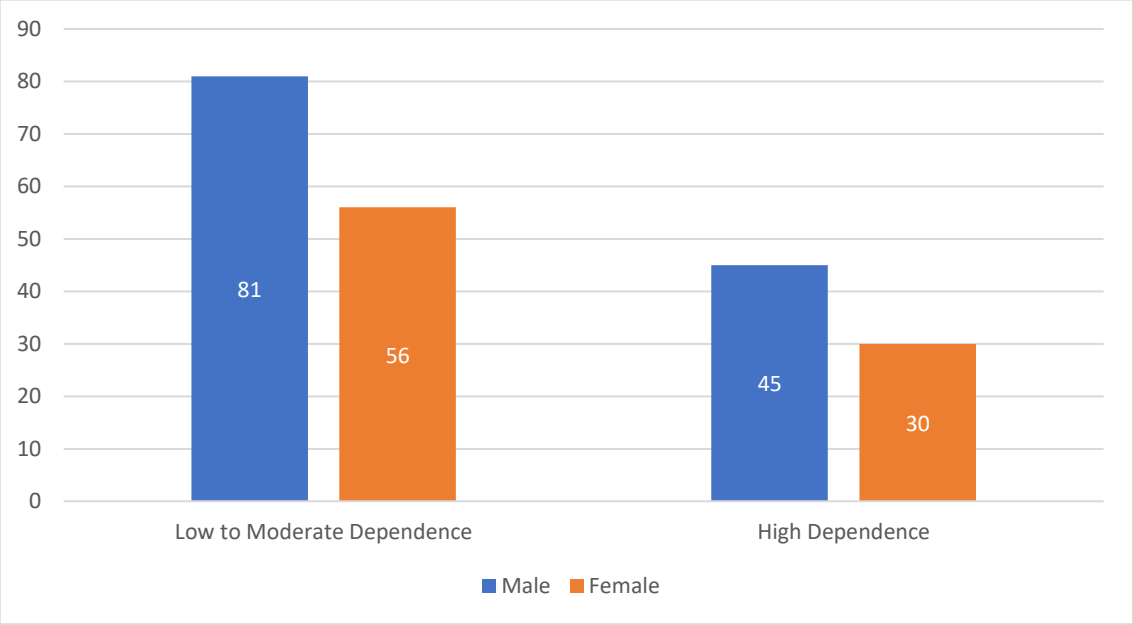


Table 6: Fagerstrom Test for Cigarette Dependence Breakdown

Question	Answer	Count	Percent
Do you find it difficult to refrain from smoking where it is forbidden (Church, library, cinema, plane, etc...)?	No	124	58.49%
	Yes	88	41.51%
How many cigarettes do you smoke each day?	10 or less	82	38.68%
	11 to 20	63	29.72%
	21 to 30	42	19.81%
	31 or more	25	11.79%
Do you smoke more frequently during the first? hours after waking up than during the rest of the day?	No	126	59.43%
	Yes	86	40.57%

Do you smoke if you are so ill that you are in bed most of the day?	No	143	67.45%
	Yes	69	32.55%
How soon after you wake up do you smoke your first cigarette?	After 60 minutes	84	39.62%
	31 to 60 minutes	49	23.11%
	5 to 30 minutes	54	25.47%
	Within 5 minutes	25	11.79%
Which cigarette would you mostly hate to give up?	All Others	109	51.42%
	First one in the morning	103	48.58%

As revealed in **Table 7**, 36.3% have stated that the number of cigarettes they smoke per day has increased while 42.4% have stated that the number of cigarettes they smoke per day has remained the same. Remarkably, of the 145 private university participants, 77.9% stated that they can afford their favorite or preferred cigarette brand while only 46.2% of public university participants stated that they can afford their favorite brand. Moreover, 34.9% stated that they switched to a cheaper alternative, while only 1.8% switched to a more expensive alternative.

Table 7: Cigarette Smoking and Brand Switching Behaviour

Question	Answer	Private University	Public University	Total
How would you describe your current smoking behavior compared to your smoking behavior before Lebanon's economic crisis and revolution began in 2019?	The number of cigarettes I smoke per day has **increased**.	56	21	77
	The number of cigarettes I smoke per day has **decreased**.	24	21	45
	The number of cigarettes I smoke per day has **remained the same**.	65	25	90
Are you currently able to afford your favorite or preferred cigarette brand(s)?	Yes.	113	31	144
	No.	32	36	68

Has 2019's revolution or economic crisis caused you to switch away from your favorite or preferred cigarette brand(s) to an alternative?	Yes, I am currently using a **cheaper alternative**.	38	36	74
	Yes, I am currently using a **more expensive alternative**.	3	1	4
	No, I am currently using my **favorite** or preferred cigarette brand(s).	104	30	134

Figure 3: Participants' Change in Number of Cigarettes Smoked per Day by Education Sector

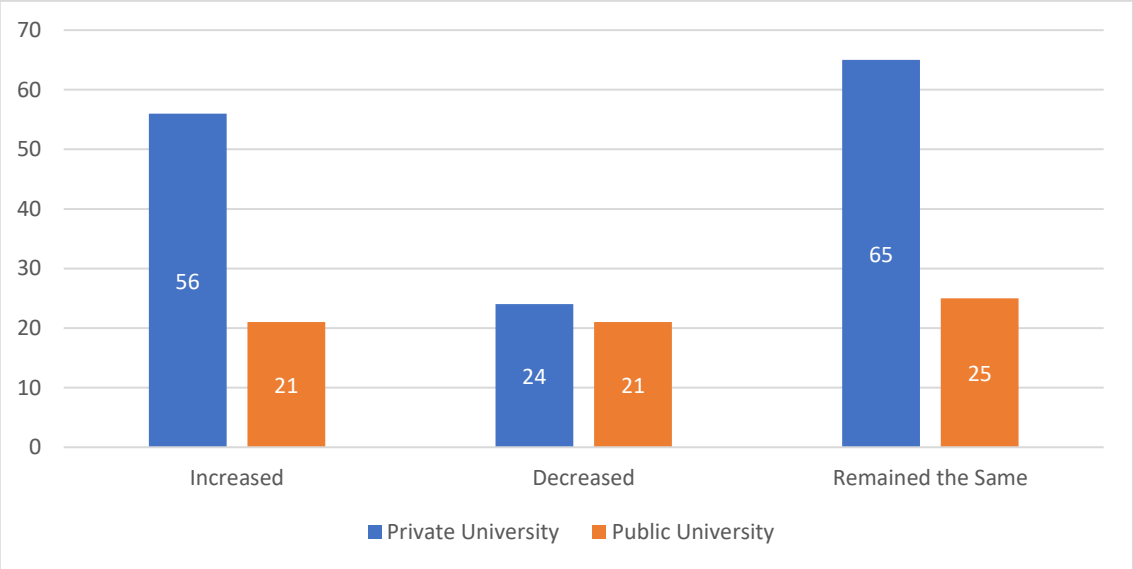
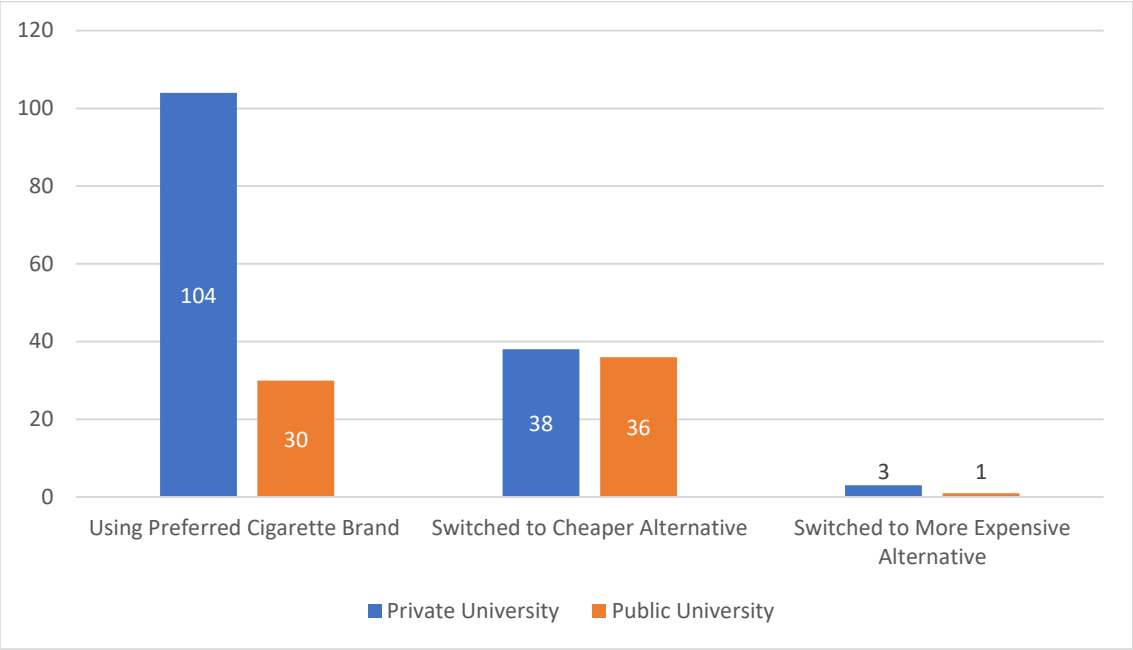


