FACIAL CARE PRODUCTS: AN EXPLORATIVE STUDY OF CONSUMER PURCHASE INTENTION USING FMRI

SYAZWANI BINTI MD SALLEHAN

UNIVERSITI SAINS MALAYSIA

2021

FACIAL CARE PRODUCTS: AN EXPLORATIVE STUDY OF CONSUMER PURCHASE INTENTION USING FMRI

by

SYAZWANI BINTI MD SALLEHAN

Research project report submitted in fulfilment of the requirements
for the degree of
Master of Science

October 2021

ACKNOWLEDGEMENT

I am very grateful to GOD ALMIGHTY for without His graces and blessings, this study would not have been possible. My heartfelt gratitude to my supervisory team, Dr Aini Ismafairus Abd Hamid and Assoc. Prof. Dr Salmi Isa for their support, words of encouragement and continuous guidance to this study.

A deep appreciation goes to Mr Hazim Omar for assisting in designing the fMRI framework. Thank you to the team of radiographers and science officer Puan Nurul Alwani Liyana, who assisted me with the data collection. Thank you also towards Dr Shaohua Yang who assisted me in PLS data analysis. An extreme debt of gratitude to the Department of Radiologi, Hospital USM, as it allowed me to use their equipment and facilities.

This project would not be possible without the support of the members of the fMRI research team: Sabrina, Maisarah, and Bayti. My friends Siti Hajar, Unaisa and Wan Sarah for their sources of inspiration. I will miss my time with all my friends.

My parents have been incredibly supportive through this whole process, allowing me to be here. Their prayers and blessing beyond imagination. This work is also dedicated to my daughter Aisyah. You have made me stronger, better and more fulfilled than I could have ever imagined. I love you to the moon and back.

Immeasurable appreciation and deepest gratitude for the help and support are extended to others who are in one way or another have contributed in making this study possible. Lastly, I would like to acknowledge the Master of Cognitive Neurosciences program for the research grant (Bench Fee Program Sarjana Neurosains Kognitif (IPS@KL) - 401/PPSP/E3170003) to fund this research project. Thank you.

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

LIST OF SYMBOLS

α	Alpha
β	Beta

LIST OF ABBREVIATIONS

ATT	Attitude
AVE	Average Variance Extracted
BOLD	Blood Oxygen Level-Dependent
CR	Composite Reliability
FFX	Fixed-Effect Analysis
fMRI	Functional Magnetic Resonance Imaging
Ho	Hypothesis
HTMT	Heterotrait-Monotrait
IPFC	Inferior Prefrontal Cortex
IPS	Institut Pengajian Siswazah
MNI	Montreal Neurological Institute
MPFC	Medial Prefrontal Cortex
OFC	Orbitofrontal Cortex
PBC	Perceived Behaviour Control
PCC	Posterior Cingulate Cortex
PFC	Prefrontal Cortex
PI	Purchase Intention
PLS	Partial Least Squares
PSC	Percentage Of Signal Change
RFX	Random-Effect Analysis
ROI	Region Of Interest
SEM	Structural Equation Model
SN	Subjective Norms
SPSS	Social Sciences Statistical Package
TPB	Theory Of Planned Behaviour
TRA	Theory Of Reasoned Action
USM	Universiti Sains Malaysia
VIF	Variance Inflation Factor
VMPFC	Ventromedial Prefrontal Cortex
VS	Ventral Striatum
WFU	Wakeforest University

LIST OF APPENDICES

PRODUK PENJAGAAN MUKA: KAJIAN PENEROKAAN TERHADAP TINGKAH LAKU PEMBELIAN PENGGUNA MENGGUNAKAN FMRI

ABSTRAK

Pengenalan: Produk penjagaan wajah berkembang dengan cepat dari segi saiz pasaran dan liputan global, ada keperluan penting untuk pengetahuan yang lebih baik mengenai tingkah laku pembelian pengguna. Model kajian yang dikaji adalah bentuk teori tingkah laku terancang yang dipermudahkan. Teori Perilaku Terancang (TPB) dijadikan kerangka teori utama untuk meramalkan niat untuk membeli produk penjagaan wajah dalam penyelidikan ini.

Objektif: Tujuan penelitian ini adalah untuk mengetahui pengaruh niat pembelian terhadap norma subjektif, kawalan tingkah laku dan sikap terhadap soal selidik dan produk penjagaan wajah. Objektif lain adalah untuk meneroka tindak balas otak pengguna dalam mendapatkan isyarat otak melalui pengimejan resonans magnetik berfungsi (fMRI).

Metodologi: Terdapat dua peringkat, pertama adalah kajian soal selidik terhadap 133 peserta dan kedua melibatkan penggunaan fMRI dengan hanya lapan subjek. Kedua-dua reka kajian berdasarkan model TPB dalam soal selidik konstruk. Pada tahap 2, kami menggunakan kembali item soal selidik untuk menilai peserta dalam pengimejan resonans magnetik berfungsi dengan disertakan bersama gambar produk penjagaan wajah global dan bukan global.

Hasil: Objektif 1 tidak disokong, hanya sikap dapat mempengaruhi niat membeli secara positif ($\beta = 0.451$, $p < 0.01$). Oleh kerana tidak sama dalam sistem pemarkahan, penyelidikan ini tidak dapat menggabungkan objektif 1 dan objektif 2. Walau bagaimanapun, kami menggunakan soalan yang sama dari soal selidik dalam

fMRI dengan menggunakan ya dan tidak respon. Terdapat signifikan secara statistik untuk isyarat otak bagi sikap ($p < 0.05$ tidak diperbetulkan), kami mendapati peningkatan aktiviti di kiri lobus parietal unggul, kanan gyrus sudut, kiri hippocampus, kiri gyrus supramarginal, kanan precuneus, dan kawasan kiri gyrus oksipital tengah ($p < 0.05$ tidak diperbetulkan).