Figure 4: Participants' Cigarette Brand Switching Behaviour



4.2. Internal Consistency (Cronbach Alpha)

Internal consistency estimates relate to item homogeneity, or the degree to which the items on a test jointly measure the same construct. When a test's items are linearly combined into a single composite score, the issue of item homogeneity speaks directly to the ability of the researcher to interpret the composite score as a reflection of all the test's items. (Henson, 2001). Cronbach's alpha estimates of 0.7 and above are considered reliable. While having a minimum score of 0.7 is enough for exploratory research, a minimum score of 0.8 and above is necessary for basic research, and a minimum score of 0.9 is necessary for applied scenarios (Nunnally & Bernstein, 1978).

Table 8 reveals that the Fagerstrom Test for Cigarette Dependence achieved a Cronbach's alpha score of 0.8 in this study, making the construct reliable and acceptable for basic research. Furthermore, **Table 8** reveals that all the personality constructs achieved a Cronbach alpha score less than 0.7 in this study. However, it

should be noted that the Ten – Item Personality Inventory (TIPI), used to measure the Big Five Personality Dimensions in this study, was designed to measure very broad domains with only two items per personality dimension while using items at both the positive and negative poles. The original questionnaire for the Big Five Personality Dimensions contains 60 questions. The goal of the TIPI was to create a very short instrument that optimized validity, and not to create an instrument with high alphas and Confirmatory Factory Analysis (CFA) fits (Gosling et al., 2003). Hence, the TIPI was designed using criteria that will lead to poor performance in alpha scores and CFA. Some researchers have pointed out that alphas are misleading when calculated on scales with a small number of items (Woods & Hampson, 2005).

Table 8: Cronbach's Alpha of Constructs

Construct	Number of Items	Cronbach's Alpha
Extraversion	2	0.58
Agreeableness	2	0.35
Conscientiousness	2	0.5
Emotional Stability	2	0.48
Openness to Experience	2	0.4
Fagerstrom Test for Cigarette Dependence (**FTCD**)	6	0.8

4.3. Logistic Regression Model for Testing Hypotheses of Impact of Personality Dimensions on High Cigarette Dependence

A logistic regression model was performed with binarized cigarette dependence (FTCD) that reflects high dependence as the dependent variable, and the five personality dimensions (extraversion, agreeableness, conscientiousness, emotional stability, and openness to new experiences) as the independent variables. Participants who score below 6 on the FTCD are considered to have low to moderate cigarette dependence, while those who score 6 or above are considered to have high cigarette dependence. Hence, a new binary variable for cigarette dependence was coded with 0 for low to moderate dependence, and 1 for high dependence. This model tests the hypotheses **H1, H2, H3, and H4**.

The results of the logistic regression model are available in **Table 9**. The results reveal that levels of Agreeableness, Conscientiousness, and Openness to Experience are significant predictors of high cigarette dependence. More agreeable smokers are less likely to have high cigarette dependence (coefficient = -0.4916; p-value = 0.001678 < 0.05). The odds of having high cigarette dependence are 1.63 times lower for every 1 unit increase in Agreeableness. In addition, more conscientious smokers are less likely to have high cigarette dependence (coefficient = -0.5009; p-value = 0.000296 < 0.05), which rejects hypothesis H1. The odds of having high cigarette dependence are 1.65 times lower for every 1 unit increase in Conscientiousness. Moreover, smokers who are more open to experiences are more likely to have high cigarette dependence (coefficient = 0.4088; p-value = 0.015212), which validates hypothesis H4. The odds of having high cigarette dependence are 1.5 times higher for every 1 unit increase in Openness to Experience. Hypothesis H2 and H3 are rejected because Extraversion and Emotional Stability are not significant predictors of high cigarette dependence.

Table 9: Logistic Regression Output for exploring impact of personality dimensions on cigarette dependence

	Estimate	Std. Error	Z Value	Pr(>|z|)	Odds Ratio
Intercept	1.492	1.283	1.163	0.244	4.448
Extraversion	0.156	0.114	1.365	0.172	1.169
Agreeableness	-0.491	0.156	-3.142	0.001 **	0.611
Conscientiousness	-0.500	0.138	-3.619	0.0002 ***	0.605
Emotional Stability	-0.113	0.121	-0.932	0.351	0.892
Openness to Experience	0.408	0.168	2.427	0.015 *	1.505

4.4. Logistic Regression Model for Exploring Impact of Personality Dimensions, Sociodemographic Characteristics, and Lifestyle Variables on High Cigarette Dependence

A logistic regression model was performed with binarized cigarette dependence (FTCD) that reflects high dependence as the dependent variable, and personality dimensions, sociodemographic variables, and lifestyle variables as independent variables. This model explores significant variables impacting brand switching behavior.

The results are revealed in **Table 11**. More agreeable smokers are less likely to have high cigarette dependence (coefficient = -0.575; p-value = $x < 0.003$). The odds of having high cigarette dependence are 1.77 times lower for every 1 unit increase in Agreeableness. More conscientious smokers are less likely to have high cigarette dependence (coefficient = -0.613; p-value = $x < 0.001$). The odds of having high cigarette dependence are 1.84 times lower for every 1 unit increase in Conscientiousness. Those who switch to a cheaper cigarette brand are more likely to

have high cigarette dependence (coefficient = 0.928; p-value = x < 0.044). The odds of having high cigarette dependence are 2.53 times higher for those who switch to a cheaper cigarette brand. Public university smokers are more likely to have high cigarette dependence (coefficient = 1.198; p-value = x < 0.018). The odds of having high cigarette dependence are 3.31 times higher for public university smokers. Smokers with more close friends who smoke are more likely to have high cigarette dependence (coefficient = 0.525; p-value = x < 0.001). The odds of having high cigarette dependence are 1.69 times higher for every, one additional close friend who smokes. Smokers with better income sufficiency are more likely to have high cigarette dependence (coefficient = 0.724; p-value = x < 0.008). The odds of having high cigarette dependence are 2.06 times higher for every 1-unit improvement in income sufficiency. Furthermore, smokers with more household members are more likely to have high cigarette dependence (coefficient = 0.330; p-value = x < 0.015). The odds of having high cigarette dependence are 1.39 times higher for every, one additional household member. Finally, smokers who exercise a few days in a month (compared to never) are less likely to have high cigarette dependence (coefficient = -1.063; p-value = x < 0.033). The odds of having high cigarette dependence are 2.89 times lower for smokers who exercise a few days a month (compared to never).

4.4.1. Mediation Analysis of Indirect Effect on High Cigarette Dependence

It should be noted that in this logistic regression model which adjusts for sociodemographic and lifestyle variables, Openness to Experience no longer becomes a significant predictor of high cigarette dependence. This is because the effect of openness to experience on high cigarette dependence is mediated by the number of

close friends who smoke cigarettes. Mediation analysis was implemented using Bayes Process (Model 4 in R Studio) to test the indirect effect of Openness to Experience on high cigarette dependence. **Table 10** provides the results of the indirect effect test from the mediation analysis. Since the indirect effect is bootstrapped, it does not show P-Value. Instead, we look at the bootstrap confidence interval. The lower limit of the confidence interval is 0.014, and the upper limit of the confidence interval is 0.289. The confidence interval does not include 0 since both side of the interval are positive, and thus we can conclude that the indirect effect is significant, and mediation exists.

Table 10: Indirect Effect(s) of Openness to Experience on Cigarette Dependence

	Effect	**Boot SE**	**Boot LLCI**	**Boot ULCI**
Number of Close Friends Who Smoke Cigarettes	0.119	0.071	0.014	0.289

Table 11: Logistic Regression model for exploring impact of personality dimensions on cigarette dependence adjusting for sociodemographic and lifestyle variables

	Estimate	**Std. Error**	**Z Value**	**Pr(>|z|)**	**OR**
Intercept	-2.729	1.973	-1.383	0.166	0.065
Extraversion	0.158	0.145	1.087	0.276	1.171
Agreeableness	-0.575	0.195	-2.942	0.003 **	0.562
Conscientiousness	-0.613	0.192	-3.182	0.001 **	0.541
Emotional Stability	0.017	0.167	0.105	0.916	1.017
Openness to Experience	0.223	0.205	1.089	0.276	1.250
Education Sector (Public)	1.198	0.509	2.353	0.018 *	3.313
Gender (Female)	0.543	0.460	1.181	0.237	1.722

Employment Status (Employed)	-0.239	0.423	-0.565	0.572	0.787
Marital Status (Engaged)	0.538	0.835	0.645	0.518	1.713
Marital Status (Married)	-0.831	1.120	-0.743	0.457	0.435
Marital Status (Divorced/Separated)	3.501	1.788	1.957	0.050 .	33.148
Marital Status (In Relationship)	-0.359	0.851	-0.422	0.673	0.698
Smoking Behavior (Increased)	0.377	0.455	0.829	0.406	1.458
Smoking Behavior (Decreased)	-1.320	0.680	-1.942	0.052 .	0.2661
Close Friends Who Smoke	0.525	0.159	3.289	0.001 **	1.691
Income Sufficiency	0.724	0.274	2.641	0.008 **	2.062
Household Members count	0.330	0.136	2.419	0.015 *	1.391
Social Media Use (Moderate)	0.054	0.522	0.104	0.917	1.055
Social Media Use (Excessive)	-0.164	0.673	-0.245	0.806	0.848
Exercise (Sometimes or few days per month)	-1.063	0.500	-2.124	0.033 *	0.345
Exercise (Often or at least 3 days a week)	-0.282	0.609	-0.463	0.643	0.754
Exercise (Every day or at least 5 days a week)	-0.585	0.798	-0.733	0.463	0.556

Switching Behavior: Switching to a cheaper brand alternative	0.928	0.462	2.005	0.044 *	2.530

4.5. Logistic Regression Model for Exploring Impact of Personality Dimensions on Cheaper Cigarette Brand Switching Behavior

A logistic regression model was performed with switching to a cheaper cigarette brand as the dependent variable, and the five personality dimensions as the independent variables. This model explores significant personality dimension variables impacting brand switching behavior.

The results of the logistic regression model are available in **Table 12**. More extraverted smokers are more likely to switch to a cheaper cigarette brand (coefficient = 0.22562; p-value = 0.0391 < 0.05). The odds of switching to a cheaper cigarette brand are 1.25 times higher for every 1-unit increase in Extraversion. Moreover, smokers with more emotional stability are less likely to switch to a cheaper cigarette brand (coefficient = -0.23428; p-value = 0.0483 < 0.05). The odds of switching to a cigarette brand are 1.26 times lower for every 1-unit increase in Emotional Stability.

Table 12: Logistic Regression model for exploring impact of personality dimensions on cigarette brand switching behaviour

	Estimate	**Std. Error**	**Z Value**	**Pr(>|z|)**	**Odds Ratio**
Intercept	0.58244	1.16565	0.500	0.6173	1.7904072
Extraversion	0.22562	0.10938	2.063	0.0391 *	1.2531027
Agreeableness	-0.05863	0.14141	-0.415	0.6784	0.9430547
Conscientiousness	-0.07345	0.12485	-0.588	0.5563	0.9291822
Emotional Stability	-0.23428	0.11862	-1.975	0.0483 *	0.7911406

Openness to Experience	-0.12367	0.13614	-0.908	0.3637	0.8836753

4.6. Logistic Regression Model for Testing Hypothesis of Impact of Sociodemographic Variables on Cheaper Cigarette Brand Switching Behavior

A logistic regression model was performed with switching to a cheaper cigarette brand as the dependent variable, and sociodemographic and lifestyle habit variables as independent variables. This model tests the hypotheses **H5** and **H6** while exploring other significant variables impacting cheaper cigarette brand switching behavior.

The results of the logistic regression model are available in **Table 13**. Smokers with better income sufficiency are less likely to switch to a cheaper cigarette brand (coefficient = -0.657; p-value = x < 0.014), validating hypothesis H5. The odds of switching to a cheaper cigarette brand are 1.96 times lower for every 1-unit improvement in income sufficiency. Smokers who have been adversely impacted by the economic crisis are more likely to switch to a cheaper cigarette brand (coefficient = 0.926; p-value = x < 8.11e-05), validating hypothesis H6. The odds of switching to a cheaper cigarette brand are 2.52 times higher for every 1-unit increase in adverse financial impact. Smokers who report decrease in the number of cigarettes smoked per day after the onset of the economic crisis are more likely to switch to a cheaper cigarette brand (coefficient = 1.057; p-value = x < 0.034). The odds of switching to a cheaper cigarette brand are 2.88 times higher for those who report an increase in the number of cigarettes smoked per day after the onset of the economic crisis. Smokers who use social media excessively are less likely to switch to a cheaper cigarette brand (coefficient = -1.391; p-value = x < 0.031). The odds of switching to a cheaper cigarette brand are 4.16 times lower for smokers who use social media excessively. The younger

the smoker was when they smoked their first cigarette, the less likely they are to switch to a cheaper cigarette brand (coefficient = -0.194; p-value = x < 0.013). The odds of switching to a cheaper cigarette brand are 1.21 times lower for every year younger the person was when they smoked their first cigarette.