Kesimpulan: Terdapat batasan dari segi produk yang digunakan dalam eksperimen. Kajian ini hanya mengkaji produk penjagaan wajah oleh fMRI. Oleh itu, kajian masa depan harus boleh menggunakan pelbagai item yang berbeza seperti kereta, makanan atau barang keperluan rumah.

Kata Kunci: Teori Tingkah Laku Terancang, fMRI, Niat Pembelian

FACIAL CARE PRODUCTS: AN EXPLORATIVE STUDY OF CONSUMER PURCHASE BEHAVIOR USING FMRI

ABSTRACT

Introduction: Facial care products are quickly expanding in terms of market size and global coverage, there are crucial needs for a better knowledge of consumer purchasing behaviors. The research model that was studied was a simplified form of the planned behavior theory. The Theory of Planned Behavior (TPB) was served as the primary theoretical frameworks for predicting intentions to purchase facial care products in this research.

Objective: The purpose of this study was to determine the effects of perceived purchase intention on subjective norms, perceived behavioral control, and attitudes toward questionnaires and facial care products. Another objective was to examine consumers' brain responses that could modulate activity of the brain signals via functional MRI.

Methodology: There were two stages, with the first being a survey of 133 participants and the second involved functional Magnetic Resonance Imaging with just eight subjects. Both designs were based on the TPB model in construct questionnaire. In stage 2, we re-used the questionnaire items that assessed participants in fMRI, which included images of global and non-global facial care products.

Results: Objective 1 was not supported, as only attitude influenced purchase intention positively ($\beta = 0.451$, $p < 0.01$). Due to the mismatch in scoring systems, this research could not reconcile objective 1 and objective 2. We used the same questions from the questionnaire with fMRI images incalculating yes and no response. There were statistically significant findings for brain signals concerning attitude ($p < 0.05$

uncorrected). We observed increased activities in the left superior parietal lobule, right angular gyrus,left hippocampus, left supramarginal gyrus, right precuneus and left middle occipital gyrus area ($p < 0.05$ uncorrected).

Conclusion: There was a limitation in terms of the products employed in the experiments. This study examined just facial care products using fMRI. Therefore, future research should duplicate this study utilizing a variety of different items like car, food or household goods.

Keywords: Theory of Planned Behavior (TPB), fMRI, Purchase Intention

CHAPTER 1

INTRODUCTION

1.1 Introduction

Cosmetics is one of the largest industries in the world, with a varied range of goods including cleansers, toners, serums, moisturizers, foundation, heavy powder, lipstick, eyeliners, eyeshadows, blushers, and mascara (Matukevica et al., 2021; Zbib et al., 2020; Haslina and Harizan, 2017). As cosmetics manufacturers provide new, actively upgraded items to the market, the product range continues to grow. At the present, the global cosmetics and toiletry market is flourishing.

Euromonitor International (Swee-keng, 2016) estimated that the beauty business as a whole was worth $444 billion globally in 2016. Additionally, skincare goods might dominate the global market, with a market value of US $ 120 billion. Additionally, the worldwide skincare industry is expected to reach $ 179 billion by 2022, according to Allied Market Research (Swee-keng, 2016).

Malaysian cosmetics and toiletry manufacturing is also thriving. According to Swee-2016 keng's Asia Personal Care and Cosmetics Guide, the cosmetics and toiletries sector generated almost US$2.24 billion in 2016. Meanwhile, personal care and cosmetics sales totaled around US$292 million, demonstrating the industry's robust need for skincare. The most frequently used cosmetics are skincare products, which account for a sizable share of the worldwide cosmetics business.

Cosmetics are exploding in popularity across the globe. With the addition of new cosmetics firms, the beauty sector is flourishing, contributing to an extremely competitive environment. Consumer behavior is not just a psychological phenomenon; it also represents a chance to increase income and gain a competitive edge. Consumer behavior is an examination of how, when, what, and why people purchase. The prior

literature was more concerned with cosmetics than with skincare. Concerning the significance, this research analyzes the theory of planned behavior (La Barbera and Ajzen, 2020), which states that the consumer may be aware of the appropriate time to purchase facial care goods. The study's foundation for understanding consumer behavior is Ajzen's theory of Planned Behavior, which claims that attitude, subjective norm, and perceived behavioral control are three fundamental drivers of behavior (Ajzen, 1991, 2002; Heydari et al., 2020).

A brand, according to the exchange model, is something that can be sold and utilized, has some practical and symbolic meaning, and produces considerable relevance for the consumer (Hammerl et al., 2016; Pusztai, 2020). For example, the brand functions as a demand product (e.g., hunger, sleep), yet its use serves as a source of identity on an emotional level. As a result, brands serve as a vehicle for customer satisfaction and customisation (Pusztai, 2020; Xie et al., 2015). Recent research has explored the effect of globalization on the quality, legitimacy, and familiarity of items, as well as the likelihood of purchasing a certain brand (Hussein and Hassan, 2018; Pusztai, 2020). Additionally, it was discovered that a brand's globalization and country of origin are significantly related to its purchasing potential. Audrin et al. (2017) and Hussein and Hussein (2018) did similar experiments, however we intended to investigate whether brand labels (global vs. non-global) have a differential influence on brain activity depending on liking scores (preference; Most liked vs Least liked).