Table 13: Logistic Regression model for testing impact of sociodemographic variables on cigarette brand switching behaviour

	Estimate	**Std. Error**	**Z Value**	**Pr(>|z|)**	**OR**
Intercept	2.336	2.046	1.142	0.253	10.342
Education Sector (Public)	0.455	0.447	1.016	0.309	1.576
Gender (Female)	-0.230	0.391	-0.588	0.556	0.793
Employment Status (Employed)	-0.525	0.365	-1.436	0.151	0.591
Marital Status (Engaged)	-1.003	0.937	-1.071	0.284	0.366
Marital Status (Married)	1.284	0.952	1.349	0.177	3.611
Marital Status (Divorced/Separated)	-1.176	1.265	-0.929	0.352	0.308
Marital Status (In Relationship)	-0.212	0.730	-0.291	0.771	0.808
Smoking Behavior (Increased)	0.500	0.433	1.156	0.247	1.649
Smoking Behavior (Decreased)	1.057	0.501	2.110	0.034 *	2.880
Exercise (Sometimes or few days per month)	-0.111	0.437	-0.255	0.798	0.894
Exercise (Often or at least 3 days a week)	0.069	0.553	0.126	0.899	1.072
Exercise (Every day or at least 5 days a week)	-0.336	0.780	-0.431	0.666	0.714

Social Media Use (Moderate)	-0.741	0.469	-1.578	0.114	0.476
Social Media Use (Excessive)	-1.391	0.648	-2.146	0.031 *	0.248
Close Friends Who Smoke	0.135	0.128	1.047	0.295	1.144
Income Sufficiency	-0.657	0.269	-2.445	0.014 *	0.5179
Financial Impact by Economic Collapse	0.926	0.235	3.941	8.11e-05 ***	2.525
Household Member Count	-0.106	0.118	-0.901	0.367	0.898
Age at Smoking Onset	-0.194	0.078	-2.481	0.013 *	0.822

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1. Study Implications and Conclusion

Tobacco use is increasing globally but unevenly; while it is decreasing in some developed countries, tobacco use is increasing in developing countries (Perez-Warnisher et al., 2018). Moreover, young adults, disadvantaged individuals, and women have experienced smaller declines in tobacco consumption (Perez-Warnisher et al., 2018). As a result of the widespread use of tobacco, government intervention is critical to addressing the tobacco epidemic. Lebanon has made some advances over the years to control cigarette and tobacco smoking prevalence. However, Lebanon still has one of the highest cigarettes smoking prevalence in the region (Age-Standardized Estimates of Current Tobacco Use, Tobacco Smoking and Cigarette Smoking (Tobacco Control: Monitor), n.d.; Akiki et al., 2020).

While many studies have contributed to understanding the variables influencing smoking behavior, such as personality dimensions, lifestyle habits, and sociodemographic characteristics, two gaps remain in the literature. First, the lack of research on the influence of personality dimensions on high cigarette dependence. Second, the opposing insight on the impact of economic crises cigarette brand switching behavior. The current economic crisis of Lebanon provides a unique opportunity to assess and examine the effects personality dimensions and sociodemographic characteristics have on high cigarette dependence and the behavior of switching to a cheaper cigarette brand among young adults during a severe economic crisis.

Regarding the association between the personality dimensions of the FFM and high cigarette dependence, our findings do not align with the 2017 study which found that among African American (AA) and European-American (EA) participants, higher neuroticism and higher conscientiousness levels were association with higher severity of cigarette dependence (Choi et al., 2017). However, our study analysis is methodologically different than the study published in 2017. The 2017 study assessed the association between the personality dimensions and the FTCD using linear regression, while our study assessed the association between the personality dimensions and high cigarette dependence using binomial logistic regression. High dependence on cigarettes is a major concern, and thus the significance of our study is in that we focused on high cigarette dependence and investigated the variables associated with it rather than simply focusing on the ranging severity of cigarette dependence.

As such, our study revealed that lower levels of conscientiousness were linked to high cigarette dependence. In other words, smokers who are more careless and disorganized, and are less dependable and self-disciplined, are more likely to have high cigarette dependence (Choi et al., 2017). Furthermore, our study found that higher levels of Openness to Experience and lower levels of Agreeableness were linked to high cigarette dependence. While the literature has a lack of evidence regarding the association between the personality dimensions of the FFM and high cigarette dependence however, the literature does provide us with evidence regarding the differences in personality dimensions between smokers and non-smokers. The evidence in the literature states that smokers have lower levels of conscientiousness compared to non-smokers (Hakulinen et al., 2015), and the risk of life-time cigarette-use increases with lower conscientiousness (Zvolensky et al., 2015). Moreover, the literature provides

evidence that higher levels of Openness to Experience is higher among smokers compared to non-smokers and is linked to life-time cigarette-use (Kahler et al., 2009; Leung et al., 2013; Munafò & Black, 2007; Zvolensky et al., 2015) However, since smoking behavior and high cigarette dependence are different concepts, we cannot make conclusions that are backed up by the literature. Hence, future research could look further into the pathway different levels of Conscientiousness, Openness to Experience, and Agreeableness lead to in cigarette dependence or compare the strength of the relationships.

In addition to the methodological differences between our study and the 2017 study, the 2017 study was conducted on AA and EA populations of all ages while our study was conducted on Lebanese young adults between the ages of 18 and 30, and thus it is possible that cultural differences may have impacted the association between personality dimensions and cigarette dependence. A study which explored the Arab-Levantine personality structure found that the basic ingredients of Extraversion, Agreeableness, Emotional Stability, and Conscientiousness are present, but they carry culture-specific accent because emic values of honor and hierarchy moderate (suppress or emphasize) specific aspects of these personality factors (Zeinoun et al., 2018). As such, future research can utilize a personality model more suitable to the Arab-Levantine personality structure to have a more accurate assessment of the relationship between personality and high cigarette dependence in the region.

Moreover, this study found that some sociodemographic variables and lifestyle habits were associated with high cigarette dependence. The results revealed that smokers from the public university are more likely to have high cigarette dependence than smokers from the private university (Fawaz & Samaha, 2021). A report issued

during the COVID-19 pandemic highlighted the need for psychological counselling for students due to high levels of anxiety (Marshall & Wolanskyj-Spinner, 2020). The data collected for this study was during a period in which the learning environment was radically changed due to the pandemic and prospect of future jobs reduced due to the economic crisis. It is known that stress and smoking share a cyclic relationship; stress induces cigarette craving for smokers, which produces the illusion that smoking in turn relieves stress (Hobkirk et al., 2018). Hence, we suggest that future studies explore if stress, anxiety, and lack of online learning readiness in Lebanon's public university leads to high cigarette dependence among smokers (Eze et al., 2018).

Additionally, sociodemographic variables which include having more household members and having more close friends who smoke are associated with high cigarette dependence. Our findings align with the evidence presented in the literature. The evidence states that individuals are more likely to be smokers and less likely to quit smoking cigarettes if they have friends or family who smoke (Blok et al., 2017; Eze et al., 2018; Lakon et al., 2015). Moreover, evidence indicates that smokers with more friends who smoke are more likely to have high cigarette dependence (Bahelah et al., 2019; Kandel et al., 2015).