The purpose of this study was to investigate consumers' purchasing intentions for cosmetic care products and how these intentions influence purchasing decisions. Advertisers can use this phenomena to establish the extent to which a certain behavioral feature relates to the inclination to purchase facial care products. They should develop an effective strategy for appropriately increasing their efficiency.

1.2 Problem statement & Study rationale

Skincare products are the most popular type of cosmetics and account for the majority of the worldwide cosmetics market. A healthy skin care routine is only as effective as the products it involves. While high-quality products can improve the appearance of your skin now and in the future, low-quality goods can be useless and even harmful. Despite its financial success, prior literature has focused on cosmetics rather than skincare goods. As a result, this research will employ a new study space: facial care products. Facial care products are often sold in supermarkets, shopping malls, pharmacies, personal care stores, direct sales/marketing, specialty stores, and internet retailers. Malaysia's local market offers over 60,000 varieties of cosmetics (Azmi Hassali and Al-Tamimi, 2015; Prakash Mani et.al., 2019).

Consumer behavior is influenced by a variety of internal and external influences. Consumer behavior is the study of a consumer's actions before to, during, and after a purchase. As marketing expertise expanded, a desire arose to discover and comprehend purchasing behavior patterns and to forecast purchase patterns with an acceptable degree of accuracy. Women's cosmetics usage has also changed as a result of the change in lifestyle. Cosmetics are not just used to enhance one's appearance; they are also regarded as a means of expressing social courtesy. Women have always been self-conscious about their appearance, and the skin is an integral part of overall beauty and personality.

Purchase intention is a decision-making process that is typically explained through the lens of the Theory of Planned Behavior (TPB). The Theory of Planned Behavior (TPB) was serve as the primary theoretical frameworks for predicting intentions to purchase facial care products in this research. The TPB is a theoretical framework for predicting behavior through the use of subjective norms, perceived

behavioral control, and attitude. It is backed up by a substantial body of research across many behavioral domains (Ajzen, 1991). Within the TPB framework, several authors demonstrated the validity of including the self-identity construct in explaining consumers' intentions and behaviors (Carfora et al., 2019; Smith et al., 2008), and several researchers demonstrated that ethical self-identity mediates consumer attitudes and purchase intentions (Barnett, Cloke, Clarke, & Malpass, 2005; Singh, 2016).

Thus, understanding Malaysian customers' attitudes regarding face skincare products is critical for developing sound and effective strategies. As such, this study will examine how characteristics associated with Ajzen's Planned Behaviour Theory (PBC) (Ajzen, 1991; Heydari et al., 2020; La Barbera and Ajzen, 2020; Smith et al., 2010) affect consumer purchase intentions (PI) for face skincare products. Subjective norm (SN), perceived behavior control (PBC), and attitude (ATT) are evaluated to see how they affect the consumer's impression of behavioral control.

Understanding how customers make purchasing decisions in today's marketplace requires a deeper understanding of consumer behavior via fMRI, skin conductors, or eye trackers. By utilizing neuromarketing research to assist in quantifying brain activity and forecasting market size. For instance, by utilizing the fMRI imaging technology, the researcher can gain a better understanding of new or additional aspects influencing the functional, symbolic, and sensory motivations underlying the consumer purchase intention under investigation.

These findings provide a more detailed explanation for consumer intention that has been missed and explored at a higher level. The signal brain will also be exposed via neuroimaging techniques when customers respond to questionnaires about factors affecting their purchasing decisions. As a result, there is a growing body of research (Amoako et al., 2020; Heydari et al., 2020; La Barbera and Ajzen, 2020; Shin et al.,

2020) examining the role of green awareness and green behavior in Ghana's young purchase behavior.

The findings indicate that there are positive and substantial linkages between green knowledge and purchasing behavior, as well as a positive and significant association between green and purchasing behaviors. Additionally, the findings indicate that green values are more essential than trust in the purchase decisions of young people in Ghana (Amoako et al., 2020).

The purpose of this research was to further establish the association between brain signal and theory-planned action on cosmetic care goods during purchasing. Perhaps this investigation will demonstrate an accurate concrete response using a questionnaire and neuroimaging approach to provide evidence. Numerous client habits must be unlocked. Consumer neuroscience research, we believe, has the potential to profoundly impact consumer behavior and marketing.

This gap was addressed in this study by comparing consumer perceptions when deciding to purchase either subjective norm (SN) within a factor; perceived behavior regulation (PBC) and attitude (ATT) both have a beneficial effect on the purchasing intention of facial care products. The purpose of this study is to describe and analyze the major factors influencing customer purchasing intentions for facial care products in Malaysia. The results would serve as a useful guide for marketers seeking to improve their customer understanding.

1.3 Research Questions

1. Does the subjective norm (SN), perceived behaviour control (PBC) and attitude (ATT) have a positive effect on the purchase intention of facial care products?

2. Does subjective norm (SN), perceived behaviour control (PBC) and attitude (ATT) affect brain signals?

1.4 General Objective

General: Investigate how individual Subjective Norm (SN); Perceived Behaviour Control (PBC) and Attitude (ATT) influence on Purchase Intention (PI) of facial care products via functional MRI.

1.4.1 Specific objective

1. To measure the influence of subjective norm (SN), perceived behaviour control (PBC) and attitude (ATT) on purchase intention of facial care products.
2. To investigate brain signal relationship to the subjective norm (SN); perceived behaviour control (PBC) and attitude (ATT) on the purchase intention by using fMRI.

CHAPTER 2

LITERATURE REVIEW

2.1 Facial Care Market

Individuals utilize facial care products in conjunction with a skincare program to assist them in treating their facial skin. The procedures to follow vary slightly based on the skin type. A skin routine is a procedure used to cleanse the skin. Regular and overnight moisturizing, as well as a weekly treatment, are all part of a simple program. Facial care products are used in conjunction with a skincare plan to assist individuals in treating their facial skin. There are some subtle distinctions in how you should apply products depending on your skin type (Noor et al., 2018; Putranto et al., 2021).