Contrary to the evidence in the literature which indicates that lower income is associated with more cigarette consumption and higher cigarette dependence (Hiscock et al., 2011; Hobkirk et al., 2018; Lund, 2015), our study found that higher income sufficiency is associated with high cigarette dependence. This opposing result could be because the drastically reduced purchasing power of lower income households incentivizes to individuals to reduce their cigarette consumption or quit smoking and therefore not develop cigarette dependence. The literature provides evidence that

financial incentives are significantly associated with high cigarette quitting rates (Volpp et al., 2006, 2009). Nonetheless, this finding requires further investigation to get more insight. Additionally, the study found that cigarette smokers who exercise sometimes or a few days per month as compared to never exercising, are less likely to have high cigarette dependence. This could be because exercise manages cigarette cravings, withdrawal symptoms, smoking behavior and cessation (de La Garza et al., 2016; Prapavessis et al., 2016; Taylor et al., 2007). An interesting result is that smokers who switch to a cheaper cigarette brand are more likely to have high cigarette dependence. Although the literature does not provide a direct connection to switching to a cheaper brand and having high cigarette dependence, the literature does discuss the different pathways smokers take when faced with issues of affordability or price increases; they reduce their cigarette consumption, switch to a cheaper brand, or both (Chaloupka et al., 2002; Hoffman & Tan, 2015; Krishnamoorthy et al., 2020; Yeh et al., 2016).

Due to the lack of research on the direct relationship between cigarette brand switching and high cigarette dependence, we decided to further investigate the variables influencing the behavior of switching to a cheaper cigarette brand to build a better understanding of the underlying factors. The results reveal that while more extroverted smokers are more likely to switch to a cheaper cigarette brand, smokers with better emotional stability are less likely to switch to a cheaper cigarette brand – in the context of a distressed country. Up to my knowledge, the literature does not provide any clear indication regarding the association between the personality dimensions of Five Factor Model (FFM) and cigarette brand switching behavior. Therefore, the findings from our exploratory analysis can provide added value to the literature.

Additionally, our study revealed that young adults who reported a decrease in daily cigarette consumption since the beginning of the economic crisis are more likely to switch to a cheaper cigarette brand alternative. The literature does not provide direct evidence that smokers who reduce cigarette consumption are more likely to switch to a cheaper cigarette brand. Yet, there is evidence that economic crises, issues of affordability and price increases tend to impact purchasing power, cigarette consumption and ultimately product selection and loyalty (Chaloupka et al., 2002; Hoffman & Tan, 2015; Krishnamoorthy et al., 2020; Yeh et al., 2016). While it may be possible that smokers in our sample who reduced their cigarette consumption eventually switched to a cheaper cigarette brand due to financial burdens, this finding is cannot be supported by the literature, and thus we recommend future research to investigate the different pathways in smoking behavior that lead to cigarette brand switching behavior. Furthermore, our study revealed that young adults whose finances are more adversely impacted are more likely to switch to a cheaper cigarette brand and young adults who had higher levels of income sufficiency are less likely to switch to a cheaper cigarette brand. These findings support the literature that determined that price increases, and affordability adversely impacts cigarette brand loyalty (Hoffman & Tan, 2015; Krishnamoorthy et al., 2020; Salti et al., 2015). An interesting result is that young adults who reported excessive social media use are less likely to switch to a cheaper cigarette brand alternative. The literature does not provide any direct evidence regarding social media use and cigarette brand switching behavior, and thus we recommend future research to look further into this association (Nesi & Prinstein, 2015; Zimmer-Gembeck et al., 2021). Both cigarette smoking and brand switching are behaviors, and the literature has established evidence of how people with different personalities behave or

respond to stimuli (Revelle, 2016; Zvolensky et al., 2015). It could be possible that there exists a sequential pathway from switching to a cheaper cigarette brand during a crisis to developing high cigarette dependence. However, we recommend that future research investigate further to achieve better insight into the matter.

This study examined variables, including personality dimensions, sociodemographic variables, and lifestyle habits influencing high cigarette dependence and the behavior of switching to a cheaper cigarette brand. The literature has well established the factors that prevent or lead to substance misuse (e.g., tobacco and alcohol abuse) which have been implemented in governmental smoke-free and tobacco policies. Nonetheless, the aim of this study is not to victimize students who smoke cigarettes based on their personalities, rather, to uncover the personality traits that are implicated in vulnerability to high cigarette dependence. There are substantial studies that have determined that school-based alcohol prevention programs targeting youth with personality risk factors for addiction and mental health problems have been found to prevent tobacco use, reduce substance use and misuse, and prevent onset of alcohol misuse and dependence in those with elevated personality profiles (Conrod et al., 2008, 2013; Debenham et al., 2021). Moreover, these personality-targeted interventions have been found to have long-term effects (Conrod et al., 2011). While our findings do not provide evidence of successful personality-targeted interventions in preventing high cigarette dependence, our study does uncover some of the vagueness behind the personality dimensions of the FFM which are most vulnerable to high cigarette dependence. As a result, our current study can provide a benchmark on a research level for future studies that aim to further understand the relationship between personality dimensions and high cigarette dependence on a larger scale. Current studies that support

personality-targeted interventions refer to personality profiles such as impulsivity, sensation seeking, anxiety sensitivity, and hopelessness (Conrod et al., 2008, 2013; Debenham et al., 2021). However, our study utilizes the personality dimensions of the FFM. While we did use a different personality model, we do believe that our insight can help add to the potential future applicability of the FFM in additional contexts, such as that of smoking cessation and prevention. Further steps would include additional investigation, designing training models that help manage the personality dimensions of the FFM, and measuring the success of personality-related interventions of the FFM in reducing high cigarette dependence or cigarette use before providing concrete evidence to the applicability of the FFM in smoking cessation and prevention programs and its application in the real world.

5.2. Limitations and Future Considerations

Participants of this study were limited to students from the American University of Beirut (AUB) and the Lebanese University (LU). Having participants from other universities may have expanded the scope of this study and provided other conclusions. Furthermore, since our data collection was through an online survey, there is a selection bias which may have impacted our findings. Careless responding and attrition in online surveys introduce measurement error and can lead to several psychometric issues (Ward et al., 2017). A study found that attrition and careless responding lead to a more conscientious, agreeable, and less extraverted sample (Ward et al., 2017). This means that our sample may have been less extraverted than the appropriate representation of the population, and thus the insignificant impact of extraversion on high cigarette dependence in this study may have been due to this sampling bias. We recommend that

future studies include or perform traditional survey to avoid bias. Furthermore, although our study achieves more than the minimum required number of events per variable (EPV) to implement the logistic regression models, the sample size of this study remains relatively small (N=212). Had our study included a larger sample, our margin of error would have been smaller. Having a larger sample would improve the precision of our description of the population student who smoke cigarette. We suggest that future studies increase the sample size to increase statistical power of their studies (Whitley & Ball, 2002). In addition, we propose that future studies include participants who exclusively smoke e-cigarettes or waterpipes, and young adults who did not receive an education since they were excluded from this study as they were not our target population. We also suggest that future studies consider going beyond the scope of the student population, and more towards the general young adult population or broader.

BIBLIOGRAPHY

Age-standardized estimates of current tobacco use, tobacco smoking and cigarette smoking (Tobacco control: Monitor). (n.d.). Retrieved May 7, 2022, from https://www.who.int/data/gho/data/indicators/indicator-details/GHO/gho-tobacco-control-monitor-current-tobaccouse-tobaccosmoking-cigarrettesmoking-agestd-tobagestdcurr

Aguilar-Palacio, I., Carrera-Lasfuentes, P., & Rabanaque, M. J. (2015). Youth unemployment and economic recession in Spain: influence on health and lifestyles in young people (16–24 years old). *International Journal of Public Health*, *60*(4), 427–435. https://doi.org/10.1007/S00038-015-0668-9/TABLES/4

Akiki, Z., Saadeh, D., Haddad, C., Sacre, H., Hallit, S., & Salameh, P. (2020). Knowledge and attitudes toward cigarette and narghile smoking among previous smokers in Lebanon. *Environmental Science and Pollution Research*, *27*(12), 14100–14107. https://doi.org/10.1007/s11356-020-07763-y

Arkes, J. (2012). How Does Youth Cigarette Use Respond to Weak Economic Periods? Implications for the Current Economic Crisis. *Https://Doi.Org/10.3109/10826084.2011.631962*, *47*(4), 375–382. https://doi.org/10.3109/10826084.2011.631962

Ásgeirsdóttir, T. L., Corman, H., Noonan, K., Ólafsdóttir, P., & Reichman, N. E. (2014). Was the economic crisis of 2008 good for Icelanders? Impact on health behaviors. *Economics and Human Biology*, *13*(1), 1–19. https://doi.org/10.1016/j.ehb.2013.03.005

Ashton, M. C., Lee, K., & de Vries, R. E. (2014). The HEXACO Honesty-Humility, Agreeableness, and Emotionality Factors: A Review of Research and Theory.

Personality and Social Psychology Review, *18*(2), 139–152. https://doi.org/10.1177/1088868314523838

Bahelah, R., Ward, K. D., ben Taleb, Z., Difranza, J. R., Eissenberg, T., Jaber, R., & Maziak, W. (2019). Determinants of progression of nicotine dependence symptoms in adolescent waterpipe smokers. *Tobacco Control*, *28*(3), 254–260. https://doi.org/10.1136/TOBACCOCONTROL-2018-054244

Biener, L., & B. Albers, A. (2004). Young adults vulnerable new targets. *American Journal of Public Health*, *94*.

Blok, D. J., de Vlas, S. J., van Empelen, P., & van Lenthe, F. J. (2017). The role of smoking in social networks on smoking cessation and relapse among adults: A longitudinal study. *Preventive Medicine*, *99*, 105–110. https://doi.org/10.1016/J.YPMED.2017.02.012

Chaloupka, F. J., Cummings, K. M., Morley, C. P., & Horan, J. K. (2002). Tax, price and cigarette smoking: Evidence from the tobacco documents and implications for tobacco company marketing strategies. *Tobacco Control*, *11*(SUPPL.1). https://doi.org/10.1136/tc.11.suppl_1.i62

Chassin, L., Presson, C. C., Rose, J. S., & Sherman, S. J. (1996). The Natural History of Cigarette Smoking From Adolescence to Adulthood: Demographic Predictors of Continuity and Change. *Health Psychology*, *15*(6), 478–484.

Choi, J.-S., Payne, T. J., Ma, J. Z., & Li, M. D. (2017). *Relationship between Personality Traits and Nicotine Dependence in Male and Female Smokers of African-American and European-American Samples*. *8*. https://doi.org/10.3389/fpsyt.2017.00122

Concato, J., Peduzzi, P., Holford, T. R., & Feinstein, A. R. (1995). Importance of events per independent variable in proportional hazards analysis I. Background, goals, and general strategy. *Journal of Clinical Epidemiology*, *48*(12), 1495–1501. https://doi.org/10.1016/0895-4356(95)00510-2

Conrod, P. J., Castellanos, N., & Mackie, C. (2008). Personality-targeted interventions delay the growth of adolescent drinking and binge drinking. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *49*(2), 181–190. https://doi.org/10.1111/J.1469-7610.2007.01826.X

Conrod, P. J., Castellanos-Ryan, N., & MacKie, C. (2011). Long-term effects of a personality-targeted intervention to reduce alcohol use in adolescents. *Journal of Consulting and Clinical Psychology*, *79*(3), 296–306. https://doi.org/10.1037/A0022997

Conrod, P. J., O'Leary-Barrett, M., Newton, N., Topper, L., Castellanos-Ryan, N., MacKie, C., & Girard, A. (2013). Effectiveness of a selective, personality-targeted prevention program for adolescent alcohol use and misuse: a cluster randomized controlled trial. *JAMA Psychiatry*, *70*(3), 334–342. https://doi.org/10.1001/JAMAPSYCHIATRY.2013.651

Costa, P. T., & McCrae, R. R. (1997). Personality Trait Structures as a Human Universal. *American Psychologist*, *52*(5), 509–516.

de La Garza, R., Yoon, J. H., Thompson-Lake, D. G. Y., Haile, C. N., Eisenhofer, J. D., Newton, T. F., & Mahoney, J. J. (2016). Treadmill exercise improves fitness and reduces craving and use of cocaine in individuals with concurrent cocaine and tobacco-use disorder. *Psychiatry Research*, *245*, 133–140. https://doi.org/10.1016/J.PSYCHRES.2016.08.003

de Souza, L. Eugenio., Rasella, Davide., & Barros, R. (2021). Smoking prevalence and economic crisis in Brazil. *Revista de Saude Publica*, 1–10.

Debenham, J., Grummitt, L., Newton, N. C., Teesson, M., Slade, T., Conrod, P., & Kelly, E. V. (2021). Personality-targeted prevention for adolescent tobacco use: Three-year outcomes for a randomised trial in Australia. *Preventive Medicine*, *153*. https://doi.org/10.1016/J.YPMED.2021.106794

Eze, S. C., Chinedu-Eze, V. C., & Bello, A. O. (2018). The utilisation of e-learning facilities in the educational delivery system of Nigeria: a study of M-University. *International Journal of Educational Technology in Higher Education*, *15*(1), 1–20. https://doi.org/10.1186/S41239-018-0116-Z/TABLES/9

Fagerström, K. (2012). Determinants of tobacco use and renaming the FTND to the Fagerström test for cigarette dependence. *Nicotine and Tobacco Research*, *14*(1), 75–78. https://doi.org/10.1093/ntr/ntr137

Fawaz, M., & Samaha, A. (2021). E-learning: Depression, anxiety, and stress symptomatology among Lebanese university students during COVID-19 quarantine. *Nursing Forum*, *56*(1), 52–57. https://doi.org/10.1111/NUF.12521

Fowler, J. S., Logan, J., Wang, G. J., Volkow, N. D., Telang, F., Zhu, W., Franceschi, D., Pappas, N., Ferrieri, R., Shea, C., Garza, V., Xu, Y., Schlyer, D., Gatley, S. J., Ding, Y. S., Alexoff, D., Warner, D., Netusil, N., Carter, P., … Vaska, P. (2003). Low monoamine oxidase B in peripheral organs in smokers. *Proceedings of the National Academy of Sciences of the United States of America*, *100*(20), 11600–11605. https://doi.org/10.1073/pnas.1833106100

Gallus, S., Ghislandi, S., & Muttarak, R. (2015). Effects of the economic crisis on smoking prevalence and number of smokers in the USA. *Tobacco Control*, *24*(1), 82–88. https://doi.org/10.1136/tobaccocontrol-2012-050856

Gilbert, D. G. (1995). *SMOKING: Individual Differences, Psychopathology, and Emotion* (Vol. 148).