At the moment, the global facial care market is forecast to be worth almost US$145.3 billion by 2020, accounting for nearly half of the whole international cosmetic skin care sector, and is expected to continue growing, offering further opportunities for skincare products and services. In today's globalized world, we can observe the most recent changes. Numerous processes are engaged in connecting and integrating individuals, businesses, and governments from other nations through international trade and investment processes regulated by cutting-edge information technology.

Global brands are defined by their degree of globalization and their presence in both domestic and foreign markets (Samiee, 2019; Zbib et al., 2020). Additionally, global brands can be recognised as a single brand by virtue of their name, logo, packaging, and positioning, allowing consumers globally to recognize them as such (Akaka and Alden, 2010; Zhang et al., 2019). Thus, despite the fact that each country's brand is unique, they all employ the same marketing strategy to recruit and retain consumers (Gürhan-Canli et al., 2018; Stojanovic et al., 2018).

However, consumers' purchasing decisions were also influenced by their perception of certain location characteristics (Iversen and Hem, 2011; Shin et al., 2020). By contrast, local brands are marketed within a single country or geographic region (Gürhan-Canli et al., 2018; Lee et al., 2019), or are defined as a brand that is exclusively available within a specific geographic region (Mutepfa and Tapera, 2018; Winit et al., 2014), or as an iconic player in the home market (Lee et al., 2019; Winit et al., 2014).

As global players, international product and company brands are well-known for their competitive edge over domestic competitors (Ansari and Kashif, 2019; Swoboda and Hirschmann, 2016). Global brands such as Coca Cola, McDonald's, and Nike can be regarded as symbols of a global lifestyle or as indicators of societal homogenization, posing a threat to domestic competition (McClure et al., 2004; Peters et al., 2002; Rudy Farid, 2021).

2.1.1 Brand label

Numerous studies demonstrate how brand-product associations might influence customer purchasing behaviour (Davvetas and Halkias, 2019; Halkias et al., 2016). For instance, globalization's perception of this brand should result in a positive perception of the brand's reputation and perceived brand quality (Kessous and Valette-Florence, 2019; Randrianasolo, 2017), as positive relationships have been shown to influence the success of brand development in terms of both quality evaluation and purchase intention (Mohan et al., 2018; Sichtmann et al., 2019; Sichtmann and Diamantopoulos, 2013).

Other studies reveal advancements in the field of research. The researcher discovers that consumers who place a premium on the product do not use globalization/locality as a yardstick for brand perception. Additionally, customers see the brand as a luxury brand as a result of their high-value awareness (Hussein and

Hassan, 2018; Jacob et al., 2019). Additionally, quality and prestige play a role in the choice of global or non-global companies. This study by Xie et al. (2015) examined this topic and discovered that non-global brands can benefit from and enjoy brand value, and that even non-global brands have the ability to deliver similar benefits to customers. Even if the brand is expressed as a part of consumer culture, it can boost consumer confidence in the brand by conveying an air of honesty, dependability, and trust.

Additionally, the significant correlation between perceived brand globalization and perceived quality, prestige, and familiarity demonstrates that brand globalization is often connected with good perceptions of quality, prestige, and familiarity (Hussein and Hassan, 2018; Lee et al., 2019). This association is consistent with prior study findings emphasizing the relevance of global brand signals in establishing quality expectations, establishing prestige, and increasing customer awareness (Stojanovic et al., 2018; Xie et al., 2016).

Other researches have elaborated on this idea by establishing a link between perceived brands and emotional ties such as warmth and competence. Global brands are viewed as competent by consumers, whilst local brands are viewed as warm. Competence can benefit or harm a brand in the long run (Davvetas and Halkias, 2019; Fastoso and González-Jiménez, 2018).

Additionally, researchers discovered that warmth and efficiency can impact consumers' purchasing decisions (Davvetas and Halkias, 2019; Halkias et al., 2016). Warmth has a critical part in consumer brand identification, since consumers perceive a brand's friendliness and well-being. Additionally, the capability will help build a brand that appears capable, clever, and efficient, as well as meeting their needs (Kolbl et al., 2019; Vuong and Khanh Giao, 2020).

2.2 Neurosciences Technology

Making a purchase decision is a fundamental unit of analysis in economics. Customers frequently assess the product's attributes, compare the pricing, and then decide whether or not to purchase. Economic theory's success is contingent upon establishing the relationship between its capabilities and the characteristics of this recurrent and basic decision process. Neuroeconomics methodologies give hope for disentangling and characterizing the many components of an individual consumer's purchase choice process. By offering a more precise image of how the body and brain function, the advancement of neuroimaging technology has raised the likelihood of integrating neuroscience to economics and marketing research.

Al-Kwifi (2016), Morin (2011) states that fMRI utilizes an MRI scanner to detect changes in blood flow in the brain. When neurons require energy to be transferred, they will be rapidly digested by the blood flow. The differential between the blood oxygen level-dependent (BOLD) signal calculated by the fMRI machine and the resting state signal is the fundamental factor that enables researchers to interpret brain activity using this instrument. When a person is exposed to a stimulus, such as advertisements, various regions of the consumer's brain receive enhanced oxygenated blood flow in compared to resting blood flow, resulting in magnetic field distortions caused by hydrogen protons in the blood's water molecules (Çakir et al., 2018; Morin, 2011).

Additionally, fMRI enables the measurement of the concurrent activation of two diametrically opposed situations or processes. Additionally, the great spatial resolution of fMRI permits precise visualization of deep brain structures, as it localizes changes in brain function within a spatial resolution of 1-10 mm of deep brain structures (Schmidt et al., 2017; Silbereis et al., 2016).

2.3 Purchase Decision Making

According purchases are motivated by a combination of customer desire and price, according to microeconomic theory. In an event-related fMRI analysis, (Ballard and Knutson, 2009; Zhang et al., 2019) found that activity of the nucleus accumbens was correlated with consumer choice. In comparison, excessive costs stimulated the insula and inhibited the medial prefrontal cortex prior to the purchase decision.

Along with evaluations of 'likes' and 'preferences,' self-reported purchasing intent and likelihood of purchase are frequently used to forecast purchasing behavior. Purchase intentions, on the other hand, may be the most reliable predictor of subsequent purchasing behavior. Additionally, this researcher examined the usefulness of numerous predictors in forecasting purchasing behavior and discovered that purchase intention was the best predictor conceivable, outperforming pleasantness and emotional responses (Kashif and Udunuwara, 2020; Kytö, 2020).

Additionally, another aspect that influences customers' purchasing decisions that may influence a consumer is advertising's influence on the desirability of a brand. Utilizing commercials and appeals from local artists has a huge impact on consumers' pleasure and willingness to adopt the brand. The greater the strength of advertising was attributed to consumers' appreciation, memory, semantics, and attentiveness (Al-Kwifi et al., 2020; Jung et al., 2018; Stasi et al., 2018).

The literature focuses on the function of the prefrontal cortex (PFC) in decision-making. Al-Kwifi et al. (2019) demonstrated that when participants were given Halal imagery, ventromedial prefrontal brain activation increased. On the other hand, the study on brand logo food demonstrates that children's brains exhibit similar regions of activation to adults' medial prefrontal cortex (MPFC), inferior prefrontal cortex (IPFC) orbitofrontal cortex (OFC), and visual cortex (Al-Kwifi et al., 2020; Bruce et al., 2014).

Thus, by including neural measurements into consumer decision-making models, one can improve the marketing environment's expectation of behavior.

McClure et al. (2004) employed functional magnetic resonance imaging (fMRI) to assess people's preferences for two related sugary beverages, Coke and Pepsi. The study involved 67 volunteers who were randomly assigned to one of four groups. Each group was subjected to a distinct taste test done outside the scanner, as well as a paradigm for drink delivery within the scanner (McClure et al., 2004).

The most often employed inference method in fMRI research was the correlation between activity in a particular brain region and an individual's particular behavior or experiences. It maked no assumptions about the underlying causal relationship. As with this study, they used functional magnetic resonance imaging to assess the neurological effects of aesthetic product design on customers' decision-making processes. fMRI studies have demonstrated that viewing sculptures at their original scale activated the insula and parietal area cortex (in the precuneus), implying that this region of the brain was crucial for aesthetic perception of artworks (Chattaraman et al., 2016; Chen, 2018; Wang and Hsu, 2019).

Additionally, a recent study by Rampl et al., (2016) on decision-making processing revealed that other parts of the brain structure are involved in the reward system, such as brand like. Increased activation is associated with parts of the brain associated with emotion, while decreased activation is associated with areas of the brain associated with working memory and logic. Additionally, Haque et al., (2021) and Reimann et al., (2012) explored the neurological effects of aesthetic experience on consumer decision making and discovered that the insula and parietal area cortex (precuneus) were implicated in the purchasing rate of the product. They discovered that

when novel products were processed, the cingulate gyrus region of the reward system was more active than when familiar brands are processed.

Apart from aesthetic perception in consumer products, a study by Chattaraman et al., (2016), Reimann et al., (2010) and Wang and Hsu, (2019) discovered that aesthetics has a different effect on brain activation than normal package design. They discovered that aesthetic package presentation activated the ventromedial prefrontal cortex (VMPFC), striatum (nucleus accumbens), cingulate cortex, primary visual cortex, and precuneus more robustly than standard standards package presentation.

2.4 Brain Valuation System

In fMRI investigations, the brain network underlying value computation has been described (Clithero and Rangel, 2013; Schmidt et al., 2017). The ventral striatum VS, VMPFC, OFC, insula, amygdala, and posterior cingulate cortex (PCC) were the primary areas of the brain where this brain valuation system encoded expected and experienced values (Al-Kwifi et al., 2020; Bartra et al., 2013; Schmidt et al., 2017). As a result, it may be necessary to convert the expected value to an experienced value. Notably, Bartra et al. (2013) demonstrated that values correlated with neural activity in the VS and VMPFC as an extensive network are associated with the value of appetite and avoidance (Schmidt et al., 2017), as well as primary and secondary awards such as food or money, cars (Al-Kwifi et al., 2020; Bruce et al., 2014; Górnik-Durose and Pilch, 2016), faces, and social status (e.g., one's reputation) (Harada et al., 2020; Ruanguttamanun, 2014).

We hypothesise, based on these findings, that affective coding processes and affective control are critical antecedents to the expected effect of price. This effect should be more dependable in this scenario, more sensitive to VS individuals' response

to reward, and not the sole contributor to price implications. Other brain systems involved in affective regulation should play a role in this occurrence as well.

2.5 Theoretical Framework

2.5.1 Theory of Planned Behavior

The The theory of planned behavior (TPB) is a revision of the theory of reasoned action (TRA) due to the TPB's limitations in describing and forecasting a wide variety of human behavior (Heydari et al., 2020; La Barbera and Ajzen, 2020). Thus, TPB advocated that an individual's actual behavior for a particular activity be identified, with the factors impacting a person's behavioral intention being linked to his or her attitude, subjective norm, and perceived behavioral control (Ajzen, 2002; La Barbera and Ajzen, 2020). TPB is commonly used in consumer behavior research, which frequently makes use of human behavior to characterize and forecast.