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, *37*(6), 504–528. https://doi.org/10.1016/S0092-6566(03)00046-1

Haddock, C. K., Talcott, G. W., Klesges, R. C., & Lando, H. (1999). An examination of cigarette brand switching to reduce health risks,,. *Annals of Behavioral Medicine*, *21*(2), 128–134. https://doi.org/10.1007/BF02908293

Hakulinen, C., Hintsanen, M., Munafò, M. R., Virtanen, M., Kivimäki, M., Batty, G. D., & Jokela, M. (2015). Personality and smoking: Individual-participant meta-analysis of nine cohort studies. *Addiction*, *110*(11), 1844–1852. https://doi.org/10.1111/add.13079

Heatherton, T. F., Kozlowski, L. T., Frecker, R. C., & Fagerstrom, K.-O.-O. (1991). The Fagerström Test for Nicotine Dependence: a revision of the Fagerstrom Tolerance Questionnaire. *British Journal of Addiction*, *86*(9), 1119–1127. https://doi.org/10.1111/j.1360-0443.1991.tb01879.x

Henson, R. K. (2001). Understanding internal consistency reliability estimates: A conceptual primer on coefficient alpha. *Measurement and Evaluation in Counseling and Development*, *34*(3), 177–189. https://doi.org/10.1080/07481756.2002.12069034

Hiscock, R., Judge, K., & Bauld, L. (2011). Social inequalities in quitting smoking: What factors mediate the relationship between socioeconomic position and smoking cessation? *Journal of Public Health*, *33*(1), 39–47. https://doi.org/10.1093/PUBMED/FDQ097

Hobkirk, A. L., Krebs, N. M., & Muscat, J. E. (2018). Income as a moderator of psychological stress and nicotine dependence among adult smokers. *Addictive Behaviors*, *84*, 215–223. https://doi.org/10.1016/J.ADDBEH.2018.04.021

Hoffman, S. J., & Tan, C. (2015). Overview of systematic reviews on the health-related effects of government tobacco control policies. *BMC Public Health*, *15*(1), 1–11. https://doi.org/10.1186/s12889-015-2041-6

Kahler, C. W., Daughters, S. B., Leventhal, A. M., Rogers, M. L., Clark, M. A., Colby, S. M., Boergers, J., Ramsey, S. E., Abrams, D. B., Niaura, R., & Buka, S. L. (2009). Personality, psychiatric disorders, and smoking in middle-aged adults. *Nicotine and Tobacco Research*, *11*(7), 833–841. https://doi.org/10.1093/ntr/ntp073

Kandel, D. B., Griesler, P. C., & Hu, M. C. (2015). Intergenerational Patterns of Smoking and Nicotine Dependence among US Adolescents. *American Journal of Public Health*, *105*(11), e63–e72. https://doi.org/10.2105/AJPH.2015.302775

Krishnamoorthy, Y., Majella, M. G., & Murali, S. (2020). Impact of tobacco industry pricing and marketing strategy on brand choice, loyalty and cessation in global south countries: a systematic review. *International Journal of Public Health*, *65*(7), 1057–1066. https://doi.org/10.1007/s00038-020-01422-2

Lakon, C. M., Wang, C., Butts, C. T., Jose, R., Timberlake, D. S., & Hipp, J. R. (2015). A Dynamic Model of Adolescent Friendship Networks, Parental Influences, and

Smoking. *Journal of Youth and Adolescence*, *44*(9), 1767–1786. https://doi.org/10.1007/S10964-014-0187-7/FIGURES/1

Lee, J. O., Hill, K. G., Hartigan, L. A., Boden, J. M., Guttmannova, K., Kosterman, R., Bailey, J. A., & Catalano, R. F. (2015). Unemployment and substance use problems among young adults: Does childhood low socioeconomic status exacerbate the effect? *Social Science & Medicine*, *143*, 36–44. https://doi.org/10.1016/J.SOCSCIMED.2015.08.016

Leeman, R. F., & Potenza, M. N. (2012). Similarities and differences between pathological gambling and substance use disorders: A focus on impulsivity and compulsivity. *Psychopharmacology*, *219*(2), 469–490. https://doi.org/10.1007/s00213-011-2550-7

Leung, D. Y. P., Au, D. W. H., Lam, T., & Chan, S. S. C. (2013). *Predictors of Long-term Abstinence Among Chinese Smokers Following Treatment : The Role of Personality Traits*. *14*, 5351–5354.

Ling, P. M., & Glantz, S. A. (2002). FORUM ON YOUTH SMOKING Why and How the Tobacco Industry Sells Cigarettes to Young Adults: Evidence From Industry Documents. *American Journal of Public Health*, *92*(6). http://www.library.ucsf.edu/

Ling, P. M., Neilands, T. B., & Glantz, S. A. (2009). Young Adult Smoking Behavior. A National Survey. *American Journal of Preventive Medicine*, *36*(5). https://doi.org/10.1016/j.amepre.2009.01.028

Lund, M. (2015). Social inequality in cigarette consumption, cigarette dependence, and intention to quit among Norwegian smokers. *BioMed Research International*, *2015*. https://doi.org/10.1155/2015/835080

Malouff, J. M., Thorsteinsson, E. B., & Schutte, N. S. (2006). The five-factor model of personality and smoking: A meta-analysis. *Journal of Drug Education*, *36*(1), 47–58. https://doi.org/10.2190/9EP8-17P8-EKG7-66AD

Marshall, A. L., & Wolanskyj-Spinner, A. (2020). COVID-19: Challenges and Opportunities for Educators and Generation Z Learners. *Mayo Clinic Proceedings*, *95*, 1135–1137. https://doi.org/10.1016/j.mayocp.2020.04.015

McClernon, F. J., Westman, E. C., & Rose, J. E. (2004). The effects of controlled deep breathing on smoking withdrawal symptoms in dependent smokers. *Addictive Behaviors*, *29*(4), 765–772. https://doi.org/10.1016/j.addbeh.2004.02.005

McClure, C. B., Valdimarsdóttir, U. A., Hauksdóttir, A., & Kawachi, I. (2012). Economic crisis and smoking behaviour: Prospective cohort study in Iceland. *BMJ Open*, *2*(5), 1–7. https://doi.org/10.1136/bmjopen-2012-001386

McCrae, R. R., & Allik, J. (2002). *The Five-Factor Model of Presonality Across Cultures*.

Mccrae, R. R., & John, O. P. (1992). The five-factor model: issues and applications. *Journal of Personality*, *60*(2), 175–532.

Moran, M. B., Soneji, S., Tan, A. S. L., & Choi, K. (2020). Associations between Exposure and Receptivity to Branded Cigarette Advertising and Subsequent Brand Preference among US Young Adults. *Nicotine and Tobacco Research*, *22*(6), 1030–1035. https://doi.org/10.1093/ntr/ntz093

Munafò, M. R., & Black, S. (2007). Personality and smoking status: A longitudinal analysis. *Nicotine and Tobacco Research*, *9*(3), 397–404. https://doi.org/10.1080/14622200701188869

Munafò, M. R., Zetteler, J. I., & Clark, T. G. (2007). Personality and smoking status: A meta-analysis. *Nicotine and Tobacco Research*, *9*(3), 405–413. https://doi.org/10.1080/14622200701188851

Nesi, J., & Prinstein, M. J. (2015). Using Social Media for Social Comparison and Feedback-Seeking: Gender and Popularity Moderate Associations with Depressive Symptoms. *Journal of Abnormal Child Psychology*, *43*(8), 1427–1438. https://doi.org/10.1007/S10802-015-0020-0/FIGURES/2

Nunnally, J. C. , & Bernstein, I. H. (1978). The role of university in the development of entrepreneurial vocations: a Spanish study. *Psychometric Theory McGraw-Hill New York*, 387–405.

Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstem, A. R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology*, *49*(12), 1373–1379. https://doi.org/10.1016/S0895-4356(96)00236-3

Perez-Warnisher, M. T., de Miguel, M. P. C., & Seijo, L. M. (2018). Tobacco Use Worldwide: Legislative Efforts to Curb Consumption. *Annals of Global Health*, *84*(4), 571. https://doi.org/10.29024/AOGH.2362

Prapavessis, H., de Jesus, S., Fitzgeorge, L., Faulkner, G., Maddison, R., & Batten, S. (2016). Exercise to Enhance Smoking Cessation: the Getting Physical on Cigarette Randomized Control Trial. *Annals of Behavioral Medicine*, *50*(3), 358–369. https://doi.org/10.1007/S12160-015-9761-9

R. DiFranza, J., J. Eddy, J., F. Brown, L., L. Ryan, J., & Bogojavlensky Ann. (1994). Tobacco acquisition and cigarette brand selection. *Tobacco Control*, *3*, 334–338.

Reichheld, F. F. (1993). Loyalty-Based Management. *Harvard Business Review*.

Reichheld, F. F., Markey, R. G., & Hopton, Christopher. (2000). E-customer loyalty - applying the traditional rules of business for online success. *European Business Journal*.

Revelle, W. (2016). *Hans Eysenck: Personality theorist*. https://doi.org/10.1016/j.paid.2016.04.007

Salameh, P., Jomaa, L., Farhat, G., Zeghondi, H., Gerges, N., Issa, C., Sabbagh, M. T., Chaaya, M., Barbour, B., Waked, M., Salamé, J., Saadallah-Zeidan, N., & Baldi, I. (2013). The Young Adults' Cigarette Dependence (YACD) score: An improved tool for cigarette dependence assessment in university students. *Addictive Behaviors*, *38*(5), 2174–2179. https://doi.org/10.1016/j.addbeh.2013.01.009

Salameh, P., Khayat, G., & Waked, M. (2014). The Lebanese cigarette dependence (LCD) score: A comprehensive tool for cigarette dependence assessment. *International Journal of Behavioral Medicine*, *21*(2), 385–393. https://doi.org/10.1007/s12529-012-9288-4

Salti, N., Chaaban, J., Nakkash, R., & Alaouie, H. (2015). The effect of taxation on tobacco consumption and public revenues in Lebanon. *Tobacco Control*, *24*(1), 77–81. https://doi.org/10.1136/tobaccocontrol-2012-050703

Scheffels, J. (2008). A difference that makes a difference: Young adult smokers' accounts of cigarette brands and package design. *Tobacco Control*, *17*(2), 118–122. https://doi.org/10.1136/tc.2007.021592

Sibai, A. M., Iskandarani, M., Darzi, A., Nakkash, R., Saleh, S., Fares, S., & Hwalla, N. (2016). Cigarette smoking in a Middle Eastern country and its association with hospitalisation use: A nationwide cross-sectional study. *BMJ Open*, *6*(4). https://doi.org/10.1136/bmjopen-2015-009881

Suhrcke, M., & Stuckler, D. (2012). Will the recession be bad for our health? It depends. *Social Science and Medicine*, *74*(5), 647–653. https://doi.org/10.1016/j.socscimed.2011.12.011

Taylor, A. H., Ussher, M. H., & Faulkner, G. (2007). The acute effects of exercise on cigarette cravings, withdrawal symptoms, affect and smoking behaviour: a systematic review. *Addiction*, *102*(4), 534–543. https://doi.org/10.1111/J.1360-0443.2006.01739.X

Thern, E., de Munter, J., Hemmingsson, T., & Rasmussen, F. (2017). *Long-term effects of youth unemployment on mental health: does an economic crisis make a difference?* https://doi.org/10.1136/jech-2016-208012

Vittinghoff, E., & McCulloch, C. E. (2007). Relaxing the Rule of Ten Events per Variable in Logistic and Cox Regression. *American Journal of Epidemiology*, *165*(6), 710–718. https://doi.org/10.1093/AJE/KWK052

Volpp, K. G., Levy, A. G., Asch, D. A., Berlin, J. A., Murphy, J. J., Gomez, A., Sox, H., Zhu, J., & Lerman, C. (2006). A Randomized Controlled Trial of Financial Incentives for Smoking Cessation. *Cancer Epidemiology, Biomarkers & Prevention*, *15*(1), 12–18. https://doi.org/10.1158/1055-9965.EPI-05-0314

Volpp, K. G., Troxel, A. B., Pauly, M. v, Glick, H. A., Puig, A., Asch, D. A., Galvin, R., Zhu, J., Wan, F., DeGuzman, J., Corbett, E., Weiner, J., Audrain-McGovern, J., & Transdisciplinary, the. (2009). A Randomized, Controlled Trial of Financial Incentives for Smoking Cessation. *Http://Dx.Doi.Org/10.1056/NEJMsa0806819*, *360*(7), 699–709. https://doi.org/10.1056/NEJMSA0806819

Walther, B., Morgenstern, M., & Hanewinkel, R. (2012). Co-occurrence of addictive behaviours: Personality factors related to substance use, gambling and computer

gaming. *European Addiction Research*, *18*(4), 167–174. https://doi.org/10.1159/000335662

Ward, M. K., Meade, A. W., Allred, C. M., Pappalardo, G., & Stoughton, J. W. (2017). Careless response and attrition as sources of bias in online survey assessments of personality traits and performance. *Computers in Human Behavior*, *76*, 417–430. https://doi.org/10.1016/J.CHB.2017.06.032

Whitley, E., & Ball, J. (2002). Statistics review 4: Sample size calculations. *Critical Care 2002 6:4*, *6*(4), 1–7. https://doi.org/10.1186/CC1521

Woods, S. A., & Hampson, S. E. (2005). Measuring the Big Five with single items using a bipolar response scale. *European Journal of Personality*, *19*(5), 373–390. https://doi.org/10.1002/PER.542

World Bank. (2021, June 21). *Lebanon Sinking into One of the Most Severe Global Crises Episodes, amidst Deliberate Inaction*. The World Bank. https://www.worldbank.org/en/news/press-release/2021/05/01/lebanon-sinking-into-one-of-the-most-severe-global-crises-episodes

World Bank. (2022). *Lebanon's Crisis: Great Denial in the Deliberate Depression*. World Bank. https://www.worldbank.org/en/news/press-release/2022/01/24/lebanon-s-crisis-great-denial-in-the-deliberate-depression

World Health Organization. (2008). Fresh and Alive Empower. *WHO Report on Th Global Tobacco Epidemic 2008 The MPOWER Package*, 330.

World Health Organization. (2013). WHO REPORT ON THE GLOBAL TOBACCO EPIDEMIC, 2013. *World Health Organization*. https://doi.org/10.1002/aehe.3640230702

World Health Organization. (2021). WHO REPORT ON THE GLOBAL TOBACCO EPIDEMIC, 2021. *World Health Organization*.

Yeh, C. Y., Schafferer, C., Lee, J. M., & Hsieh, C. J. (2016). Smoking-related changes or brand switching? Smokers' anticipated responses to a large increase in Taiwan's Tobacco Health and Welfare Surcharge. *Public Health*, *136*, 41–47. https://doi.org/10.1016/J.PUHE.2016.02.018

Zeinoun, P., Daouk-Öyry, L., Choueiri, L., & van de Vijver, F. J. R. (2018). Arab-Levantine personality structure: A psycholexical study of modern standard Arabic in Lebanon, Syria, Jordan, and the West Bank. *Journal of Personality*, *86*(3), 397–421. https://doi.org/10.1111/jopy.12324

Zimmer-Gembeck, M. J., Hawes, T., & Pariz, J. (2021). A closer look at appearance and social media: Measuring activity, self-presentation, and social comparison and their associations with emotional adjustment. *Psychology of Popular Media*, *10*(1), 74–86. https://doi.org/10.1037/PPM0000277

Zvolensky, M. J., Taha, F., Bono, A., & Goodwin, R. D. (2015). Big five personality factors and cigarette smoking: A 10-year study among US adults. *Journal of Psychiatric Research*, *63*, 91–96. https://doi.org/10.1016/j.jpsychires.2015.02.008