TPB is frequently used in consumer behavior research, where it has been shown to be effective in explaining and forecasting human behavior. Several investigations employed the TPB model to examine consumers' intentions to purchase organic food and beverages (Carfora et al., 2019; Testa et al., 2019). Additionally, some studies employed the TPB model to examine consumer acceptance of remanufactured products (Sharma and Singh, 2019; Singhal et al., 2019).

TPB is a requirement for purchasing green items due to its numerous expansions that have already been utilized to research and comprehend environmental challenges and knowledge (Kautish et al., 2019; A. Sharma and Foropon, 2019). Thus, it was established that variables within the TPB model, such as attitude, subjective norms, and perceived behavioral control, all had a substantial effect on purchase intention.

2.5.2 Purchase Intention

The intention to purchase is a sort of decision-making process that typically clarifies the Theory of Planned Behavior (TPB). The primary theoretical framework for forecasting the intents of facial care products is the (TPB). The TPB is a theoretical framework for predicting behavior via subjective norms, perceived behavioral control, and attitude, all of which have been validated in numerous research across a variety of behavioral domains (Heydari et al., 2020). The purpose of expressing the desire for a particular behavior and demonstrating how much effort someone will exert and their willingness to try (A. Sharma and Foropon, 2019; Zentner et al., 2015).

Additionally, clients are influenced by internal and external factors during the purchasing process (Garas et al., 2018; Piehler et al., 2019). Additionally, other aspects impact buyers prior to purchasing a facial care product, including quality, price, loyalty, advertisement, and ethnocentrism (Alam, 2020; Fleseriu et al., 2020; Lee et al., 2019). As a result of this study, it was concluded that consumer levels of ethical self-identity with regard to facial care products have an effect on consumer buying attitudes.

Human beings are often seen as rational actors, as their actions are impacted when they accomplish a goal after careful planning. The intention to purchase is a customer's strategy or desire to purchase a product. As a result, the objective to acquire is one of the most critical factors to remember for industry in order to maximize earnings.

2.5.3 Subjective Norm (SN)

When evaluating the perspectives of others on their behavior, subjective norms are a cause of personal concern (Policarpo and Aguiar, 2020; Shin et al., 2020). They exert a form of social pressure on customers, influencing their expectations, attitudes,

and product behavior (Policarpo and Aguiar, 2020). Subjective norms are a result of a normative belief about how others should behave in a certain context (Yadav and Pathak, 2017). However, the motivation for compliance refers to an individual's desire to adhere to major beliefs held by others (Testa et al., 2019; Yadav and Pathak, 2017).

Subjective norms in this study indicate customer expectations regarding whether the consumer's influence circle welcomes, encourages, and executes the sensation associated with purchasing a facial care product. Consumers' shopping decisions are increasingly influenced by peer evaluation and recommendations. Subjective norms refer to the belief that the majority of people approve or disapprove of a particular behaviour (Pacho, 2020; Shin et al., 2020).

2.5.4 Perceived Behavior Control (PBC)

Behavioral capability and trust are typically used to standardize individual behavior (Kautish et al., 2019; Testa et al., 2019). Perceived behavioral control (PBC) is a term that refers to a person's interpretation of simple or difficult to do behaviors (Ajzen, 1991). Thus, it can be divided into two critical factors: 1) self-efficacy as internal control factors, which are used as a personal judgment to perform predicted behavior effectively, and perceived barriers as external control factors; and 2) personal judgment for overcoming external constraints, such as time and money required to conduct specific operations (Ajzen, 1991; Kautish et al., 2019). Perceived behavioral control indicates if an individual have the resources and opportunities necessary to engage in certain behaviors.

2.5.5 Attitude (AT)

The purpose of this study is to determine the effect of facial care products on attitudes, subjective norms, and perceived behavioral control elements. This behavior

impacted a person's belief in engaging in such behaviors, whereas the findings investigated the behavior's prospective consequences. According to Ajzen (1991), attitude is a "degree of another's positive or negative acts."

Attitude is a social, psychological judgment of a customer's behavior and the most important predictor of future behavior. Individuals' attitudes are influenced by their perceptions of costs, threats, and rewards, as well as their positive and negative views about technology, confidence, and fairness (Huijts et al., 2012; Shin et al., 2020; Testa et al., 2019). Additionally, an attitude is a state of mind that is not readily apparent through direct observation.

2.5.6 Conceptual framework

This study explain how subjective norms, perceived behavioral control, and attitude affect buy intention in comparison to previous quantitative research on purchase intention. Following that, we noticed and verified the consistency of past empirical investigations on purchase intention. The results are represented in Fig 2.1.

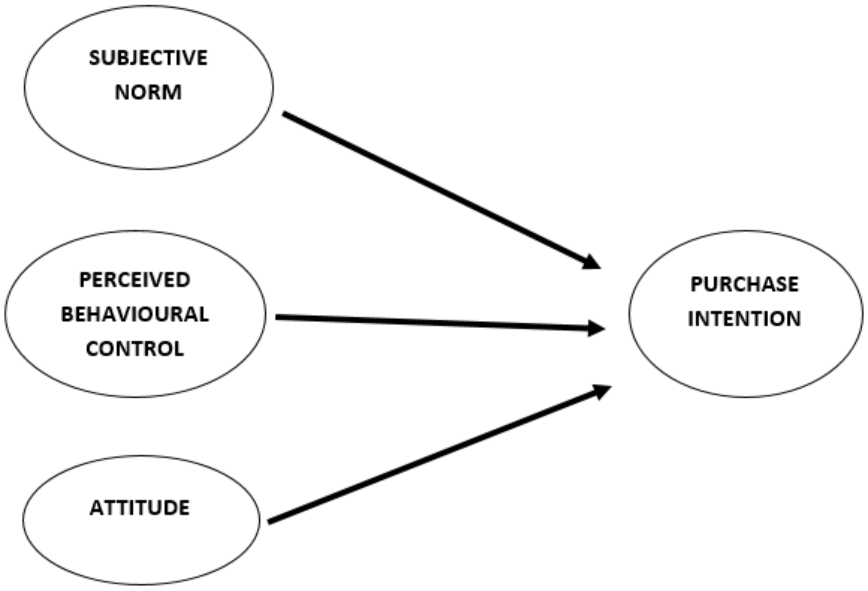

Figure 2.1 Relevant variables with purchase intention

Figure 2.2 shows the conceptual framework of the study, which was developed to investigate the factors influencing the purchase intention of facial care products.

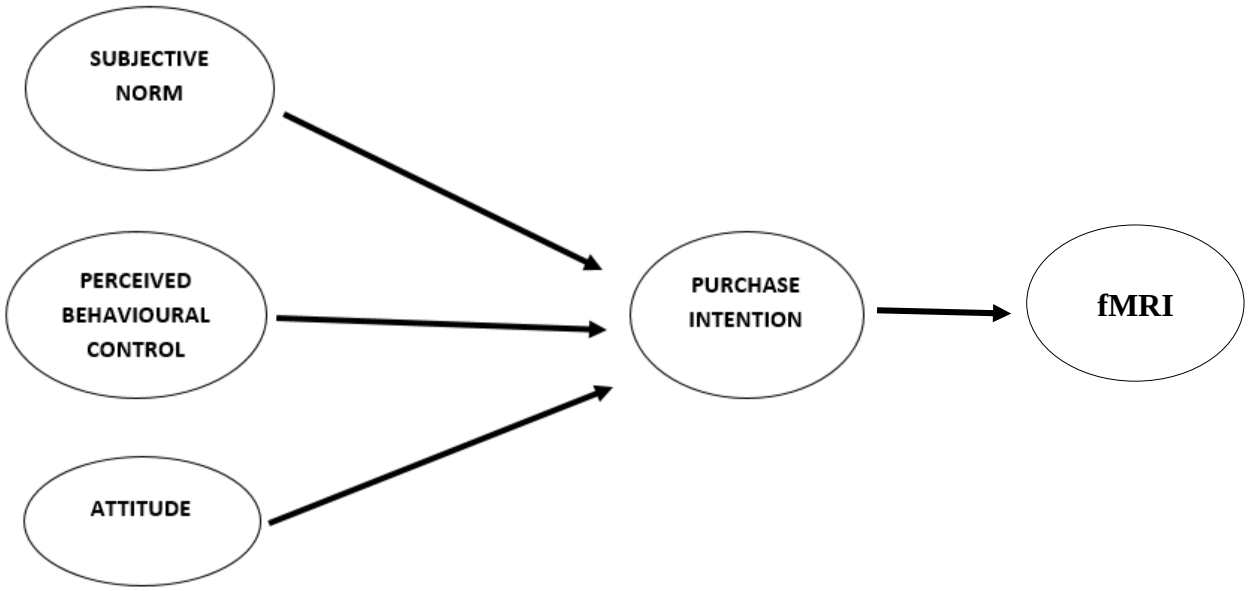

Figure 2.2 The conceptual framework of the study

2.6 Operation Definition

The important key terms of the research are defined to prevent possible misconceptions and are presented in Table 1.1.

Table 2.1 Operation definition

Term	Working Definition	References
Purchase intention	Possible behaviour of a consumer willing to purchase	Tsai et al. (2020)

Perceived behavioural control	Perceived behavioural control determines whether an individual has the resources and opportunities to act on such behaviours.	Tsai et al. (2020)
Subjective norm	Subjective norms are an individual's concern about the perception of his or her behaviour by the reference group, which he or she may alter to meet the expectations of the reference group.	Tsai et al. (2020)
Attitude	An attitude is a feeling of affection for a certain behaviour, and it is also a total of the individual's behavioural values, which are the potential outcome of the individual's actions.	Tsai et al. (2020)
Facial care product	Facial care products are a skincare regimen to help people treat their facial skin. Routine differences are to be used based on different skin types. A skin routine is a method of skin washing. Simple routines are clean, early morning and night moisturizing, weekly treatment.	Noor et al. (2018)

CHAPTER 3

METHODOLOGY

3.1 Introduction

The experiment was required in two stages. The first method was quantitative, applying questionnaires to elicit responses from individuals regarding the effect of subjective norm, perceived behavioral control, and attitude on purchasing intention. Theoretical Planned Behavior was being used in two stages to ascertain the reason for a person's purchase intention. Prior to the start of this experiment, JEPeM granted approval on 1st December 2020. USM/JEPeM/20060300.

The first stage was to determine which of these theories had an effect on the participants. This hypothesis was developed to determine the human behavior associated with purchasing intentions, and was still in use today. The questionnaire was derived from articles published in high-ranking publications on topics related to the intention to purchase facial care products by Tsai et al. (2020) and Yadav & Pathak (2017). Then, in level 2, we re-used the questionnaire items to assess participants in fmri, yet included images of global and non-global facial care goods.

Stage 1 involved randomly assigning 170 respondents to complete questionnaires. After removing faulty questionnaires and those with repeating responses, there remained just 133 valid surveys. After with eliminating irrelevant responses, the huge sample size of this study leads in greater statistical strength and robustness. Following stage 1, participants went to stage 2, where they randomly picked based inclusion and exclusion criteria. Only eight participants were chosen to go to the second level.

Stage 2, we chose eight Malay-speaking adults, four male and four female, with an average age of 23.2 (Mean age 23.20 = 20–28 years) and no history of psychological or neurological problems. The study was completed by each of the eight participants. All participants who passed the inclusion criteria by using the Sijil Pelajaran Malaysia (Malaysian Certificate of Education) and then instructed to enter the fMRI machine for brains were scanned for fMRI pictures.

By signing the informed consent form, all participants provided their informed consent (refer to Appendix D). Furthermore, they were advised that they were not required to complete the session and were free to leave at any point if the situation became uncomfortable. Eight healthy volunteers were scanned inside an fMRI scanner while doing block-related activities, which included presenting 12 product images. The researcher chose the images based on the products' local and global origins.

The product is chosen based on a survey of subjects, regardless of whether they are familiar with the products. The products were chosen from among the several products available in drug shops and internet applications that are easily accessible and recognizable. The researcher then chooses six global brands and six non-global brands to put in the fmri block.

3.2 Study area

In stage 1, the participants were recruited among adults above 18 years old with purchasing power within 13 states in Malaysia. This research was conducted by identifying and examining the significant factor affecting consumers purchasing intentions on facial care products in Malaysia. According to Sekaran (2016), sampling data is the process of identifying an appropriate and an adequate number of people to constitute the total population.

Therefore, this research used a nonprobability sampling method because the Malaysian population is too large to get a response from all people. Indeed, this study's variable evaluation method was reliable and widely acknowledged by well-known high-index journals (Y. Liu et al., 2020; Sekaran, 2016; Yadav and Pathak, 2017).

In stage 2, fMRI data collection was performed at Department Radiology, Hospital Universiti Sains Malaysia (HUSM), Kubang Kerian Kelantan.

3.3 Subject criteria

In stage 1, we only include those participants who met the inclusion requirements. In order to progress to stage 2, the participant must fulfill one of the requirements listed below (Binder et al., 2009; Nair et al., 2019) from inclusion and exclusion criteria, the subjects were included in the experiment. Claustrophobia, hypertension, diabetes or any psychiatric disease also represented exclusion criteria. Following (Dong et al., 2005; Mohd Isa et al., 2019), informed written consent was obtained from each participant after a full 15 min pre-test training session. Given this study's sample size atypical in behavioural studies, simulation studies had shown that eight participants in fMRI studies were enough to achieve 80% statistical power (Desmond and Glover, 2002; Murphy and Garavan, 2004).

3.3.1 Criteria for inclusion for stage 1 and stage 2:

- Malaysian citizen
- User of any facial product set
- Age from 18-54 years
- At least 11 years of education (at least Sijil Pendidikan Malaysia- SPM)

3.3.2 Criteria for exclusion for stage 2:

- Under the influence of some medicine that endangers working memory
- Surgery involving the brain
- Medical or psychiatric illness
- Orthopaedic or neurosurgery history
- Presence of MRI-contraindications
- Claustrophobia, pregnancy, metal implants

3.4 Questionnaire Development

This research began with a search of publications published in high-index journals and on themes relevant to the intention to purchase facial care products. Scopus was used to supplement the review without regard for category, subject area, or year of publication.

Following the critical literature selection process, this study developed a content analysis approach for 10 journal articles with a WOS index greater than one. As illustrated in Table 3.1, the sole dependent variable tested was purchase intention; however, additional variables such as subjective norms, perceived behavioral control, and attitude were included.

Table 3.1 Content Analysis of Prevalence Variables in Core Literature Article

Article No	SN	PBC	ATT	PI
A1	1	1	1	1
A2	1	1	1	1
A3	1	1	1	1
A4	1	1	1	1
A5	1	1	1	1
A6	1	1	1	1

A7	1	1	1	1
A8	1	1	1	1
A9	1	1	1	1
A10	1	1	1	1

Note : A1 = Tsai et al. (2020); A2 =Patel et al. (2020) ; A3 =Testa, Sarti, and Frey (2019) ; A4 = Singhal, Tripathy, and Jena (2019) ; A5 =Moon, Mohel, and Farooq (2019) ; A6 = Judge, Warren-Myers, and Paladino (2019); A7 =Carfora et al. (2019); A8 =Sreen, Purbey, and Sadarangani (2018); A9 =Yadav and Pathak (2017); A10 =Khor and Hazen (2017).

With 10 out of 10 core articles, the most prevalent signal for determining which elements influence a consumer's purchase intention was a combination of subjective norms, perceived behavioral control, and attitude (100%). As a result, the majority of empirical quantitative research on determining buy intention has focused on subjective norms, perceived behavioral control, and consumer attitude. Several studies, like Tsai et al. (2020), Yadav & Pathak (2017), Patel, Trivedi, and Yagnik (2020), Testa, Sarti, and Frey (2019) integrate purchasing intention into their research frameworks.

Additionally, to confirm the reliability and validity of all construct measures, the evaluation of convergent validity (CR) was performed to examine the source of measurement. The CR value greater than 0.80 is included in the summary of the measurement source in Table 3.6. The questionnaire used Likert scales for the majority of the items, ranging from 1 to 5, however for the dependent variable purchase intentions, seven-point Likert scales were used to stimulate respondents' interest.

3.5 Research Instrument

Research instrument in this study used a questionnaire survey to collect data. The questionnaire was a set of pre-defined questions used to record the respondents'